國立交通大學

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碩 士 論 文

轉換交易所對公司信用價差的影響

The Effects of Switching Exchange on Firms' Credit Spreads

研 究 生：鍾燕晴

指導教授：林建榮　博士

中 華 民 國 九 十 四 年 六 月

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轉換交易所對公司信用價差的影響

研究生：鍾燕晴　　　　　　　指導教授：林建榮 博士

國立交通大學財務金融研究所

摘要

本篇論文主要做實証研究，分析當公司轉換交易所後，信用價差的變化，是變大或變小此一現象，信用價差也就是公司債和政府公債之間殖利率的差。我也放入了幾個其他可能會影響信用價差的變數，來看看它們和信用價差之間的關係。樣本期間是 1998 到 2003 年從 AMEX(美國證券交易所)轉到 NYSE(紐約證券交易所)和 NASDAQ(證券處理人自動報價系統全國協會)轉到 NYSE(紐約證券交易所)的 34 家公司共 235 張債券。實證結果有一個最重要的發現，當公司從 AMEX 轉到 NYSE 和 NASDAQ 轉到 NYSE 均會使信用價差減少。另外一個主要的發現，不論是從 AMEX 轉到 NYSE 和 NASDAQ 轉到 NYSE，兩者是沒有差異的。

The Effects of Switching Exchange on Firms' Credit Spreads

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June 2005

ABSTRACT

The main purpose of this thesis is to report on the empirical results of an analysis of how credit spreads, the spreads between yields on corporate and government bonds, respond when a firm switches to another exchange. The relationship between credit spreads and several economic and financial variables were also analyzed. Data was collected from a sample of 235 bonds from 34 different issuers (firms) that moved from the American Stock Exchange (AMEX) to the New York Stock Exchange (NYSE) and from the National Association of Securities Dealers' Automated Quotations system (NASDAQ) to the NYSE during the period between 1998 - 2003. A key finding is that credit spreads decreased when firms switch from the AMEX to the NYSE and from the NASDAQ to the NYSE. The evidence is also conclusive and proves that whether a company moves from the NASDAQ to the NYSE or from the AMEX to the NYSE, the effects on credit spreads are similar. These results are consistent with intuition because switching will conduce to lower credit risk.

Keywords: Credit Spread; Switch; Exchange; NYSE; AMEX; NASDAQ; Credit Risk

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Contents

1. Introduction

For the past several decades, there have been a large number of companies switching their trading locations either from the over-the-counter (OTC) market, represented by the National Association of Security Dealers Automated Quotation (NASDAQ), to the national exchanges, represented by the New York Stock Exchange (NYSE) and American Stock Exchange (AMEX), or within the two national exchanges. Companies may be motivated to move trading location of their stocks to an alternate exchange in the belief that the change will improve the yield, and benefit shareholders in some manner. However, the evidence of whether shareholders are better off due to this action is inconclusive.

Generally speaking, listing increases a firm's visibility through announcements and receives more attention from financial analysts and investors. Moreover, listing on a national exchange, especially on the NYSE, is considered a prestigious milestone in corporate development. Additionally, because the criteria for listing on the NYSE are more stringent than those on the AMEX or the NASDAQ, switching firms that meet the criteria have been considered a positive signal about their future prospects. Furthermore, spreads between rates on corporate and government bonds should be affected due to expected default loss. Some corporate bonds will default and investors require a higher promised payment to compensate for the expected loss from defaults. Therefore, it is reasonable to assume that upward listing would decrease the expected default loss (risk) of their bond, and reduce the spreads of rates between corporate and government bonds.

Different from previous research which focused only on bid-ask spread of switching firms, this thesis is the first study of its kind to examine the effects on yield spread when a company moves trading location of its stock to a different exchange.

This paper is organized as follows. Section 2 presents the literature reviews. Section 3 presents the empirical tests conducted. The data is discussed, and the proxies and the methodology used are also defined. In Section 4, the estimation results are analyzed. Finally, Section 5 presents the findings and conclusions.

2. Literature Review

2.1 Reasons for Switching

Company management often provides numerous reasons for moving the trading locale of their stock (Baker and Johnson (1990)). One of the more frequently cited reasons is the desire by management to gain "prestige" for the company (Van Horne (1970)). Managers often believe that their firm will receive added attention from financial analysts and the investing public after listing. To be accepted to list on an organized exchange has been considered a signal of management's confidence in the company's future performance, perhaps because of the screening process involved in applying for listing (McConnell and Sanger (1984) and Ying, Lewellen, Schlarbaum, and Lease (1977)). Finally, but not unanimously supported in the literature is the argument that trading liquidity will improve when a common stock begins trading on an organized exchange (Sanger and McConnell (1986), Christie and Huang (1993), and Kadlec and McConnell (1994)).

2.2 Stock Performance after Switching

For more than five decades, researchers have found positive abnormal stock performance prior to listing, but negative abnormal performance subsequent to listing. Ule (1937), Van Horne (1970), Ying, Lewellen, Schlarbaum, and Lease (1977) and Sanger and McConnell (1986), among others, show that firms experience significantly positive stock returns prior to listing on the ASE or NYSE. Moreover, several studies report that the market reaction to the announcement that a firm is moving to either the ASE or NYSE is positive. Researches by Sanger and McConnell (1986), Grammatikos and Papaioannou (1986), and McConnell and Sanger (1987) show that announcements to change the current trading venue to a market with stricter standards will often show positive price reactions followed by negative return performance after the listing change.

In a more recent studies, Dharan and Ikenberry (1995) report that the negative post-listing drift for listing between 1962 and 1992 persists up to three years. Their full sample exhibits a cumulative abnormal return of -12.39% (significant at the 1% level) thirty-six months after listing. Even after they remove firms with initial public offerings (IPOs) or seasoned equity offerings (SEOs) before and after listing changes, the negative three-year drift persists, especially for stocks that move from NASDAQ to the NYSE or to the American Stock Exchange (AMEX).

McConnell and Sanger (1987) examine the post-listing returns of 2,482 companies that moved trading locations of their common stock from Curb/AMEX onto the NYSE during the period 1926 - 1982. They report that the average market-adjusted abnormal return in the first two months following listing is about -2 percent and find negative average abnormal returns in the subsequent ten months. Further findings indicate that negative post-listing performance was also not unique to U.S. markets. Hwang and Jayaraman (1993) report that companies listing on the Tokyo Stock Exchange also experienced poor post-listing performance.

2.3 Reasons for Negative Stock Performance after Switching

The worst-performing listings are those involving smaller firms and those not widely held by institutional investors. Dharan and Ikenberry suggest that these findings support the opportunistic timing hypothesis. Satisfying stricter initial listing criteria can be more difficult for some firms, especially those smaller in size and with less investor following. These firms may choose to switch their listings while experiencing strong performance, which may not be sustainable in the long run.

A portion of the poor post-listing performance is explained by the large frequency of exchange-listed firms that issue equity prior to listing on either the ASE or the NYSE. Loughran and Ritter (1995) show that the poor performance of listed firms is not a simple manifestation of the equity-issuance puzzle since poor post-listing performance is also observed in seasoned firms not involved in equity offerings. The evidence is consistent with the hypothesis that some managers may be opportunistically choosing when to apply for listing. This same rationale has been offered elsewhere in the literature to explain other long-run phenomena such as the poor stock price performance observed following initial and seasoned equity offerings (Loughran and Ritter (1995), Mikkelson and Shah (1994), Nelson (1994), and Spiess and Affleck-Graves (1995)).

On the other hand, Ikenberry, Lakonishok, and Vermaelen (1995) find that firms, on average, outperform the market when they undertake the opposite transaction and announce share repurchases. Thus, the evidence would appear to suggest that timing may be a general phenomenon affecting a variety of corporate decisions, including when to list, and that the market fails to fully anticipate this behavior.

