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Corporate Spinoffs: An Investigation of Short and Long-Term Shareholder Wealth Effects.

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CORPORATE SPINOFFS: AN INVESTIGATION OF SHORT AND LONG-TERM SHAREHOLDER WEALTH EFFECTS

A Dissertation

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Louisiana State University and
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in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Interdepartmental Programs in Business Administration

by
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ABSTRACT

The positive stock price reaction associated with the announcement of a corporate spinoff is well-documented but not yet explained. This work offers a new hypothesis: investor sentiment may affect the market response to the announcement of a spinoff. The results of an investigation using market-oriented proxies for investor sentiment support this hypothesis. Results of an analysis using non-market proxies for investor sentiment are not consistent with the above hypothesis. An analysis of the long-term effects on shareholder wealth of spinoffs is also conducted. It is found that pre and post-spinoff performance cannot be considered (statistically) significantly different.

CHAPTER 1: INTRODUCTION

During the decade of the 1980's, there was a marked increase in the frequency of events that are generally referred to as corporate restructuring. This decade is notable as a period of vigorous merger activity, reminiscent of the merger "wave" of the late 1960's, resulting in an acceleration in the pace of change in the ownership structure of U.S. corporations. Less well-publicized, however, is a parallel trend in the number of corporate divestitures.

As is often the case, this market activity has inspired renewed academic interest in the restructuring issue. Specifically, over the past few years, the merger and LBO phenomena have come under intense scrutiny. Less well-examined, however, are issues regarding those types of reorganization that result in a smaller corporate entity. In particular, although the corporate merger has been the focus of a number of dissertations and countless academic articles, the "demerger" or spinoff has received far less attention.

While a merger creates one firm where before there were two, the spinoff reverses this procedure and produces two separate corporate entities from one. In a typical spinoff a large conglomerate divests one of its subsidiaries, often one in a different industry than that of the parent. However, the business unit spun off is not

always an existing subsidiary; it is sometimes a collection of heretofore unrelated assets, grouped for the express purpose of forming a segment to be divested. Also, occasionally more than one subsidiary or operating segment is spun off, and a spinoff is sometimes only one element of a much larger corporate restructuring.

The operations of each business unit of the newly divided firm typically remain unchanged. Although the spun off segment of the corporation becomes an independent firm, the constituent components of this demerger are still related through common ownership. This is so because the pre-spinoff shareholders of the parent organization receive a pro-rata share of the spun off corporation's equity. This continuity of ownership differentiates spinoffs from other types of divestitures, which generally involve an exchange of the firm's assets for cash or other means of compensation.

On average, divestitures seem to elicit a positive stock price reaction from the market on the day(s) on which the restructuring is announced (for example, see Rosenfeld, (1984) and Zaima and Hearth, (1985)). Shipper and Smith (1983) report a two-day cumulative return of approximately 3.0% for a sample of spinoffs that took place between 1963 and 1981. Various explanations for this market reaction to the announcement of a spinoff have been advanced.

Nevertheless, to date none has proved completely satisfactory explanations of the spinoff phenomenon.

An early hypothesis to explain the observed positive shareholder wealth effects of spinoffs is bondholder expropriation. Underlying the expropriation hypothesis is the notion that a spinoff involves a wealth transfer between the firm's securityholders rather than an increase in firm value. In this view, the shareholders are thought to "steal" a portion of the bondholder's collateral by dividing the firm and reducing the assets to which the bondholders have claim. Hite and Owers (1983) and Schipper and Smith (1983) reject this hypothesis, however, by demonstrating 1) that the spun off subsidiary is typically assigned a proportionate amount of the corporation's total debt, and 2) that bond prices and ratings are usually unaffected by the announcement of a spinoff.

Currently, the specialization hypothesis is probably the most widely accepted explanation regarding the stock price reaction to corporate spinoffs. This argument emphasizes managerial focus, and is rooted in the transactions cost theory of the firm associated with the work of Coase (1937). Diseconomies of decision-making are assumed to arise once the firm reaches some unspecified critical size and are exacerbated if there exist subsidiaries that operate in different industries than the parent. A divestiture of one or more of the subsidiaries

allows the executives of each business segment to better manage the resources of the separate firms. This argument may be viewed as the converse of the synergy explanation in the merger literature and the two share a common problem in empirical testing: the difficulty of formulating refutable hypotheses that are sufficiently distinct.

Other explanations regarding the shareholder wealth effects of spinoffs offered in the divestiture literature include the regulatory hypothesis, the union hypothesis, and the merger hypothesis. (Hite and Owers, (1983) and Schipper and Smith, (1983)). The first rationale posits escape from some type of regulatory interference as creating the wealth resulting from the divestiture. The union hypothesis suggests that labor union containment (dividing the firm into union and non-union segments) may be beneficial to shareholders. Finally, it appears that some firms spinoff a subsidiary to facilitate a merger between the spun off firm and a third corporation. These three hypotheses appear to motivate a number of the observed spinoffs. However, the majority of demergers do not appear to fit into any one of these three categories. Given the lack of a satisfactory explanation for the positive wealth effects associated with the demerger phenomenon in the literature, it is the objective of this study to formulate a new hypothesis regarding investor reaction to a spinoff announcement.

Since the operations of each segment of the divided firm usually do not change after the divestiture, the economic rationale motivating corporate spinoffs may be difficult for investors to perceive. It is possible that the initial reaction to this event is not based at all on enhanced economic value. While the long-term wealth effects of spinoffs may be difficult for investors to evaluate, the circumstances surrounding the announcement of the typical spinoff are such that investors could be overly-optimistic about the prospects of the newly divided firm. The hypothesis developed here and termed the Positive Reaction to Non-Negative Information (PRNI) hypothesis posits that the announcement day returns of spinoff firms are inflated by the optimistic expectations of investors.

Although the stock price reaction to the announcement of a corporate spinoff has been thoroughly investigated (if not explained), the long-term effects of a demerger on shareholder wealth have been the subject of few empirical studies. Cusatis, Miles, and Woolridge (1991) find that a sample of spun off subsidiaries outperform a market proxy and a sample of size and industry matched firms over a 36 month holding period. While making a significant contribution to the divestiture literature, that study ignores an important aspect of the long-term effects of corporate spinoffs. The post-spinoff performance of parent

firms is at least as important as that of spun off subsidiaries, since the parent firm is typically the larger entity and therefore retains the bulk of the equity of the original corporation.

This study also investigates the long-term shareholder wealth effects associated with corporate spinoffs. The post-spinoff performance of parent firms as well as that of spun off subsidiaries is considered. Rather than compare portfolio performance to that of the market or a sample of "matched" firms, more traditional measures of portfolio performance are used. Use of the Jensen (1968), Sharpe (1966) and Treynor (1965) measures of portfolio performance should provide a more precise evaluation of portfolio risk and are therefore more informative regarding the long-term return properties of spinoff firms.