2.4 Credit Spread

Two approaches for pricing derivative securities have been popular in the last decade. The first approach views these derivatives as contingent claims, not on the financial securities themselves, but as “compound options” on the assets underlying the financial securities. This is the case, for example, with the pricing of imbedded options on corporate debt (Merton (1974, 1977), Black and Cox (1976), Ho and

Singer (1982), Chance (1990), and Kim, Ramaswamy, and Sundaresan (1993)) or the pricing of vulnerable options (Johnson and Stulz (1987)). In practice, this valuation methodology is difficult to use due to two reasons. Firstly, the assets underlying the financial securities are often not tradable. This makes application of the theory and estimation of the relevant parameters problematic because their values are not observable. Secondly, all of the other liabilities of the firm prior to the corporate debt must first (and simultaneously) be valued. As a result, this approach has not proven very effective in practice for pricing corporate liabilities (Jones, Mason, and Rosenfeld (1984)) due to it being computationally difficult. As a pragmatic alternative, the second approach to pricing derivative securities involving credit risk is to ignore the credit risk and price the imbedded options as default-free interest rate options (Ho and Singer (1984), and Ramaswamy and Sundaresan (1986)). This approach, however, is inconsistent due to the absence of arbitrage and the existence of spreads between the yields on corporate debt and Treasuries.

Next, these studies focus on corporate bond returns and their yield changes. The credit spread represents the premium that is required in order to hold an instrument subject to credit risk; it is commonly expressed as a yield differential. Since the 1970s there have been extensive studies on the pricing of credit risk. The credit risk models can be divided into two major groups. The so-called structural-form models, by Merton (1974) and the reduced-form models, also known as intensity-based models, represented by Jarrow and Turnbull (1995), Duffie and Singleton (1999), Madan and Unal (1999) and Hull and White (2000).

Merton’s model explicitly evaluates the firm value process and values corporate bonds using modern option theory. In Merton’s world, a firm issues two types of assets: equities and bonds. A default happens if the total asset value falls below a default threshold. This standard theoretical paradigm for modeling credit risks is the contingent claims approach pioneered by Black and Scholes (1973) who demonstrated that equity and debt can be valued using contingent-claims analysis. Much of the literature follows Merton (1974) by explicitly linking the risk of a firm's default to the variability in the firm's asset value. Although this line of research has proven very useful in addressing the qualitatively important aspects of pricing credit risk, it has been less successful in practice.

The Reduced-form models typically treat default as a random stopping time with a stochastic arrival intensity. The credit spread is determined by risk neutral valuation under the absence of arbitrage opportunities.

2.5 The Relation between Credit Spread and Risk-free Interest Rate

Over the last two decades, the Merton model has been extended in several ways by relaxing some of its restrictive assumptions (for example, Geske (1977), Black and Cox (1976), Leland (1994), Longstaff. and Schwartz (1995), and Leland and Toft (1996)). However, the main factors such as the risk-free rate, asset value, asset volatility and their effects on credit spread are common to all of these models.

Merton (1974) argues that the impact of a higher risk-free rate should tighten the corporate spread because higher risk-free rates increase the value of corporate debt. Empirical studies such as Morris, Neale, and Rolph (1998) and Bevan and Garzarelli (2000) using data stretching back to the 1960s find the opposite relationship. Collin-Dufresne, Goldstein, and Martin (2001) using more recent data are in favor of the theoretical conjecture. Merton also demonstrates that the value of corporate bonds subject to default risk is a function of several other factors in addition to the risk-free rate: the underlying value of the firm, the face value of the debt, the volatility of the firm's underlying assets, and the time to maturity of the bond. Hence, the underlying value of the firm and the volatility of that firm's value are also key determinants of the credit spread.

The negative relation between yield spread changes and Treasury rate changes documented by Duffee (1998), and Longstaff and Schwartz (1995) could be due to two related factors: (1) changes in rates are correlated with future economic conditions and hence expected default losses and/or (2) changes in Treasury rates are correlated with the market prices of risk or liquidity. If Treasury rate changes are correlated with the market price of risk or liquidity, then adding variables that proxy for the prices of liquidity or risk will reduce the strength of any negative relation between corporate bond yield spreads and interest rates.

Davies (2004) develops the empirical line of inquiry using a recent data history, and applies a new set of regime-switching estimators that have recently gained in popularity. Key findings are that the corporate spread is inversely related to the risk-free rate in the long run, a result at odds with the finding of Morris, Neale, and Rolph (1998) and Bevan and Garzarelli (2000): increases in the risk-free rate induce a widening of credit spreads.

2.6 Determinants of the Credit Spread

The Longstaff and Schwartz (1995) model assume that the value of the firm follows a standard Wiener process, yield spreads decline with the ratio of assets to liabilities, the rate of growth of the firm's assets, and the level of interest rates. Yield spreads are positively related to the volatility of the firm value process and the write down from the face value of debt securities in the event of default.

As with asset volatility, an increase in equity volatility increases the probability that the put option will be exercised and therefore credit spreads will increase (for example, Ronn and Verma (1986) and Jones et al. (1984)).

Option models typically used in the structural approach assume perfect and complete markets where trading takes place continuously. This implies that liquidity risk does not affect credit spreads. However, Collin-Dufresne et al. (2001), Houweling et al. (2002), and Perraudin and Taylor (2003) find evidence that liquidity significantly influences credit spreads (changes). Investors are only willing to invest in less liquid assets compared to similar liquid assets at a higher premium. If the liquidity risk were similar for government and corporate bonds, the liquidity premium should be cancelled out when taking the difference between the two yields. However, government bond markets are larger and more liquid than corporate bond markets. Therefore, an investor may expect some reward for the lower liquidity in corporate bond markets.

According to Brown (2001), the corporate bond yield spread consists of: (1) a default margin, (2) a risk premium and (3) a liquidity premium. Existing theoretical models of credit spreads (Longstaff and Schwartz (1995), Leland (1994) and Leland and Toft (1996) for example) derive the level of the default margin component of the credit spread as a function of the characteristics of the bond, the issuer's liabilities and the issuer's assets. Brown shows that credit spread volatility and the sensitivity of credit spreads to changes in economic conditions are clearly related to the credit quality and maturity of a corporate bond. These relations are largely consistent with predictions from the Longstaff and Schwartz (1995) model of the default margin of credit spreads. Further evidence shows that a considerable portion of yield spread volatility is due to changes in the non-default margin components of the corporate bond yield spread. The high explanatory power of the spread beta models is consistent with Collin-Dufresnse, Goldstein and Martin (1999) who find that errors from their time series models of spread changes for individual portfolios are highly correlated. Thus, (1) corporate bond yield spreads are driven by common factors that drive expected default losses and important factors have not been identified and/or (2) much of the variation in corporate bond yield spreads result from changes in non-default margin factors. After that, Collin-Dufresne, Goldstein, and Martin (2001) use Lehman Brothers data at a disaggregated level making a distinction between credit spreads for different rating categories and two maturity classes to examine the changes in corporate spreads from 1988 through 1997 at a monthly frequency. They find evidence to support the theoretical role of the risk-free rate and also find additional explanatory power in aggregate equity returns, equity market volatility, and a proxy for individual firm leverage. Collin-Dufresne et al. also conclude that aggregate factors are much more important than firm-specific factors in explaining credit spread changes.

Masazumi Hattori, Koji Koyama and Tatsuya Yonetani (2001) conducted empirical tests on the relationship between credit spreads and several economic and financial variables in Japan's bond market after 1997. They attempted regression analyses to examine the relation between variation in credit spread and the regressors in the regression equation which are total liabilities of bankrupt firms, Tibor (Tokyo Interbank offered rate)-Libor spread, five-10 year government bond spread, ratio of the volume of new corporate bond issues to that of new government bond issues, value of government bonds outstanding, monetary base, and lag of credit spread. A key finding is that default risk and the overall financial situation in Japan were the most significant factors in explaining the credit spread.

3. Empirical Analysis

3.1 Data Description

Our objective is to investigate how well the variables identified below explain observed changes in credit spread.

All 431 firms that switched their stock listings between 1 January 1998 to 31

December 2003 are selected from CRSP daily database (exchange code (EX) 1: NYSE, 2: AMEX, 3: NASDAQ). Out of the complete set, the corporate bond yield daily data of 93 firms are obtained from Bloomberg because there is no corporate bond yield data available before 1998 in Bloomberg. Then, we base on the following filtering criteria. (The following filtering criteria are then used:)

(i) Only yields on noncallable, nonputtable bond of industrial firms are used;

(ii) Corporate bonds for maturities of 2, 3, 5, 7, 10, and 30 year are used over the period January 1998 through December 2003;

(iii) There are at least 150 days with valid yields for the bond during the sample period.