The remainder of this work is organized as follows. Chapter 2 contains a review of the relevant literature and a discussion of the institutional issues regarding spinoffs. In Chapter 3, the PRNI hypothesis is presented and its implications are discussed. An event study examining the short-term effects of spinoffs and testing the PRNI hypothesis are the subject of Chapter 4. The long-term (portfolio) effects of the spinoff are analyzed in Chapter 5. Finally, summary and conclusions are offered in Chapter 6.

CHAPTER 2: LITERATURE REVIEW

2.1. Divestitures

The spinoff is merely one method by which a firm may divest a portion of its total assets. Other forms of corporate divestiture include the splitoff, in which one or more shareholders of the parent firm exchange their stock in the parent firm for stock in the subsidiary. In a split-up, the parent firm is divided into several parts, the equity of each part is distributed among the parent's shareholders, and then the parent is dissolved. The most popular type of divestiture is the selloff, which involves the sale of some portion of the assets of one firm to another firm. In most cases, the asset becomes a subsidiary or division of the purchasing firm.

Virtually all of the published empirical research examining the wealth effects of divestiture has considered either selloffs or spinoffs or both. The bulk of this empirical evidence suggests that the announcement of a divestiture is generally associated with a positive stock price reaction for the divesting firm. An early empirical study examining the wealth effects of corporate divestiture is that of Boudreaux (1975), who investigates the stock price reaction to the announcement of 138 voluntary and 31 involuntary divestitures over the period 1965-1970. For the sub-sample of voluntary divestitures, Boudreaux finds an "unusually positive" price movement for the three months

preceding and one month following the announcement. Boudreaux's sub-sample of voluntary divestitures contains both spinoffs and selloffs; unfortunately, no attempt is made to distinguish differential effects (if any) between these two forms of divestiture.

Using daily data, Alexander, Benson and Kampmeyer (1984) (ABK) and Hearth and Zaima (1984) restrict their respective samples to voluntary selloffs, and each find that the announcement of such an event results in positive abnormal returns. Consistent with the findings of the bulk of the divestiture literature, Hearth and Zaima find an upward "drift" in share price for several weeks immediately prior to the announcement date. In contrast, ABK report a negative trend in share price over the weeks prior to the announcement date.

Rosenfeld (1984) investigates stock price reaction to both selloffs and spinoffs and concludes that although each has a positive effect on stock price, the effect of the latter is larger in magnitude than the former. The author suggests that this difference is due to the different circumstances typically surrounding the two types of divestitures. Specifically, selloffs are often precipitated by poor economic performance by the parent firm, while this is usually not true of spinoffs. Consistent with this hypothesis, Hearth and Zaima (1984) report that the announcement of a selloff by relatively

"healthy" firms has a stronger positive effect on share price than the same announcement by their less successful counterparts.

Zaima and Hearth (1985) examine the wealth effects of voluntary selloffs with respect to the division of economic gains between the divesting and acquiring firms. The authors conclude that while shareholders of acquiring firms may realize some economic gains from selloffs, the majority of economic gains accrue to the shareholders of divesting firms. Although there is some evidence of a positive price movement around the announcement (of acquisition) date for acquiring firms, there is no evidence that these price movements are significant. Zaima and Hearth (1985) also document an empirical relationship they reported elsewhere: the positive correlation between relative size of the assets divested and stock price reaction at the announcement date.

2.2. Institutional Issues

The typical sequence of events for a corporation undertaking a spinoff is as follows:

1) Management announces that it plans to divest a portion of the firm through a pro-rata distribution of new shares to shareholders of the parent company. Shareholder approval is sought

if required by the parent's corporate bylaws. If shareholder approval is required, a special shareholders' meeting is called. At this meeting (or by proxy), shareholders are asked to approve the plan of reorganization. The plan of reorganization contains details of the mechanics of the spinoff, including the relationship between parent and subsidiary during and after the spinoff. Any exchanges of assets and liabilities between parent and subsidiary that are part of the overall restructuring are included. Other items generally contained in a plan of reorganization are the number of shares of stock to be distributed, record and payment dates for the distribution, and the proposed exchange listing for the subsidiary.

2) The board of directors reviews and approves the plan of reorganization.

3) The company seeks and is granted a favorable ruling from the IRS. If the proposed spinoff meets the requirements of Section 355 of the Internal Revenue Code, the distribution of the subsidiary's stock to the shareholders of the parent firm is considered a stock dividend by the IRS, and is

therefore tax-free to the recipients until the stock is sold. In order to qualify for tax-free status, the spinoff must be motivated by "business considerations" and not by tax avoidance. Examples of allowable business considerations are to expand credit for one or both corporations, to separate businesses to allow employees to share in the profits of ownership and to make the subsidiary's stock more acceptable in a merger. Note that this list is not exhaustive.

Additionally, the Tax Code requires that parent and subsidiary must be actively engaged in business for at least five years before the spinoff and that there exists no pre-arranged plan for all the shareholders to sell off the subsidiary stock after the distribution. Other criteria that must be satisfied to qualify a spinoff as a dividend include the directive that the distribution must constitute at least 80% of the outstanding shares of the subsidiary. Finally, any shares retained by the parent must not constitute "practical control" of the subsidiary. Failure to satisfy these conditions can result in the tax treatment of the spinoff shares as dividend income to the parent company shareholders in the year of receipt.

4) The shareholders approve the plan of reorganization.

5) The company files a registration statement for the subsidiary with the Securities and Exchange Commission. A prospectus must be provided to all stockholders who will receive stock in the spinoff. The subsidiary must meet all reporting guidelines required by the SEC for publicly traded corporations.

Prior to 1969, the tax rules were the only regulations in place regarding spinoffs, since the SEC considered a spinoff a dividend, not a sale of securities. Therefore, the registration requirements for publicly traded securities under the Securities Act of 1933 did not apply to the equity or debt of spun off firms. This "loophole" in registration requirements led the SEC to suspect that spinoffs were being used to avoid the disclosures of information required for public corporations. In order to prevent possible abuses, in July 1969 the SEC issued a directive stating that spinoff stock should be registered if the shares are issued with the intent of resale.

6) The subsidiary's shares are distributed to the parent company's shareholders on a pro-rata basis. The shares are typically distributed six months after the initial announcement, although the time period between public announcement and completion of the spinoff may be as short as two months or as long as several years.