As mentioned, there is no corporate bond yield data sufficient for analysis before 1998, and there are few data available from the NYSE to the AMEX, the NYSE to the NASDAQ, the AMEX to the NASDAQ, and the NASDAQ to the AMEX. These restrictions generate a final sample of 235 bonds from 34 different issuers, which switch from the NASDAQ to the NYSE and the AMEX to the NYSE only. Therefore, only 34 observations from January 1998 to December 2003 are suitable for time-series regressions.

1. Credit Spreads. To determine the credit spread, CS_t^i, for bond *i* at day *t*, the Benchmark Treasury rates from Datastream for maturities of 2, 3, 5, 7, 10, and 30 years are used. Credit spreads are then defined as the difference between the yield of bond *i* and the associated yield of the Treasury with the same maturity.

2. Treasury Rate Level. Datastream's daily series of 10-year Benchmark Treasury rates, $r_{t,10}$ is used. To capture potential nonlinear effects due to convexity,

the squared level of the term structure, $(r_{t,10})^2$ is also included.

3. Slope of Yield Curve. We define the slope of the yield curve as the difference between Datastream's 10-year and 2-year Benchmark Treasury yields. ($slope_t \equiv (r_{t,10} - r_{t,2})$) We interpret this proxy as both an indication of expectations of future short rates and as an indication of overall economic health.

4. Firm Equity Return. We note that previous studies of yield changes have often used the firm's equity return rather than changes in leverage to proxy for the changes in the firm's health. So, for each bond i, we use each firm's daily equity return, ret_t^i, obtained from CRSP, as an explanatory variable.

5. Changes in Business Climate. We use daily S&P 500 returns, *S&Pt*, as a proxy for the overall state of the economy. The data are obtained from CRSP.

6. Dummy. As mentioned, there are few data available from the NYSE to the AMEX, the NYSE to the NASDAQ, the AMEX to the NASDAQ, and the NASDAQ to the AMEX. Thus, a final sample of 235 bonds from 34 different firms includes the data that switch from the NASDAQ to the NYSE and the AMEX to the NYSE only. A dummy variable (or an indicator variable), D_t^i, is coded 1 after the switch and 0 before the switch in our time-series regression to show whether credit spreads increase or decrease after these firms switch to another exchange. A dummy variable is coded 1 for NASDAQ -to -NYSE and 0 for AMEX -to -NYSE in our cross-sectional regression to show that if the effects on credit spreads are different when these firms move from different exchange, i.e. the NASDAQ or the AMEX, to the NYSE.

3.2 Test Methodology

In this section, we adopt regression analysis to examine the relation between credit spread and the variables introduced in the last section.

We estimate regressions that model the determinants of credit spread in the following model with a dummy regressor. First, we run the multivariate time-series regressions of an individual firm, and then run the cross-sectional regression. The main purpose of the time-series regression for individual bond ***i*** of 34 firms over the period January 1998 to December 2003 is to analyze that whether credit spreads, the spreads between yields on corporate and government bonds, increase or decrease when firms switch from the AMEX to the NYSE and from the NASDAQ to the NYSE, which has stricter restriction of listing. The regression also includes several economic and financial variables to capture effects of determinants on credit spreads changes.

Accordingly, if the dummy variable is significant for individual firm in the multivariate analyses, it is reasonable to assume that risks of these switching firms would somehow been decreased, i.e. a decrease in credit spreads.

The purpose of the cross-sectional model for each sample bond ***i*** at each firm's switching date ***t*** over the period January 1998 to December 2003 is to prove that whether a company moves from the NASDAQ to the NYSE or from the AMEX to the NYSE, the effects on credit spreads are similar or not. We analyze if there exists difference between switching of two situations, from the NASDAQ to the NYSE and from the AMEX to the NYSE. If the effects on credit spreads are similar no matter which exchange the switching originated from due to both groups listing on the same exchange, both switching will conduce to lower credit risk.

For each bond ***i*** at date ***t*** with credit spread CS_t^i, we estimate the following time-series regression:

$$CS_t^i = a + b_1^i ret_t^i + b_2^i \Delta r_{t,10} + b_3^i (\Delta r_{t,10})^2 + b_4^i \Delta slope_t + b_5^i S\&P_t + b_6^i D_t^i + e_t^i$$

All the variables (the regress and the regressors) in the regression equation are explained as follows:

CS_t^i : credit spread ;

ret_t^i : each firm's daily equity return ;

$r_{t,10}$: daily series of 10-year Benchmark Treasury rates ;

$(r_{t,10})^2$: squared level of the term structure ;

$slope_t$: the slope of yield curve is the difference between 10-year and 2-year Benchmark Treasury yields ;

$S\&P_t$: daily S&P 500 returns ;

D_t^i : a dummy variable. D=1 after –switching

D=0 before-switching

For each bond *i* at date *t* with credit spread CS_t^i, we estimate the following cross-sectional regression:

$$CS_t^i = a + b_1^i ret_t^i + b_2^i \Delta r_{t,10} + b_3^i (\Delta r_{t,10})^2 + b_4^i \Delta slope_t + b_5^i S\&P_t + b_6^i D_t^i + e_t^i$$

All the variables (the regress and the regressors) in the regression equation are explained as follows:

CS_t^i : credit spread ;

ret_t^i : each firm's daily equity return ;

$r_{t,10}$: daily series of 10-year Benchmark Treasury rates ;

$(r_{t,10})^2$: squared level of the term structure ;

$slope_t$: the slope of yield curve is the difference between 10-year and 2-year Benchmark Treasury yields ;

$S\&P_t$: daily S&P 500 returns ;

D_t^i : a dummy variable. D=1 if switching from NASDAQ to NYSE

D=0 if switching from AMEX to NYSE

(t is the exchange date of individual firms)

Table 1 summarizes the predicted sign of the correlation between changes in credit spreads and changes in the underlying variable. The variable ret_t^i is firm equity return with predicted negative correlation. The variable $\Delta r_{t,10}$ is change in yield on 10-year Treasury with predicted negative correlation. The variable $\Delta slope_t$ is change in 10-year minus 2-year Treasury yields with predicted negative correlation. The variable $S\&P_t$ is return on S&P 500 with predicted negative correlation. The variable D_t^i is dummy variable with predicted negative correlation.

Table 2 summarizes the descriptive statistics of credit spreads which are divided into two parts, before and after switching. We use data at a disaggregated level making a distinction between credit spreads for two parts and six maturity classes to examine the mean, median, std. deviation, minimum, maximum of credit spreads from 1998 through 2003 at a daily frequency.

Table 1

Explanatory Variables and Expected Signs on the Coefficients of the Regression:

$$CS_t^i = a + b_1^i ret_t^i + b_2^i \Delta r_{t,10} + b_3^i (\Delta r_{t,10})^2 + b_4^i \Delta slope_t + b_5^i S\&P_t + b_6^i D_t^i + e_t^i$$

Variable	Description	Predicted Sign
ret_t^i	Firm Equity Return	-
$\Delta r_{t,10}$	Change in yield on 10-year Treasury	-
$\Delta slope_t$	Change in 10-year minus 2-year Treasury yields	-
$S\&P_t$	Return on S&P 500	-
D_t^i	Dummy Variable	-

Table 2

Descriptive statistics of credit spreads are divided into two parts, before and after switching:

Statistics	Mean		Median		Std. Deviation		Minimum		Maximum	
	(before)	(after)	(before)	(after)	(before)	(after)	(before)	(after)	(before)	(after)
Two	—	0.198474	—	0.083	—	0.350827	—	-0.6151	—	1.596
Three	—	0.192596	—	0.008	—	0.594643	—	-1.724	—	1.933
Five	0.62706	0.364869	0.92545	0.1494	1.83581	1.27283	-4.7226	-53.4798	7.0579	24.1023
Seven	0.592335	0.889905	0.4355	0.1474	1.512808	8.38908	-7.6332	-15.678	14.547	902.4448
Ten	1.529869	3.350785	0.9692	0.9724	3.749798	237.5509	-3.5952	-4.2016	519.472	48329.44
Thirty	1.118936	1.863425	0.962	1.7406	0.824494	1.328071	-4.7017	-4.8529	5.327	8.7485

4. Empirical Results

The credit spread *CS* (*t*) is defined as *CS* (*t*)= *CS (Vt , rt ,* $\{X_t\}$), where *V* is firm value, *r* is the spot rate, and $\{X_t\}$ represents all of the other "state variables" used for specifying the model (see Collin-Dufresne, Goldstein, and Martin (2001)). Since credit spreads are determined given the current values of the state variables, it follows that structural models generate predictions for what the theoretical determinants of credit spreads should be, and moreover offer a prediction for whether changes in these variables should be positively or negatively correlated with credit spreads. In accordance with the proxies for explanatory variables of credit spreads, each determinant is discussed individually.

The tables below report OLS estimates of the regression, and summary statistics of the distribution of coefficient estimates are presented. Table 3 shows the integrated data table of individual firm's time series regression, and summarizes the estimation coefficients and the p-values of explanatory variables in the time-series regression for 34 switching firms. Permanent code (PERMCO) of 34 firms refer to appendix. Table 4 summarizes the estimation coefficients and p-values of explanatory variables in the cross-sectional regression at each firm's switching date. We use 5% significant level. If p-value is less than 0.05, there is statistically significant relation between credit spread and the variables introduced above.

Most of the variables investigated in the regressions have some ability to explain changes in credit spreads. Further, the signs of the estimated coefficients generally agree with theory.

From Table 3, the firm equity return ret_t^i is with predicted negative sign, but not statistically significant, for most (almost 91%) firms in the multivariate analyses. Indeed, the factor loading on the S&P 500 return is typically several times larger than the loading on the firm's own equity return. This is the first indication that daily

Table 3

Estimation Coefficients of Explanatory Variables of the Time-Series Regression: For individual bond *i* of 34 firms with credit spread CS_t^i over the period January 1998 to December 2003, we estimate the following regression: $CS_t^i = a + b_1^i ret_t^i + b_2^i \Delta r_{t,10} + b_3^i (\Delta r_{t,10})^2 + b_4^i \Delta slope_t + b_5^i S\&P_t + b_6^i D_t^i + e_t^i$ Note: Figures in the upper rows of variables indicate coefficients, and figures in ( ) indicate their *p-values.*

	Variable					
PERMCO	ret_t^i	Δr_t^{10}	$(\Delta r_t^{10})^2$	$\Delta slope_t$	$S\&P_t$	D_t^i
4521	-0.655311	-0.255523	0.315343	-0.095941	-0.824065	-0.390127
	(0.0447)**	(0.0731)*	(0.8077)	(0.0000)***	(0.2496)	(0.0000)***
11108	-1.003842	-0.178302	4.120822	-0.458060	-0.446828	-2.960317
	(0.0182)**	(0.5244)	(0.0981)*	(0.0000)***	(0.7531)	(0.0000)***
2381	-0.061292	-0.342085	-0.581783	0.451428	-1.383366	-0.287029
	(0.9035)	(0.0203)**	(0.6698)	(0.0000)***	(0.0443)**	(0.0000)***
16061	-0.007279	-1.279810	-13.78461	2.688810	-1.085748	-1.176969
	(0.0029)***	(0.0784)*	(0.0928)*	(0.0000)***	(0.7105)	(0.0000)***
22031	-1.894951	-0.643887	14.98827	1.777131	-4.460996	-3.484373
	(0.3611)	(0.6305)	(0.2025)	(0.0000)***	(0.5608)	(0.0000)***
5651	-0.805781	-0.043372	9.289033	-0.149044	-0.450778	-0.961356
	(0.2313)	(0.9286)	(0.0413)**	(0.0000)***	(0.8434)	(0.0000)***
14237	-0.010355	-0.278667	11.39779	-5.550929	-2.625212	-1.040966
	(0.3452)	(0.7503)	(0.2770)	(0.0000)***	(0.5562)	(0.0000)***
13665	-13.21044	-11.84481	388.0689	-187.6909	-462.9410	-75.01070
	(0.6509)	(0.8607)	(0.4972)	(0.0000)***	(0.0749)*	(0.0000)***
15602	-12.13866	-3.675929	106.2136	-2.062926	-13.68298	-10.52311
	(0.0002)***	(0.2726)	(0.0007)***	(0.0145)**	(0.4334)	(0.0000)***
2589	-0.652810	-1.356061	-9.980395	-1.813234	-0.525127	-5.958353
	(0.8178)	(0.3181)	(0.3682)	(0.0007)***	(0.9482)	(0.0000)***
2801	-0.099259	-0.418296	2.360247	0.072286	-0.865748	-0.563111
	(0.7500)	(0.0000)***	(0.0046)***	(0.0000)***	(0.0396)**	(0.0000)***
12318	-3.740239	-1.642038	-32.01164	13.19793	-1.993312	-6.547389
	(0.4824)	(0.7778)	(0.5653)	(0.0000)***	(0.9331)	(0.0000)***
15946	-0.329215	-1.091962	100.1578	-2.104894	-22.82828	-1.023206
	(0.9183)	(0.7240)	(0.0017)***	(0.0364)**	(0.0598)*	(0.0135)**
9662	0.073043	-0.305453	-2.308288	1.693512	-1.212264	-0.399391
	(0.9109)	(0.2558)	(0.3365)	(0.0000)***	(0.4136)	(0.0000)***
15545	-0.002775	-0.017007	8.281434	1.613494	-0.325332	-0.115407
	(0.8448)	(0.9609)	(0.0166)**	(0.0000)***	(0.8317)	(0.0123)**
3306	-0.308195	-0.310802	1.396296	0.203844	-0.923668	-0.592285

	(0.4545)	(0.0051)***	(0.1759)	(0.0000)***	(0.0892)*	(0.0000)***
5238	-0.554699	-0.623574	7.853321	0.100903	-0.391316	-0.452398
	(0.4116)	(0.0615)*	(0.0086)***	(0.0013)***	(0.8057)	(0.0000)***
11070	-0.132386	-0.220789	2.312423	0.243813	-0.224246	-0.730106
	(0.8587)	(0.5712)	(0.5123)	(0.0000)***	(0.9056)	(0.0000)***
32056	-0.010063	-0.276256	0.256787	-0.355753	-0.367927	-1.534557
	(0.1608)	(0.1153)	(0.8772)	(0.0000)***	(0.6521)	(0.0000)***
14915	-4.471458	-1.578867	-25.57000	-1.920075	-23.91885	-11.06217
	(0.2998)	(0.5786)	(0.3219)	(0.0000)***	(0.1362)	(0.0000)***
16268	-2.828522	-1.428096	-7.093392	-1.833114	-3.835661	-7.699108
	(0.1522)	(0.3361)	(0.6087)	(0.0000)***	(0.6282)	(0.0000)***
17927	-1.634623	-15.54375	119.6268	2.478028	-9.161650	-2.794500
	(0.6332)	(0.0013)***	(0.0159)**	(0.0000)***	(0.6629)	(0.0036)***
6959	0.054605	-0.099826	0.167400	-0.253459	-2.739742	-1.149146
	(0.9565)	(0.8261)	(0.9651)	(0.0340)**	(0.2880)	(0.0000)***
11735	-0.748626	-0.086811	8.661405	1.483341	-0.626670	-0.179802
	(0.0075)***	(0.7155)	(0.0001)***	(0.0000)***	(0.5838)	(0.0005)***
15961	-6.760593	-0.421655	8.981914	0.031911	-2.434223	-4.414141
	(0.0000)***	(0.6613)	(0.2652)	(0.8195)	(0.6078)	(0.0000)***
1523	-6.751421	-5.345427	46.94720	-8.582602	-11.13392	-7.612228
	(0.0621)*	(0.0919)*	(0.1640)	(0.0000)***	(0.4305)	(0.0000)***
8782	-0.626539	-0.273008	1.274711	0.013854	-1.083500	-1.190992
	(0.1923)	(0.1779)	(0.5484)	(0.4967)	(0.2937)	(0.0000)***
11857	-1.038704	-0.763778	2.399365	0.522031	-0.144656	-0.527809
	(0.2991)	(0.0361)**	(0.4957)	(0.0004)***	(0.9279)	(0.0000)***
7558	1.156306	-0.905226	-16.62551	0.312814	-5.960221	-2.103284
	(0.6752)	(0.5851)	(0.2415)	(0.6450)	(0.5182)	(0.0000)***
1718	-0.284562	-0.265119	1.234463	-0.414228	-0.530485	-0.632999
	(0.5250)	(0.0654)*	(0.3060)	(0.0000)***	(0.4951)	(0.0000)***
12007	-1.921404	-1.549813	-4.120985	-0.146276	-7.356438	-7.198410
	(0.4030)	(0.2569)	(0.7672)	(0.8103)	(0.4434)	(0.0000)***
2510	-3.432860	-0.298105	0.872629	-0.461800	-2.379282	-0.140510
	(0.1049)	(0.5577)	(0.8559)	(0.4062)	(0.7082)	(0.2155)
11418	-11.13956	-0.526205	11.64840	1.704753	-9.703993	-0.299097
	(0.0312)**	(0.8178)	(0.5749)	(0.0000)***	(0.3958)	(0.5101)
41465	-2.148436	-1.197619	9.533713	-2.134763	-0.411941	-0.100361
	(0.2370)	(0.0921)*	(0.2521)	(0.0000)***	(0.9415)	(0.6553)
Average	-2.29767370	-1.6202332	22.243631	-5.5128857	-17.617042	-4.7310502