Whether or not the conversion and exercise prices of warrants and convertible securities are adjusted for the effects of the demerger depends on their terms as described in the corporate charter. Some firms are not required to adjust the terms of these securities at all. More typically, the parent firm modifies their terms by multiplying the number of shares received upon exercise or conversion by the ratio of the market value of the parent firm including the subsidiary to the market value of the parent firm excluding the subsidiary. The value of outstanding options received through a stock option plan is usually preserved in a similar fashion: the number of shares obtainable at exercise is adjusted upward, and the exercise price downward.

Most firms that are large enough to engage in a spinoff have established retirement plans for the benefit of their employees. The subsidiary typically establishes a plan similar to that of the parent, into which the assets

of employees of the spun off firm are transferred. The subsidiary then assumes responsibility for the unfunded liability of its pension plan. Years of service with the parent company usually count toward eligibility and increase the level of retirement benefits for employees of the spun off subsidiary.

Perhaps the most intriguing aspect of the spinoff is that, on average, it seems to be a value creating event. That is, there appear to be gains associated with the act of separating one firm into two entities. This circumstance is especially intriguing when one considers that mergers are *also* value creating events (at least initially - see Jensen and Ruback, (1983)). As many authors point out, (for example, Hite and Owers, (1983)) potential synergies may well increase the aggregate market value of two merging firms. Since a demerger is the direct opposite of the merger the synergy argument cannot hold.

Abstracting from synergies and assuming frictionless capital markets, spinoffs that do not affect cash flows should not affect market value. It is probably safe to assume that the majority of spinoffs do not affect cash flows because, typically, the operations of each segment remains unchanged. Why then should a mere reconfiguration of the equity of a corporation increase the market value of the firm?

2.3. Extant Hypotheses

Possible explanations include one proposed by Hakansson (1982), who demonstrates that if financial markets are incomplete, a spinoff can increase the opportunity set available to investors. Litzenberger and Sosin (1977) suggest that if there exist differential growth opportunities between the subsidiary and parent, a spinoff can provide investors with more flexibility vis-a'-vis the capital gains/dividends alternatives. That is, if the subsidiary has substantial growth opportunities while the parent is capable of paying a relatively high dividend, investors who prefer capital gains may choose to hold shares only in the subsidiary, and investors who prefer dividends will retain only the parent's stock.

Another explanation for the positive stock-price reaction associated with spinoffs is that value is not created at all, but that there is merely a wealth *transfer* from the senior security holders (debt and preferred stock) to the equity holders. Galai and Masulis (1976) suggest that with a spinoff, the stockholders may be able to "steal away" a part of the bondholder's collateral, since they (the bondholders) have no claim on the assets of the new firm. Naturally, this argument assumes:

1) that the bondholders are unable to foresee the possibility of such maneuvering on the part of the shareholders, or

2) that the bondholders are unable either to prevent spinoffs (through debt covenants) or to charge an appropriate rate to compensate for this risk.

In somewhat the same vein, Myers (1977) argues that firms with risky debt may reject positive net present value projects, since it is possible that some projects may enhance overall firm value but leave the shareholders no better (or worse) off. A relevant example given by Miles and Rosenfeld (1983) is as follows: a subsidiary has positive net present value projects that are rejected because the benefits will accrue to the bondholders of the parent. If the subsidiary is spun off, then all the benefits will accrue to the shareholders of the spun off corporation. Thus a spinoff announcement might increase the value of the (parent) firm's equity by the net present value of these investment opportunities.

The elimination of negative synergies between the parent and subsidiary may serve to explain the generally positive reaction to spinoffs. For example, if the parent and subsidiary operate in disparate industries, there may be an advantage in allowing each firm to "stick to its knitting", and eliminating the managerial distraction of an unnatural corporate relationship. As argued by Schipper and Smith (1983), divesting firms may have reached the point of diminishing marginal returns to management. These firms divest to reduce the number and complexity of their managerial contracts. This rationale is known as the

"specialization" hypothesis. A spinoff undertaken for specialization purposes may be viewed as the converse of a conglomerate merger.

It has been suggested in the literature that there may be a legal or regulatory basis for the positive stock price reaction generally associated with spinoffs. If the nature of a subsidiary's operations cause it to fall under the supervision of a state or federal regulatory agency, it is often the case that the parent's operations are subject to the scrutiny of the same regulatory agency. For example, if a financial services holding company owns a bank as a subsidiary operation, the parent firm as well as the subsidiary bank may be forced to adhere to policies set by bank regulators. Another example might be the spinoff of a foreign subsidiary by a US corporation, which would free the parent from restrictions imposed by Congress on domestic firms that have operations abroad. There may be a tax advantage in spinning off a foreign subsidiary, since the spun off firm is required to pay corporate taxes only to the nation in which the company operates. If this rate is lower than the US corporate tax rate, the shareholders may benefit. Naturally, any dividends paid to US citizens by a foreign company are taxed at the prevailing US rate.

Similarly, a spinoff may allow a subsidiary to avoid burdensome obligations associated with the parent's labor union. Attempting to contain union-organizing activities

is an acceptable business purpose to spinoff a subsidiary, according to Section 355 of the Tax Code. The National Labor Relations Board and a federal appeals court have held that a spun off firm does not share automatically in the parent's collective bargaining agreements. If a spinoff is not solely motivated by a desire to avoid labor obligations, the spun off firm may be considered a "new" firm as far as organized labor is concerned (Schipper and Smith, (1983)).

Hite and Owers (1983) argue that spinoffs precipitated by (potential) legal or regulatory difficulties should *decrease* the value of the firm. In this case, the decision to spinoff is prompted by potential interference with the firm's desired activities. Hite and Owers (1983) maintain that if the combined operations of parent and subsidiary are optimal in an unconstrained situation, then separation of the two units induced by legal or regulatory impediments can only reduce total firm value. On the other hand, merger considerations may enhance the value of a firm executing a spinoff. It appears that rather than sell a subsidiary directly for cash, some firms spinoff the subsidiary first, and then the acquiring firm negotiates with the shareholders in a "partial merger". The generally positive stock returns to target firms upon the announcement of a merger might explain the positive returns observed upon the announcement of a spinoff.

Another rationale for the stock price reaction to spinoffs found in the literature is a hypothesis advanced by Mauer and Lewellen (1990). Their argument is based on the tax circumstances of the securityholders of the firms involved in the spinoff. By way of exposition, Mauer and Lewellen (1990) offer the example of an unlevered firm that has asset investments in two different lines of business. Since these two investments *are* in different lines of business, they will have operating returns, and therefore market values, that are imperfectly correlated.

The market value of the combined firm will be the market value of its component businesses, and this value will fluctuate with changes in the value of each component. If the combined firm chooses to spinoff one of its component businesses and distribute the common stock of the new firm to its existing shareholders, investors may then experience (and realize) capital gains and losses from their holdings in each corporation.