changes in firm-specific attributes are not the driving force in credit spread changes (Collin-Dufresne, Goldstein, and Martin (2001)). Then, Collin-Dufresne, Goldstein, and Martin (2001) also demonstrate that the apparently weak explanatory power of firm-specific variables is not due to potential collinearity with the market return *S&Pt*.

We expect a negative relation between the risk-free rate and the credit spread. The drift of the risk-neutral process of the value of the assets, which is the expected growth of the firm's asset value, equals the risk-free interest rate. An increase in the interest rate implies an increase in the expected growth rate of the firm's asset value. This will in turn reduce the probability of default and the credit spread (see Longstaff and Schwartz (1995)). This prediction is borne out in their data. Further evidence is provided by Duffee (1998), who uses a sample restricted to noncallable bonds and finds a significant, albeit weaker, negative relationship between changes in credit spreads and interest rates. Furthermore, lower interest rates are usually associated with a weakening economy and thus higher credit spreads.

Our result is consistent with the empirical findings of Longstaff and Schwartz (1995) and Duffee (1998), we find that an increase in the risk-free rate lowers the credit spread for all bonds. Once again, this finding can be explained by noting that an increase in drift decreases the risk-neutral probability of default, and that the closer firms are to the default threshold, the more sensitive they are to this change.

The expectations hypothesis of the term structure implies that the slope of the default-free term structure (the Treasury yield curve slope), which is often measured as the spread between the long-term and the short-term rate, is an optimal predictor of future changes in short-term rates over the life of the long-term bond. As such, an increase in the slope implies an increase in the expected short-term interest rates. As in the case of the motivation for the risk-free interest rate above, it should also lead to a decrease in credit spreads. Although the spot rate is the only interest-rate-sensitive factor that appears in the firm value process, the spot rate process itself may depend upon other factors as well. For example, Litterman and Scheinkman (1991) and Chen and Scott (1993) find that the two most important factors driving the term structure of interest rates are the level and slope of the term structure. Furthermore, the slope of the term structure is often related to future business cycle conditions (see, for example, Estrella and Hardouvelis (1991), Bernard and Gerlach (1998), and Estrella and Mishkin (1995, 1998)). A decrease in the slope is considered to be indicators of a weakening economy. It is reasonable to believe that the expected recovery rate might decrease in times of recession. A positively sloped yield curve is associated with improving economic activity, which might in turn increase a firm's growth rate and reduce its default probability. This strengthens our expectations of a negative relation between the slope and the credit spread.

Overall, convexity of the term structure is not significant statistically. Slope of the term structure is statistically significant for 44% firms in the multivariate analyses only. As expected, it has a negative impact for half firms in the multivariate analyses.

Even if the probability of default remains constant for a firm, changes in credit spreads can occur due to changes in the expected recovery rate. The expected recovery rate in turn should be a function of the overall business climate (Collin-Dufresne, Goldstein, and Martin (2001)).

The return of the S&P 500 is insignificant statistically. Estimated coefficients have the same sign for all firms. As expected, it has a negative impact.

Generally speaking, listing increases a firm's visibility through announcements and receives more attention from financial analysts and investors. Moreover, listing on the national exchange, especially on the NYSE, is considered a prestigious milestone in corporate development. Additionally, because the criteria for listing on the NYSE are more stringent than those on the AMEX or the NASDAQ, switching firms that meet the criteria have been considered a positive signal about their future prospects. Accordingly, it is reasonable to assume that risks of switching firms would somehow been decreased.

In the time-series regressions of a sample of 235 bonds from 34 firms during the period 1998 - 2003, the dummy variable, D_t^i, is statistically significant for 91% firms in the multivariate analyses. The sign, as expected, indicates that after these firms switch to NYSE, which has stricter restriction of listing, triggers a decrease in credit spreads. The behavior is relatively homogeneous across all firms.

Table 4 summarizes the estimation coefficients and p-values of explanatory variables in the cross-sectional regression at each firm's switching date.

As in the case of the motivation for the time-series regressions above, in the cross-sectional regression, the dummy variable is statistically insignificant at 5% significant level. The evidence also proves that whether a company moves from the NASDAQ to the NYSE or from the AMEX to the NYSE, the effects on credit spreads are similar, no matter which exchange the switching originated from due to both groups listing on the same exchange.

Table 4

Estimation Coefficients and P-Values of Explanatory Variables of the Cross-Sectional Regression:

For each sample bond ***i*** at date ***t*** with credit spread CS_t^i over the period January 1998 to December 2003, the following regression is assumed:

$$CS_t^i = a + b_1^i ret_t^i + b_2^i \Delta r_{t,10} + b_3^i (\Delta r_{t,10})^2 + b_4^i \Delta slope_t + b_5^i S\,\&\,P_t + b_6^i D_t^i + e_t^i$$

t is exchange date for each firm.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-5.828633	3.015136	-1.933124	0.0552*
DR10	-1.900905	4.476551	-0.424636	0.6717
DR10_2	103.4797	45.36812	2.280890	0.0240**
R10_R2	-0.217467	0.235489	-0.923474	0.3573
S_P_RETURN	-7.863237	15.70653	-0.500635	0.6174
DUMMY	-0.273481	1.505869	-0.181610	0.8561
C	2.430080	1.434022	1.694590	0.0923*
Adjusted R-squared	0.023484	R-squared		0.062807
Log likelihood	-335.9307	F-statistic		1.597204
Durbin-Watson stat	1.562411	Prob(F-statistic)		0.152089

Note: White Heteroskedasticity-Consistent Standard Errors & Covariance

5. Conclusions

In this paper, we mainly analyze whether the sensitivity of credit spread changes to the firms that switch their locations is significant. Using data of 34 firms that switched from the American Stock Exchange (AMEX) to the New York Stock Exchange (NYSE) and from the National Association of Securities Dealers' Automated Quotations system (NASDAQ) to the NYSE during the period 1998 -2003, we first examine the changes in credit spreads of individual 34 firms that switching to NYSE by adopting a multivariate time-series regression approach. The regression also includes several economic and financial variables to capture effects of determinants on credit spreads changes.

First, we find the dummy variable is statistically significant for almost all firms in the multivariate analyses. The sign, as expected, indicates that after these firms switch to NYSE, which has stricter restriction of listing, triggers a decrease in credit spreads. Second, we find the firm equity return is negative for most firms in the multivariate analyses. It is consistent with the results of Collin-Dufresne, Goldstein, and Martin (2001). Third, we find that an increase in the risk-free rate lowers the credit spread for all bonds. It is consistent with the empirical findings of Longstaff and Schwartz (1995) and Duffee (1998). Fourth, the slope of the term structure is statistically significant for most firms in the multivariate analyses. As expected, it has a negative impact. Fifth, the estimated coefficients of the return of the S&P 500 have the same sign for all firms. As expected, it has a negative impact.

Finally, we analyze if there exists difference between switching of two situations, from the NASDAQ to the NYSE and from the AMEX to the NYSE. In the cross-sectional regression, the dummy variable is statistically insignificant. The evidence indicates that there is no difference in credit spreads no matter which exchange the switching originated from. They both switch to the same terminus. This result is also intuitive.