In the post-spinoff period, the net change in shareholder wealth will be no different from the situation where the corporation remained a single entity. However, investors now may trade separately on the movements of the market values of each company. The advantage of this circumstance over the previous corporate structure to investors is the ability to realize capital losses for tax purposes when the market values of the two firms change in

opposite directions. As Mauer and Lewellen (1990) point out, if the market value of one of the firms increases and the other decreases, then investors may realize the full loss of the latter, given separate corporate organization, whereas the losses of one component of a combined firm might be "swamped" by the gains of the other division.

Constantinides (1983) and Constantinides and Ingersoll (1984) have shown that immediately realizing all capital losses in order to take the associated tax deductions (but deferring all capital gains) is optimal tax-trading behavior in an environment of fluctuating securities prices. Another implication of their research is that the ability to implement such a strategy offers to investors a valuable tax-timing option that may contribute significantly to the value of an investment in any given security. Consistent with option pricing models (Galai and Masulis, (1976)), the value of this option increases with the variance of the underlying security.

An argument similar to that of Mauer and Lewellen is presented by Sarig (1985). He demonstrates, in an Arrow-Debreu framework, that mergers reduce the aggregate value of the merging firm's outstanding securities, and conversely, divesting economically unrelated lines of business should increase the aggregate value of corporate securities. Sarig points out that the shareholders' limited liability is the principal advantage of the

corporate form of organization. He argues that by combining two corporations, the shareholders have lost the valuable option of forfeiting their claim on the assets of one of the firms, should either company become insolvent. This option is more valuable, the author submits, when the returns on the two firms are more negatively correlated.

Perhaps the most general hypothesis regarding the market's reaction to spinoffs is proposed by Hite and Owers (1983), who suggest that the gains realized by dividing the firm are explained by the savings from using separate specialized contracts in which the parent and subsidiary have comparative advantages. Hite and Owers posit that spinoffs are associated with changes in the firm's opportunity set. In this scenario, the demerger better positions the corporate entity (as a whole) to exploit the new state of the world. However, since the revelation of the change in the firm's opportunity set coincides with the spinoff announcement, it is difficult (if not impossible) to separate the individual effects of the two factors.

Miller (1977) has advanced a clientele argument to explain the apparent shareholder wealth gains associated with spinoff announcements. That is, the total value of the parts can be greater than that of the whole if investors hold divergent opinions with regard to the prospects of each division. In this situation, each of the spun off segments of the firm may be marketed to the group

of investors with the most optimistic expectations of that segment's future performance. Schnabel (1992) duplicates Miller's rather ad hoc argument in a more rigorous framework, also demonstrating that binding short sales constraints are a sufficient (and necessary) condition to induce value subadditivity (the whole being worth less than the sum of the parts).

2.4. Market Reaction to Spinoff Announcements

Kudla and McInish (1983) report a positive stock price reaction to spinoff announcements; however, data limitations flaw this study. (The sample size is six firms, and the day that the new shares are distributed is used as the event day.) A more thorough investigation of the market reaction to spinoff announcements is conducted by Hite and Owers (1983), who examine 123 voluntary spinoffs that occurred during 1962-1981. The authors, using the event study method and daily data, analyze security price reactions around the spinoff announcements in order to determine the magnitude and possible sources of valuation changes.

Hite and Owers (1983) compute market-adjusted excess returns from 50 days before the announcement date through the reporting of the completion of the spinoff plan. The authors find a statistically significant price increase, on average, over the 50 day period prior to the announcement

date and over the two day "announcement window" (days -1 to 0) of 3.30%.

Another empirical study examining the spinoff phenomenon is that of Schipper and Smith (1983). In spite of some similarities, there do exist significant differences in the findings of these two studies. Also using the event study method, Schipper and Smith (1983) investigate the cumulative prediction errors from the market model for 93 firms that voluntarily spun off a subsidiary between the years 1962 and 1982. In contrast to the results obtained by Hite and Owers (1983), Schipper and Smith (1983) find no statistically significant trend over the pre-event period. This absence of an upward price drift in the months prior to the spinoff announcement is at variance with the results obtained by most researchers. The authors report a positive cumulative abnormal return (2.84%) over the (-1 to 0) event window.

A fourth empirical examination of the effects of voluntary spinoff announcements on shareholder wealth is that of Miles and Rosenfeld (1983). Consistent with the results obtained by Hite and Owers (1983), Miles and Rosenfeld find the pre-announcement returns (day -120 to day -11) to be significantly positive. Consistent with the results of *both* of the previous studies, the two day announcement period return is also significantly positive (3.34%).

As noted by Hite and Owers (1983), the pattern of cumulative excess returns observed by the majority of researchers represents two phenomena. First, the spinoff firms, on average, experience good stock market performance for several months immediately prior to the announcement day. Second, the announcement, on average, is associated with significantly positive stock price reactions. Since this evidence appears to be consistent with wealth gains for shareholders, the next obvious avenue of inquiry is investigation of potential sources of these wealth gains.

2.5. Tests of Hypotheses

As discussed above, one possible explanation for the apparent shareholder wealth gains resulting from spinoffs suggested in the literature is bondholder expropriation. In order to test the expropriation hypothesis, Hite and Owers examine the senior security returns as well as common stock returns around the spinoff announcement. In an examination of the prediction errors of samples of straight bonds, convertible bonds and preferred stock of the demerging firms, the authors find positive, but statistically insignificant results. This work directly contradicts the expropriation hypothesis, since one would expect a negative price reaction for these securities (and a positive price reaction of common stocks) if the bondholders' wealth was indeed diminished by a spinoff.

Additionally, if the expropriation hypothesis were correct, one would expect to observe the most strongly negative price reactions by the bonds of those firms whose equity increased the most. In fact, Hite and Owers (1983) find that the returns of the non-convertible debt instruments (straight debt and preferred stock) had no statistically significant correlation with those of the equity.

Interestingly, although more than half of the bonds showed positive abnormal returns, more than half of the preferred stock abnormal returns were negative. Not surprisingly, the convertible securities' price reaction to the spinoff announcement was the most similar to that of the common stock; positive and statistically significant.

Schipper and Smith (1983) point out that the spinoff induced wealth transfer described by Galai and Masulis requires exclusive distribution of the equity of the new firm to the parent firm's *shareholders*. There is a wealth transfer to the extent that the bondholders' collateral has been reduced. Schipper and Smith (1983) analyze their data and find that firms routinely assign debt to spun off subsidiaries (64 of 93 firms). The authors also find that the leverage of spun off firms is similar to that of pre-spinoff firms. Another test of the bondholder expropriation hypothesis involves the impact of a spinoff on bond prices and ratings. Schipper and Smith find a low

frequency of declines in bond prices and ratings associated with spinoff announcements, additional evidence contradicting the expropriation hypothesis.