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Appendix

Table 1

Company Name: TOYOTA MOTOR CORP (4521)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.655311	0.326475	-2.007233	0.0447**
DR10	-0.255523	0.142587	-1.792045	0.0731*
DR10_2	0.315343	1.295599	0.243396	0.8077
R10_R2	-0.095941	0.010552	-9.092572	0.0000***
S_P_RETURN	-0.824065	0.715737	-1.151351	0.2496
DUMMY	-0.390127	0.030990	-12.58877	0.0000***
C	0.384637	0.025544	15.05807	0.0000***
R-squared	0.009876	Durbin-Watson stat		0.010625
Adjusted R-squared	0.009556	F-statistic		30.83773
Log likelihood	-29452.09	Prob(F-statistic)		0.000000

Table 2

Company Name: ALLIED WASTE INDUSTRIES INC (11108)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-1.003842	0.425169	-2.361041	0.0182**
DR10	-0.178302	0.280097	-0.636573	0.5244
DR10_2	4.120822	2.490700	1.654483	0.0981*
R10_R2	-0.458060	0.020632	-22.20114	0.0000***
S_P_RETURN	-0.446828	1.420168	-0.314630	0.7531
DUMMY	-2.960317	0.036855	-80.32400	0.0000***
C	1.497497	0.026532	56.44123	0.0000***
R-squared	0.456632	Durbin-Watson stat		0.020086
Adjusted R-squared	0.456225	F-statistic		1121.059
Log likelihood	-14402.55	Prob(F-statistic)		0.000000

Table 3

Company Name: ENBRIDGE INC (2381)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.061292	0.505363	-0.121283	0.9035
DR10	-0.342085	0.147431	-2.320311	0.0203**
DR10_2	-0.581783	1.364270	-0.426443	0.6698
R10_R2	0.451428	0.019426	23.23867	0.0000***
S_P_RETURN	-1.383366	0.687918	-2.010948	0.0443**
DUMMY	-0.287029	0.039699	-7.230131	0.0000***
C	1.470314	0.014307	102.7662	0.0000***
R-squared	0.030457	Durbin-Watson stat		0.004895
Adjusted R-squared	0.030333	F-statistic		245.0523
Log likelihood	-96660.94	Prob(F-statistic)		0.000000

Table 4

Company Name: S F X ENTERTAINMENT INC (16061)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.007279	0.002389	-3.046574	0.0029***
DR10	-1.279810	0.720358	-1.776631	0.0784*
DR10_2	-13.78461	8.127695	-1.696005	0.0928*
R10_R2	2.688810	0.151199	17.78325	0.0000***
S_P_RETURN	-1.085748	2.917725	-0.372121	0.7105
DUMMY	-1.176969	0.064988	-18.11043	0.0000***
C	3.167933	0.045031	70.34931	0.0000***
Adjusted R-squared	0.878483	R-squared		0.884879
Log likelihood	-21.08617	F-statistic		138.3567
Durbin-Watson stat	0.707395	Prob(F-statistic)		0.000000

Table 5

Company Name: ALARIS MEDICAL SYSTEMS INC (22031)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-1.894951	2.073616	-0.913839	0.3611
DR10	-0.643887	1.337969	-0.481242	0.6305
DR10_2	14.98827	11.75204	1.275377	0.2025
R10_R2	1.777131	0.273725	6.492395	0.0000***
S_P_RETURN	-4.460996	7.665960	-0.581923	0.5608
DUMMY	-3.484373	0.218063	-15.97877	0.0000***
C	-1.314353	0.571143	-2.301268	0.0216**
Adjusted R-squared	0.378078	R-squared		0.382266
Log likelihood	-2100.835	F-statistic		91.27609
Durbin-Watson stat	0.012422	Prob(F-statistic)		0.000000

Table 6

Company Name: N B T Y INC (5651)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.805781	0.672869	-1.197531	0.2313
DR10	-0.043372	0.483863	-0.089637	0.9286
DR10_2	9.289033	4.547345	2.042737	0.0413**
R10_R2	-0.149044	0.030512	-4.884786	0.0000***
S_P_RETURN	-0.450778	2.281521	-0.197578	0.8434
DUMMY	-0.961356	0.141638	-6.787442	0.0000***
C	4.627431	0.042271	109.4693	0.0000***
Adjusted R-squared	0.063696	R-squared		0.067494
Log likelihood	-2243.983	F-statistic		17.76907
Durbin-Watson stat	0.025271	Prob(F-statistic)		0.000000

Table 7

Company Name: STAR GAS PARTNERS LP (14237)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.010355	0.010953	-0.945356	0.3452
DR10	-0.278667	0.874999	-0.318476	0.7503
DR10_2	11.39779	10.46599	1.089032	0.2770
R10_R2	-5.550929	0.196227	-28.28825	0.0000***
S_P_RETURN	-2.625212	4.456374	-0.589092	0.5562
DUMMY	-1.040966	0.126032	-8.259572	0.0000***
C	7.525547	0.086330	87.17148	0.0000***
Adjusted R-squared	0.728185	R-squared		0.733363
Log likelihood	-341.5032	F-statistic		141.6464
Durbin-Watson stat	0.242723	Prob(F-statistic)		0.000000

Table 8

Company Name: C H S ELECTRONICS INC (13665)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-13.21044	29.12582	-0.453565	0.6509
DR10	-11.84481	67.37280	-0.175810	0.8607
DR10_2	388.0689	569.9702	0.680858	0.4972
R10_R2	-187.6909	22.11034	-8.488827	0.0000***
S_P_RETURN	-462.9410	257.7753	-1.795909	0.0749*
DUMMY	-75.01070	15.58657	-4.812520	0.0000***
C	14.06040	14.51335	0.968791	0.3345
Adjusted R-squared	0.371447	R-squared		0.399591
Log likelihood	-696.3906	F-statistic		14.19803
Durbin-Watson stat	0.157216	Prob(F-statistic)		0.000000

Table 9

Company Name: FRIEDE GOLDMAN INTERNATIONAL INC (15602)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-12.13866	3.208178	-3.783662	0.0002***
DR10	-3.675929	3.342856	-1.099637	0.2726
DR10_2	106.2136	30.91533	3.435628	0.0007***
R10_R2	-2.062926	0.837010	-2.464638	0.0145**
S_P_RETURN	-13.68298	17.43658	-0.784728	0.4334
DUMMY	-10.52311	0.374335	-28.11146	0.0000***
C	2.914086	0.308007	9.461089	0.0000***
Adjusted R-squared	0.788079	R-squared		0.793513
Log likelihood	-570.7901	F-statistic		146.0310
Durbin-Watson stat	0.317837	Prob(F-statistic)		0.000000

Table 10

Company Name: K V PHARMACEUTICAL CO (2589)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.652810	2.832557	-0.230467	0.8178
DR10	-1.356061	1.357575	-0.998884	0.3181
DR10_2	-9.980395	11.08418	-0.900418	0.3682
R10_R2	-1.813234	0.530024	-3.421043	0.0007***
S_P_RETURN	-0.525127	8.083427	-0.064963	0.9482
DUMMY	-5.958353	0.996725	-5.977933	0.0000***
C	2.546704	0.287756	8.850236	0.0000***
Adjusted R-squared	0.239881	R-squared		0.245409
Log likelihood	-1861.288	F-statistic		44.39272
Durbin-Watson stat	0.024027	Prob(F-statistic)		0.000000

Table 11

Company Name: MCCORMICK & CO INC (2801)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.099259	0.311532	-0.318615	0.7500
DR10	-0.418296	0.087483	-4.781472	0.0000***
DR10_2	2.360247	0.833533	2.831617	0.0046***
R10_R2	0.072286	0.006147	11.75989	0.0000***
S_P_RETURN	-0.865748	0.420767	-2.057548	0.0396**
DUMMY	-0.563111	0.012309	-45.74971	0.0000***
C	1.237294	0.009276	133.3888	0.0000***
Adjusted R-squared	0.131800	R-squared		0.132018
Log likelihood	-28282.82	F-statistic		604.4378
Durbin-Watson stat	0.032057	Prob(F-statistic)		0.000000

Table 12

Company Name: WESTPOINT STEVENS INC (12318)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-3.740239	5.319494	-0.703119	0.4824
DR10	-1.642038	5.816522	-0.282306	0.7778
DR10_2	-32.01164	55.62536	-0.575486	0.5653
R10_R2	13.19793	0.393185	33.56673	0.0000***
S_P_RETURN	-1.993312	23.73935	-0.083967	0.9331
DUMMY	-6.547389	0.777846	-8.417336	0.0000***
C	0.181561	0.675547	0.268762	0.7882
Adjusted R-squared	0.771356	R-squared		0.774577
Log likelihood	-1431.645	F-statistic		240.5271
Durbin-Watson stat	0.238519	Prob(F-statistic)		0.000000

Table 13

Company Name: GLOBAL TELESYSTEMS GRP INC (15946)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.329215	3.202537	-0.102798	0.9183
DR10	-1.091962	3.086766	-0.353756	0.7240
DR10_2	100.1578	31.44124	3.185555	0.0017***
R10_R2	-2.104894	0.997571	-2.110020	0.0364**
S_P_RETURN	-22.82828	12.04029	-1.895991	0.0598*
DUMMY	-1.023206	0.409343	-2.499633	0.0135**
C	5.144349	0.248645	20.68956	0.0000***
Adjusted R-squared	0.122637	R-squared		0.154736
Log likelihood	-352.1071	F-statistic		4.820629
Durbin-Watson stat	0.398988	Prob(F-statistic)		0.000152

Table 14

Company Name: CHARTER ONE FINANCIAL INC (9662)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	0.073043	0.652287	0.111980	0.9109
DR10	-0.305453	0.268605	-1.137182	0.2558
DR10_2	-2.308288	2.400227	-0.961695	0.3365
R10_R2	1.693512	0.072804	23.26121	0.0000***
S_P_RETURN	-1.212264	1.481856	-0.818072	0.4136
DUMMY	-0.399391	0.062597	-6.380337	0.0000***
C	1.193801	0.030446	39.21012	0.0000***
Adjusted R-squared	0.395952	R-squared		0.400377
Log likelihood	-439.0656	F-statistic		90.47527
Durbin-Watson stat	0.063728	Prob(F-statistic)		0.000000

Table 15

Company Name: QWEST COMMUNICATIONS INTL INC (15545)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.002775	0.014176	-0.195722	0.8448
DR10	-0.017007	0.347087	-0.048999	0.9609
DR10_2	8.281434	3.457323	2.395331	0.0166**
R10_R2	1.613494	0.023655	68.21030	0.0000***
S_P_RETURN	-0.325332	1.531136	-0.212477	0.8317
DUMMY	-0.115407	0.046084	-2.504262	0.0123**
C	1.966848	0.035702	55.09033	0.0000***
Adjusted R-squared	0.466023	R-squared		0.466484
Log likelihood	-13205.95	F-statistic		1011.343
Durbin-Watson stat	0.103942	Prob(F-statistic)		0.000000

Table 16

Company Name: NORTHWEST NATURAL GAS CO (3306)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.308195	0.412034	-0.747984	0.4545
DR10	-0.310802	0.110857	-2.803629	0.0051***
DR10_2	1.396296	1.031535	1.353610	0.1759
R10_R2	0.203844	0.010124	20.13386	0.0000***
S_P_RETURN	-0.923668	0.543474	-1.699563	0.0892*
DUMMY	-0.592285	0.020647	-28.68629	0.0000***
C	1.482266	0.011257	131.6708	0.0000***
Adjusted R-squared	0.117227	R-squared		0.117369
Log likelihood	-61394.53	F-statistic		821.7303
Durbin-Watson stat	0.010631	Prob(F-statistic)		0.000000

Table 17

Company Name: EVERGREEN RESOURCES INC (5238)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.554699	0.675424	-0.821260	0.4116
DR10	-0.623574	0.333365	-1.870546	0.0615*
DR10_2	7.853321	2.989108	2.627313	0.0086***
R10_R2	0.100903	0.031394	3.214106	0.0013***
S_P_RETURN	-0.391316	1.591040	-0.245950	0.8057
DUMMY	-0.452398	0.061465	-7.360216	0.0000***
C	2.914535	0.032372	90.03244	0.0000***
Adjusted R-squared	0.073029	R-squared		0.074722
Log likelihood	-5038.437	F-statistic		44.11994
Durbin-Watson stat	0.014273	Prob(F-statistic)		0.000000

Table 18

Company Name: OXFORD HEALTH PLANS INC (11070)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.132386	0.743643	-0.178023	0.8587
DR10	-0.220789	0.389868	-0.566317	0.5712
DR10_2	2.312423	3.528467	0.655362	0.5123
R10_R2	0.243813	0.058346	4.178770	0.0000***
S_P_RETURN	-0.224246	1.891036	-0.118584	0.9056
DUMMY	-0.730106	0.126104	-5.789734	0.0000***
C	1.350867	0.044091	30.63791	0.0000***
Adjusted R-squared	0.136805	R-squared		0.138212
Log likelihood	-6515.983	F-statistic		98.20500
Durbin-Watson stat	0.018865	Prob(F-statistic)		0.000000

Table 19

Company Name: BRASCAN CORP (32056)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.010063	0.007173	-1.403016	0.1608
DR10	-0.276256	0.175343	-1.575513	0.1153
DR10_2	0.256787	1.661173	0.154582	0.8772
R10_R2	-0.355753	0.022983	-15.47911	0.0000***
S_P_RETURN	-0.367927	0.816036	-0.450871	0.6521
DUMMY	-1.534557	0.047462	-32.33213	0.0000***
C	1.210078	0.014915	81.13282	0.0000***
Adjusted R-squared	0.491689	R-squared		0.493176
Log likelihood	-1372.956	F-statistic		331.6557
Durbin-Watson stat	0.046289	Prob(F-statistic)		0.000000

Table 20

Company Name: E TRADE GROUP INC (14915)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-4.471458	4.308650	-1.037786	0.2998
DR10	-1.578867	2.840852	-0.555772	0.5786
DR10_2	-25.57000	25.79407	-0.991313	0.3219
R10_R2	-1.920075	0.344206	-5.578273	0.0000***
S_P_RETURN	-23.91885	16.02998	-1.492133	0.1362
DUMMY	-11.06217	0.755940	-14.63366	0.0000***
C	1.685393	0.306987	5.490118	0.0000***
Adjusted R-squared	0.423130	R-squared		0.428823
Log likelihood	-1739.235	F-statistic		75.32740
Durbin-Watson stat	0.058044	Prob(F-statistic)		0.000000

Table 21

Company Name: CROWN CASTLE INTERNATIONAL CORP (16268)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-2.828522	1.974813	-1.432299	0.1522
DR10	-1.428096	1.484367	-0.962091	0.3361
DR10_2	-7.093392	13.85520	-0.511966	0.6087
R10_R2	-1.833114	0.212636	-8.620883	0.0000***
S_P_RETURN	-3.835661	7.918578	-0.484388	0.6282
DUMMY	-7.699108	0.499997	-15.39831	0.0000***
C	4.509523	0.155784	28.94729	0.0000***
Adjusted R-squared	0.199539	R-squared		0.202092
Log likelihood	-5188.865	F-statistic		79.14936
Durbin-Watson stat	0.030184	Prob(F-statistic)		0.000000

Table 22

Company Name: ALAMOSA HOLDINGS INC (17927)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-1.634623	3.422656	-0.477589	0.6332
DR10	-15.54375	4.786174	-3.247636	0.0013***
DR10_2	119.6268	49.42488	2.420377	0.0159**
R10_R2	2.478028	0.441647	5.610877	0.0000***
S_P_RETURN	-9.161650	20.99894	-0.436291	0.6629
DUMMY	-2.794500	0.954450	-2.927865	0.0036***
C	7.800267	0.374316	20.83874	0.0000***
Adjusted R-squared	0.304193	R-squared		0.314133
Log likelihood	-1306.659	F-statistic		31.60265
Durbin-Watson stat	0.247175	Prob(F-statistic)		0.000000

Table 23

Company Name: MICHAELS STORES INC (6959)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	0.054605	1.000759	0.054563	0.9565
DR10	-0.099826	0.454037	-0.219862	0.8261
DR10_2	0.167400	3.823610	0.043781	0.9651
R10_R2	-0.253459	0.119245	-2.125530	0.0340**
S_P_RETURN	-2.739742	2.576340	-1.063424	0.2880
DUMMY	-1.149146	0.107235	-10.71614	0.0000***
C	5.752358	0.241399	23.82924	0.0000***
Adjusted R-squared	0.214011	R-squared		0.222358
Log likelihood	-568.5189	F-statistic		26.63998
Durbin-Watson stat	0.176168	Prob(F-statistic)		0.000000