The evidence regarding spinoffs undertaken to facilitate a merger is not as unambiguous as that concerning the bondholder expropriation hypothesis. Hite and Owers (1983) include 12 firms in their sample that were preparing for a merger by spinning off a subsidiary into a free-standing unit. When the data were categorized by reason given (by management) for the spinoff, this portion of the total sample displayed the largest positive cumulative prediction errors over the announcement day window.

Unfortunately, because the announcement of the spinoff often coincides with that of the merger, it is not possible to disentangle the separate effects of each. Since merger announcements are known to induce positive stock price reactions for the target firm, it is not clear how much of the price increase is due to the impending merger, and how much (if any) is due to the spinoff itself.

The specialization hypothesis is also tested by Hite and Owers (1983). Recall that this explanation involves the spinoff of a subsidiary in a fundamentally different line of business from that of the parent, which may allow each to focus on "the business at hand." Again, the authors disaggregate their sample, categorizing by

management's stated motivation for the spinoff, and find 27 firms that appear to fall into the specialization category. The cumulative abnormal prediction errors for this group are positive, and are the largest of any group in the sample over the entire event period.

A perhaps more painstaking examination of the specialization hypothesis is conducted by Schipper and Smith (1983). These authors provide two measures of the similarity/dissimilarity of the parent and subsidiary firms:

1) industry membership of the parent and subsidiary
2) a comparison of the time series behavior of stock returns to the value weighted portfolio of parent and subsidiary versus returns of the parent stock alone.

Of Schipper and Smith's total sample of 93 firms, 72 spun off firms were classified in industries different from that of their parents, and 21 were in the same industry. The authors also report that nine of the latter 21 may have experienced relaxed regulatory or legal constraints.

The second measure of similarity is the extent to which the parameter estimates of the market model differ for the pre-spinoff combined firm, and the parent firm post-spinoff. The authors report that sufficient data were available for 62 of the total sample of 93. The hypothesis that stock returns follow the same relationship with market returns after the ex-date as prior to it is rejected at the

.05 level for 22 firms. The structural shifts that appear to have occurred for the 22 firms are primarily increases in idiosyncratic risk and total return variance. Naturally, this means that for 40 of the firms tested for a change in the parameter estimates of the market model, the null hypothesis of no change could not be rejected. The industry information lends a measure of empirical support to the specialization hypothesis. However, the fact that variance increased for roughly one-third of the sample after the spinoff does not seem to be particularly informative vis-a'-vis this hypothesis.

Hite and Owers (1983) classify 19 firms as citing legal or regulatory difficulties as motivation for the spinoff. Consistent with their hypothesis regarding this group, the cumulative excess returns for these firms are negative over the entire event period. The legal/regulatory group is the only such category to display negative excess returns. However, the announcement day returns are positive and statistically significant. Schipper and Smith (1983) classify 18 firms of their total sample of 93 as citing relaxation of legal or regulatory restrictions as motivation for the spinoff. Consistent with the results obtained by Hite and Owers, this group of firms is associated with negative cumulative prediction errors during the entire event period, and positive returns on the announcement day.

Kudla and McInish (1988) test Miller's (1977) clientele hypothesis, using relative trading volume before and after the spinoff as a proxy for the level of divergence of opinion regarding the prospects of the spun off segments. The authors show that the magnitude of the share price reaction to the announcement of a spinoff is positively correlated with the increase in trading volume post-spinoff. The weak link in this line of research, of course, is the somewhat curious assumption that a relative increase in trading volume post-spinoff is indicative of more greatly diverging opinions. It seems likely that trading volume would increase after *any* important corporate event; an investigation of the post-announcement trading volume for a group of merging firms (for example) would have been informative in this regard.

An interesting empirical result obtained consistently in the literature is the positive correlation between the increase in share price upon announcement of the spinoff and the relative size of the subsidiary being spun off. Miles and Rosenfeld (1983) divide their sample of 55 firms into two subsamples based on the size of the spun off unit relative to the parent firm. The "large" spinoff group consists of those firms that divested a subsidiary with an equity market value of at least 10% of the parent's common stock (34 firms), while the small group comprises firms

whose subsidiary had a market value of less than 10% of the parent (21 firms).

The authors find that the effect of minor spinoffs on shareholder wealth are small relative to that of major spinoffs. Miles and Rosenfeld (1983) report a 20.70% differential between the two subsamples over the 181-day event period, which is statistically significant at the 5% level. The authors conclude that, for the small spinoff set, the net present value of the divested unit's cash flows is trivial relative to the cash flows of the remaining firm, and therefore has no noticeable influence on share price.

Hite and Owers (1983) also categorize their sample according to the size of the division divested. However, the fraction of the equity spun off used to partition the sample is 6.6%. Consistent with Miles and Rosenfeld's results, Hite and Owers find that over the entire event period, the large spinoffs generate excess returns of 11.6% and the small spinoffs create excess returns of only 2.7%. Although the authors call this result "intuitively appealing", no hypotheses are submitted regarding the nature of the observed relationship.

Most extant empirical work examining the spinoff phenomenon has focused on the announcement effects of demergers. Relatively little research has addressed the issue of post-spinoff performance. This apparent oversight

is likely due to data limitations and resulting technical difficulties. Cusatis, Miles and Woolridge (1991) (CMW) examine the post-spinoff performance of 146 firms, and find that, on average, the spun off segment of these firms significantly outperforms the market, as well as a sample of matched firms.

CMW investigate the performance of a sample of 146 subsidiaries that were spun-off voluntarily during the 1965-1988 period. Using both portfolio-rebalancing and buy-and-hold strategies, the authors find that a portfolio of spun off firms significantly outperforms both the market and a sample of size and industry matched firms over a three year period. The authors compare the post-announcement day performance of spinoffs and IPOs, since each is a "new" company to the public markets.

Aggarwal and Rivoli (1990) and Ritter (1991) have shown that after superior first day returns, IPOs earn negative abnormal returns for varying holding periods up to three years. In contrast to the early positive returns and negative long-term performance of IPOs, CMW find that spinoffs under-perform the market in the distribution month, and subsequently earn above-market returns for varying holding periods within a three year time horizon. The authors report that the strongest performance for their sample of firms occurs in the second year (between months 12 and 24 relative to the distribution date).

Over a 36 month period, an investment in CMW's sample of spun off firms would earn a cumulative raw return of 73.8 percent (total return: 106.6 percent assuming monthly compounding and dividend reinvestment). After adjusting for market returns and the returns of the matched sample firms, abnormal returns for the spinoff sample are in excess of 20 percent over the three-year period. These results are robust with respect to portfolio strategy: buy-and-hold and portfolio rebalancing produce comparable results.

CMW speculate that these post-spinoff returns can be attributed to:

1) enhanced operating performance as a result of a reduction in agency and overhead costs,

2) market as opposed to administrative capital allocation,

3) incentives created by more effective compensation of management, and

4) the potential for asset reallocation to more highly valued uses through acquisition.

However, they offer no empirical evidence to support these conjectures. The possibility of superior performance by spinoffs raises an interesting question in regard to capital market efficiency, especially when paired with the sub-par performance of IPO's. That is, why do investors systematically overbid for the shares of IPO's on the offer day, and consistently underbid for the shares of spun off subsidiaries when these shares begin trading?

In the case of IPO's, an underwriter underpricing argument may explain the issue-day returns, but what of the long-term performance of these shares? More pertinent for the purposes of this study is the question: why do returns on shares of spun off firms follow the pattern observed by CMW? The authors hypothesize that the sub-par performance of spinoffs in the month of distribution can be attributed to selling pressure induced by large institutional holders, who, because of legal or self-imposed restrictions, may not invest in small firms or firms without a "track record". After a period of months, the potential number of buyers for spun off firm's shares increases as the company establishes a dividend record, earnings history, etc. and increases the market value of its equity. This type of supply/demand argument is at odds with capital market theory, however.

CHAPTER 3: THE PRNI HYPOTHESIS

Analysis of the stock price reaction to the announcement of a corporate spinoff has been conclusive: without exception, researchers report a positive and statistically significant average price reaction over the announcement window. Tests of the various hypotheses seeking to explain this market reaction have been less definitive. To date, analysis of the demerger hypotheses has consisted primarily of disaggregation of the data by various criteria and the subsequent application of the event study method to each categorization. The stock price reaction for each category is then compared to that of the aggregate sample and to each of an alternative grouping.

This approach has provided evidence with respect to some of the explanations for the observed stock price reaction advanced in the literature. Unfortunately, in most cases, it has not been applied as a test of a refutable hypothesis. (A notable exception is the tests of the bondholder expropriation hypothesis. This hypothesis has been rejected both by Hite and Owers, (1983) and Schipper and Smith, (1983).) Consequently, there exists no satisfactory explanation for the market reaction to the announcement of a spinoff. In the following section a new hypothesis is offered regarding the positive market reaction associated with spinoffs. This hypothesis is subsequently tested in the framework of a rigorous model.

3.1. Rational Expectations and the Stock Market

A spinoff divides a company into two entities, typically separating two business units of a corporation into stand-alone firms. The operations and management of each business unit generally remain unchanged after the divestiture. Separation of the operating units of the parent and subsidiary seems to be the only real change effected by a demerger. Absent resolution of dyssynergies between the two operating units, why should this restructuring of a corporation's equity create economic value? It is possible that a spinoff is a value-neutral event, and that the observed stock price response is a reflection of market sentiment at the time of the announcement.

The finance literature is replete with contradictions of the rational expectations hypothesis: that investors' subjective probability distributions regarding stock returns are equivalent to the realized distribution. Specifically, it does not appear that the behavior of market participants is motivated by strict application of Bayes' Rule, which should dictate investors' reaction to new information in an informationally efficient market. Recent empirical evidence suggests that investors display a consistent tendency to overreact to new information, placing an inordinate emphasis on the most recent data for decision making purposes.

Rather than evaluate each incoming piece of information as a small part of a much greater whole, it appears that investors become euphoric or despondent over a firm's (or the market's) prospects when unusually good or bad news is disclosed. For example, in two related papers, Debondt and Thaler (1985, 1987) examine the performance of portfolios comprised of "winners" and "losers" - stocks with either extreme capital gains or extreme losses (respectively) over periods up to five years. Debondt and Thaler report a statistically significant difference in the market-adjusted performance (calculated as an equally weighted arithmetic average rate of return) of the two portfolios for a 36 month period after portfolio formation. These results have been replicated by other researchers. (For example, see Chopra, Lakonishok, and Ritter, (1992).)

The work of Robert Shiller (1989) examining stock market volatility has led researchers to question the rationality of market reaction to new information, given the relative stability of dividends over time. The results of this research that suggest that the market disproportionately weights the most recent information is perhaps the strongest evidence available that the financial markets may not operate in a strictly rational fashion at all times. Other examples of the results of empirical research refusing to conform to (existing) theory are the

familiar and numerous stock market anomalies, such as the small firm effect, the January effect, the P/E effect, etc.

Most financial economists accept the presence of irrational economic agents in financial markets, but disagree with the view that these individuals can influence market prices. The standard rebuttal to any irrationality hypothesis is a survivorship argument wherein rational agents, by virtue of appropriate behavior, accumulate all wealth and eliminate irrational agents (and their effect on prices) from the market. However, as pointed out by Arrow (1982), there exist at least two problems with the survivorship argument.

First, in financial markets, not all arbitrage possibilities are exploitable. Second, if most agents are irrational, it is not at all clear that rational agents can profit through arbitrage, at least in the short run. For patient arbitrageurs, discounting and the loss of liquidity while holding arbitrage positions may serve to reduce any profit associated with driving market prices to their "correct" values. Additionally, market frictions such as transactions costs and the lack of availability of the full proceeds of a short sale can reduce the attractiveness of an arbitrage position. Finally, although market professionals are usually included in any list of rational investors who might be expected to recognize and exploit available arbitrage opportunities, it appears that even

those who derive their livelihood from the stock market are subject to biases in judgement (DeBondt and Thaler, (1990)).

3.2. Investor Psychology

Tverksy and Kahneman (1981) define a *decision frame* as "the decision maker's conception of the acts, outcomes and contingencies associated with a particular choice". These authors have demonstrated in series of experiments that the evaluation of probabilities and outcomes produces predictable shifts in preference when the same problem is "framed" in different ways. That is, the way a problem is formulated can affect the choice preferred by decision-makers. Tversky and Khahneman are able to effect reversals of preference by experimental subjects in choices regarding monetary outcomes, both hypothetical and real. Their experiments show that perspective is important in the decision-making process.

Tversky and Kahneman (1974) also argue that people rely on a limited number of heuristic principles to simplify the task of assessing probabilities. One of these principles, *availability*, is the ease with which similar situations can be brought to mind. The authors suggest that recent occurrences are likely to be relatively more available (for recall) than earlier occurrences. However, since availability is affected by factors other than

frequency and probability, the reliance on availability leads to predictable biases in the subjective assessment of probabilities. Specifically, occurrences that are more available for recall tend to be judged more "likely" than those that are less available. The authors note that "it is a common experience that the subjective probability of traffic accidents rises temporarily when one sees a car overturned by the side of the road."