Table 24

Company Name: NETWORKS ASSOCIATES INC (11735)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.748626	0.279893	-2.674689	0.0075***
DR10	-0.086811	0.238122	-0.364563	0.7155
DR10_2	8.661405	2.251558	3.846849	0.0001***
R10_R2	1.483341	0.023678	62.64588	0.0000***
S_P_RETURN	-0.626670	1.143727	-0.547919	0.5838
DUMMY	-0.179802	0.051839	-3.468477	0.0005***
C	0.160234	0.019833	8.079004	0.0000***
Adjusted R-squared	0.853934	R-squared		0.854347
Log likelihood	-2057.655	F-statistic		2065.683
Durbin-Watson stat	0.043094	Prob(F-statistic)		0.000000

Table 25

Company Name: PROVINCE HEALTHCARE CO (15961)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-6.760593	1.527498	-4.425926	0.0000***
DR10	-0.421655	0.962318	-0.438166	0.6613
DR10_2	8.981914	8.057264	1.114760	0.2652
R10_R2	0.031911	0.139808	0.228247	0.8195
S_P_RETURN	-2.434223	4.741922	-0.513341	0.6078
DUMMY	-4.414141	0.159466	-27.68079	0.0000***
C	-0.956650	0.222725	-4.295215	0.0000***
Adjusted R-squared	0.535815	R-squared		0.537920
Log likelihood	-2847.628	F-statistic		255.5258
Durbin-Watson stat	0.129347	Prob(F-statistic)		0.000000

Table 26

Company Name: EMULEX CORP (1523)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-6.751421	3.602854	-1.873909	0.0621*
DR10	-5.345427	3.159125	-1.692059	0.0919*
DR10_2	46.94720	33.63345	1.395848	0.1640
R10_R2	-8.582602	1.076481	-7.972835	0.0000***
S_P_RETURN	-11.13392	14.10087	-0.789591	0.4305
DUMMY	-7.612228	0.550433	-13.82953	0.0000***
C	18.02586	2.036426	8.851712	0.0000***
Adjusted R-squared	0.473374	R-squared		0.486013
Log likelihood	-603.6531	F-statistic		38.45330
Durbin-Watson stat	0.241798	Prob(F-statistic)		0.000000

Table 27

Company Name: BANKNORTH GROUP INC NEW (8782)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.626539	0.480025	-1.305223	0.1923
DR10	-0.273008	0.202449	-1.348525	0.1779
DR10_2	1.274711	2.123119	0.600395	0.5484
R10_R2	0.013854	0.020373	0.679988	0.4967
S_P_RETURN	-1.083500	1.031046	-1.050875	0.2937
DUMMY	-1.190992	0.054206	-21.97146	0.0000***
C	3.671235	0.016267	225.6875	0.0000***
Adjusted R-squared	0.672562	R-squared		0.675459
Log likelihood	-166.5536	F-statistic		233.1033
Durbin-Watson stat	0.037700	Prob(F-statistic)		0.000000

Table 28

Company Name: ST MARY LAND & EXPLORATION CO (11857)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-1.038704	0.998143	-1.040636	0.2991
DR10	-0.763778	0.362348	-2.107858	0.0361**
DR10_2	2.399365	3.516982	0.682223	0.4957
R10_R2	0.522031	0.145150	3.596495	0.0004***
S_P_RETURN	-0.144656	1.597958	-0.090525	0.9279
DUMMY	-0.527809	0.075523	-6.988673	0.0000***
C	1.760671	0.281840	6.247056	0.0000***
Adjusted R-squared	0.224204	R-squared		0.242603
Log likelihood	-64.70778	F-statistic		13.18614
Durbin-Watson stat	0.108683	Prob(F-statistic)		0.000000

Table 29

Company Name: PACIFICARE HEALTH SYS INC DEL (7558)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	1.156306	2.755800	0.419590	0.6752
DR10	-0.905226	1.655795	-0.546702	0.5851
DR10_2	-16.62551	14.15698	-1.174368	0.2415
R10_R2	0.312814	0.678120	0.461297	0.6450
S_P_RETURN	-5.960221	9.209472	-0.647184	0.5182
DUMMY	-2.103284	0.232842	-9.033093	0.0000***
C	-2.237276	1.535142	-1.457374	0.1465
Adjusted R-squared	0.357037	R-squared		0.374414
Log likelihood	-381.0396	F-statistic		21.54607
Durbin-Watson stat	0.188262	Prob(F-statistic)		0.000000

Table 30

Company Name: FIRST HAWAIIAN INC(BANCWEST CORP NEW)1718

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-0.284562	0.447469	-0.635936	0.5250
DR10	-0.265119	0.143710	-1.844822	0.0654*
DR10_2	1.234463	1.205392	1.024117	0.3060
R10_R2	-0.414228	0.041195	-10.05528	0.0000***
S_P_RETURN	-0.530485	0.777269	-0.682498	0.4951
DUMMY	-0.632999	0.031146	-20.32363	0.0000***
C	1.900761	0.022449	84.66889	0.0000***
Adjusted R-squared	0.672558	R-squared		0.674618
Log likelihood	47.36106	F-statistic		327.5824
Durbin-Watson stat	0.129167	Prob(F-statistic)		0.000000

Table 31

Company Name: FIBERMARK INC (12007)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-1.921404	2.291700	-0.838419	0.4030
DR10	-1.549813	1.362497	-1.137479	0.2569
DR10_2	-4.120985	13.89587	-0.296562	0.7672
R10_R2	-0.146276	0.608519	-0.240380	0.8103
S_P_RETURN	-7.356438	9.575481	-0.768258	0.4434
DUMMY	-7.198410	0.221661	-32.47482	0.0000***
C	7.038645	1.386463	5.076690	0.0000***
Adjusted R-squared	0.898748	R-squared		0.902142
Log likelihood	-286.1045	F-statistic		265.8101
Durbin-Watson stat	0.305651	Prob(F-statistic)		0.000000

Table 32

Company Name: KEANE INC (2510)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-3.432860	2.088347	-1.643817	0.1049
DR10	-0.298105	0.505911	-0.589244	0.5577
DR10_2	0.872629	4.785798	0.182337	0.8559
R10_R2	-0.461800	0.552523	-0.835802	0.4062
S_P_RETURN	-2.379282	6.330101	-0.375868	0.7082
DUMMY	-0.140510	0.112381	-1.250308	0.2155
C	-1.210305	1.409158	-0.858885	0.3935
Adjusted R-squared	0.017792	R-squared		0.098522
Log likelihood	-10.28918	F-statistic		1.220395
Durbin-Watson stat	0.281828	Prob(F-statistic)		0.306944

Table 33

Company Name: BISYS GROUP INC (11418)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-11.13956	5.143270	-2.165852	0.0312**
DR10	-0.526205	2.282470	-0.230542	0.8178
DR10_2	11.64840	20.74619	0.561472	0.5749
R10_R2	1.704753	0.367579	4.637787	0.0000***
S_P_RETURN	-9.703993	11.40917	-0.850544	0.3958
DUMMY	-0.299097	0.453510	-0.659516	0.5101
C	-3.907080	0.514703	-7.590942	0.0000***
Adjusted R-squared	0.144617	R-squared		0.163212
Log likelihood	-616.9675	F-statistic		8.777065
Durbin-Watson stat	0.056473	Prob(F-statistic)		0.000000

Table 34

Company Name: SELECT MEDICAL CORPORATION (41465)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EQUITY_RETURN	-2.148436	1.801605	-1.192512	0.2370
DR10	-1.197619	0.701566	-1.707065	0.0921*
DR10_2	9.533713	8.258503	1.154412	0.2521
R10_R2	-2.134763	0.292848	-7.289665	0.0000***
S_P_RETURN	-0.411941	5.589328	-0.073701	0.9415
DUMMY	-0.100361	0.223869	-0.448304	0.6553
C	9.062310	0.574584	15.77196	0.0000***
Adjusted R-squared	0.599573	R-squared		0.630376
Log likelihood	-34.59602	F-statistic		20.46538
Durbin-Watson stat	0.415373	Prob(F-statistic)		0.000000