3.3. The PRNI Hypothesis: Implications and Predictions

3.3.1. Short-Term Effects

Drawing on the work of Tversky and Kahneman, it is possible to formulate a new hypothesis regarding the market reaction to contractual reorganization. The stock price reaction to the announcement of a spinoff may be the result of investor optimism, induced (framed, to use Tversky and Kahneman's terminology) by a prior period of market gains, and may have little to do with the underlying economic effects of the demerger. This hypothesis - the positive reaction to non-negative information hypothesis - could also explain the stock price reaction to mergers, which, like spinoffs, may be only a non-negative event inflated by investors' expectations.

In a similar vein, a recent paper by Lee, Shleifer and Thaler (1991) demonstrates that the magnitude of the discount on closed end mutual funds may be associated with

investor sentiment (whether investors are optimistic or pessimistic). Since the PRNI hypothesis implies that investors' expectations are influenced by events of the recent past, the rate of return of the market immediately prior to the spinoff announcement may affect the associated stock price reaction. Specifically, if this hypothesis is correct, one would expect to observe larger share price reactions to spinoff announcements during periods of higher market returns. (Hereafter, for ease of exposition, market returns will be categorized into "bull" and "bear" periods.)

Note that the PRNI hypothesis does not necessarily imply that spinoffs are a value-decreasing event. It is possible that the typical demerger enhances stockholder wealth. A positive stock price reaction may be an appropriate response to the announcement of a spinoff, on average. However, if the stock price reaction to any given announcement is entirely driven by the economic effects of the spinoff, then there should be no association between the market response to the announcement and the market return in prior periods.

It may be that the reaction to events that are difficult for investors to evaluate (e.g. economic restructurings) are influenced by investor sentiment. An empirical investigation of the PRNI hypothesis is conducted employing prior period market returns as a proxy for the

level of investor optimism about future prospects. If investor sentiment does in fact influence the market's reaction to the announcement of a spinoff, the results of this research should be robust with respect to choice of proxy for market sentiment. (Assuming, of course, that all proxies chosen are indeed representative of investors' beliefs about the prospects of the stock market.) Therefore, the PRNI hypothesis is tested using several sentiment indices.

3.3.2. Long-Term Effects

The intended effect of a corporate spinoff (to judge from the explanations offered by management(s) at the time of the announcement) is to enhance shareholder wealth by legally and operationally separating two entities that are more valuable apart than together. If improvements in operating performance or other benefits from spinoffs are realized, on average, the long-term return performance of a firm undertaking a spinoff may be improved. More generally, the return performance of a portfolio of firms measured post-spinoff may exceed that of a portfolio of those same firms measured pre-spinoff.

On the other hand, the PRNI hypothesis implies that the post-spinoff return performance of a portfolio of spinoff firms will not exceed, and indeed, may be less than, the return performance of a portfolio of those same

firms pre-spinoff. If the stock price reaction to the announcement of a spinoff is primarily a reflection of investor sentiment at the time of the announcement, then a spinoff should have no positive effect on long-term return performance. Note that it is also possible that a restructuring in the form of a spinoff *does* have a positive effect on return performance on average, but that this effect is recognized and impounded in price on the announcement day(s). In order examine the long-term effects of a corporate spinoff, pre and post-spinoff portfolios of demerging firms are created and analyzed. Data, method and results of a study examining the short-term effects of spinoffs are described in Chapter 4.

CHAPTER 4: SHORT TERM EFFECTS AND TESTS

4.1. Data and Method

4.1.1. Data

To create the sample of voluntary spinoffs, stock distributions coded as tax-free spinoffs are identified from the Center for Research in Securities Prices (CRSP) Master daily file. A search of the Dow Jones News Retrieval database text is undertaken to identify additional spinoff announcements. Next, a search of the Wall Street Journal (WSJ) Index and Moody's Dividend Record is conducted to confirm the nature of the stock distribution and identify the announcement date. Finally, the WSJ article announcing the impending spinoff is examined for evidence of contaminating announcements. Spinoffs that are considered to be involuntary or taxable distributions are eliminated from the data.

The initial search results in a sample of 156 voluntary spinoffs, occurring between January 1970 and December 1990. Of the total sample of 156 announcements of voluntary spinoffs, 24 are considered to be contaminated because of non-spinoff related information in the announcing WSJ article. Thus, the final sample consists of 132 "clean" voluntary spinoff announcements. Tables 4.1 and 4.2 provide the frequency of distribution of voluntary spinoff announcements by year and month, respectively.

TABLE 4.1

DISTRIBUTION OF SPINOFF ANNOUNCEMENTS BY YEAR

Year	Number of Spinoff Announcements	Year	Number of Spinoff Announcements
1972	2	1982	8
1974	4	1983	10
1975	2	1984	13
1976	4	1985	14
1977	4	1986	19
1978	6	1987	9
1979	6	1988	20
1980	10	1989	6
1981	8	1990	11
		Total	156

TABLE 4.2

DISTRIBUTION OF SPINOFF ANNOUNCEMENTS BY MONTH

Month	Number of Spinoff Announcements	Month	Number of Spinoff Announcements
Jan	17	Jul	17
Feb	10	Aug	9
Mar	8	Sep	9
Apr	9	Oct	16
May	15	Nov	10
Jun	19	Dec	17
		Total	156

The number of spinoffs announced during the decade of the 1980's (117) appears to have increased dramatically over the number announced during the 1970's (28). The increase in the number of spinoffs from the 1970's to the 1980's is consistent with results reported in prior research.

However, the magnitude of the difference between decades in this sample may be amplified by data source limitations.[1]

No clear trend is apparent in the distribution of spinoff announcements by month. However, it does appear that the greatest number of spinoffs are announced during the beginning, end and middle of the calendar year. This probably reflects the popularity of the calendar year as fiscal year and the tendency of board of directors' meetings, shareholders' meetings and other corporate business to follow a calendar year schedule.[2]

Summary statistics for the size (of capitalization) of the parent and subsidiary firms, as well as relative size are presented in Table 4.3. Size is calculated by multiplying the number of shares outstanding by the market price, both of which are obtained from the CRSP daily file. For parent firms, the market price and number of shares outstanding used in the computation are those prevailing on

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[1]Data from the Dow Jones Newswire is available only from June 1979 forward. Therefore, the disproportionate number of spinoffs announced during the last 12 years of the sample period may be partially attributable to selection bias.

[2]The relatively high number of spinoffs during the month of January (17) suggests that there may be a "January effect" for the share price reaction to the announcement of a spinoff; that is, it is possible that demergers announced during particular months exhibit systematically larger share price reactions than those announced in other months. However, disaggregation of the data by month of announcement reveal no statistically significant differences between demerger announcements in different months.

the day the spinoff is announced. For subsidiary firms, the data are gathered on the first day trading data are available. Relative size is the ratio of the market value of equity of the subsidiary over the market value of the equity of the parent.

TABLE 4.3

SUMMARY SIZE STATISTICS FOR TOTAL SAMPLE
(Parent and Subs in 000's, Relative Statistics in %)

	N	MEAN	MEDIAN	MINIMUM	MAXIMUM
Parent	156	$988,855	258,296	1,252	14,691,094
Subsidiary	144	197,741	53,886	530	2,767,856
Relative Size	144	25.16	16.39	1.76	96.68

As might be anticipated, firms that spin off a business segment tend to be large, on average (mean market value = $989 million). The portion of the equity spun off during the restructuring averages 25% for this sample. In some cases, the parent is smaller than the subsidiary after the spinoff. This peculiar outcome results when the smaller segment retains the original name and corporate charter. As reported by Hite and Owers (1983) and Miles and Rosenfeld (1983), the size of the subsidiary relative to the parent appears to be positively correlated with the magnitude of the market reaction to the announcement of a spinoff. For this sample, the Pearson product moment correlation coefficient between the two variables is .175 with a p-value of .0624.

4.1.2. Method

To test the PRNI hypothesis, it is necessary to establish a working definition of bull and bear markets. One simple delineation, suggested by Fabozzi and Francis (1977), is to categorize all months with a positive return for the value-weighted CRSP index as bull markets and all those with a negative return as bear markets. Following Fabozzi and Francis, this categorization will be designated Up/Down Markets.

Since it is likely that some spinoff announcements occur at the beginning of the month, before any period of market gains, the Up/Down Markets definition is modified to include multiple month periods of gains and losses, respectively. Two and three month periods are examined, with spinoffs announced during the preceding month(s) of each period deemed to have been announced in a "normal" period.[3]

Another definition of bull/bear markets proposed by Fabozzi and Francis is Substantial Up and Down (SUD) Months. The SUD Months definition separates the sample period into three subsets: months when the market moves up substantially, months when the market moves down

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[3]Requiring returns to be of a consistent sign for longer than three months reduced the sample size and the number of degrees of freedom dramatically. Therefore only bull/bear periods of a maximum of three months were examined for the Up/Down markets scenario.

substantially, and months when the market does not move substantially. The definition of a month in which "substantial" move takes place is one for which the absolute value of the market return is larger than half of one standard deviation of the market return measured over the entire sample period ($|R_{mt}| > 0.5\sigma_m$). Naturally, bull (bear) months are those for which the foregoing inequality is true, and the sign of the market return is positive (negative). Months during which no substantial move takes place are categorized as normal months. Requiring persistence over periods longer than two months results in the loss of most of the sample observations. Again, announcements occurring during the first month of the two month analysis fall into the normal categorization.

Finally, a third method of defining bull/bear markets is to chose a longer time frame than those described above, and require that the sign of the monthly market return be primarily, but not exclusively positive or negative. The 252 month period from 1970-1990 is divided into six month segments. Bull (bear) markets are defined as six month intervals during which at least four months exhibit a positive (negative) market return. Again, normal months are those that do not fall into either the bull or bear category. This definition is referred to hereafter as Six Month Periods. Table 4.4 presents the number of bull, bear

and normal months for the each of the market definitions of investor sentiment.

TABLE 4.4

NUMBER OF MONTHS FOR MARKET INVESTOR SENTIMENT PROXIES

	Up/Down Markets			
Persistence	Bull	Bear	Normal	Total
1 month	142	110	0	252
2 months	90	50	112	252
3 months	51	25	176	252

	Substantial Up and Down Months			
Persistence	Bull	Bear	Normal	Total
1 month	114	75	63	252
2 months	86	39	127	252

	Six Month Periods			
Persistence	Bull	Bear	Normal	Total
4 of 6 months with same sign	78	30	144	252

Given the decision-making heuristics and biases that the PRNI hypothesis is predicated upon, it seems that the recent past performance of the stock market itself may be the best proxy for investor expectations about future market performance. However, an investigation of the robustness of the PRNI hypothesis to varying specifications of investor "optimism" and "pessimism" may be illuminating with respect to the generality of the hypothesis. In this spirit, the hypothesis is examined in the context of four additional proxies for investor sentiment. The four proposed measures of investor sentiment are:

1) the University of Michigan's Institute for Social Research's consumer confidence survey,

2) the ABC News/Money magazine consumer comfort index,

3) the monthly percentage change in the Bureau of Economic Analysis's Index of Leading Indicators,

4) the percentage of investment advisory services that are "bullish".

Descriptions of these four data series follow.

The first non-market investor sentiment proxies to be described are the two indices of consumer confidence: the University of Michigan's Institute for Social Research's consumer confidence survey (CCS) and the ABC News/Money magazine consumer comfort index (CCI). Although the indices each attempt to measure and quantify the expectations of consumers and thus predict their future behavior, survey frequency as well as the number of questions asked differ between the two polls.

The CCS is a monthly telephone survey of US consumers chosen at random. The survey consists of five questions: two regarding the individual's personal finances (short-term and long-term), two concerning the economic outlook for the nation (short-term and long-term), and one pertaining to the likelihood of a purchase of consumer durables within the year. The CCI is also a telephone survey of randomly chosen individuals, but is conducted on a weekly, rather than a monthly basis. The CCI consists of only three questions regarding the same three areas of

concern: personal finances, outlook for the aggregate economy, and near-term purchasing conditions.

Each organization analyzes the information gathered in its survey and condenses the data into a single number. This number is intended to characterize the relevant time period with respect to the confidence of consumers. Relatively higher numbers indicate that consumers plan to increase purchases over the near term, and relatively lower numbers indicate the converse. The time series of this data may be evaluated to detect trends in consumer confidence, and to gauge whether consumers plan to make more or fewer purchases during the upcoming months than those immediately past.

The University of Michigan's index has been compiled on a quarterly basis since 1945, but on a monthly basis only since January, 1978. Therefore, monthly figures from this index are available for only the last 156 of the 252 month sample period. To include the entire sample period in the analysis, quarterly data are converted to monthly data by using each quarterly figure as the index value for each of the three months comprising the quarter. The ABC News/Money magazine index is a weekly number that is a monthly moving average, so that the figure reported for the last week of the month is the average for the month. This monthly average is the figure used to represent investor sentiment. The CCI has been compiled since the end of

1985; therefore only 61 months of the total sample period are available for analysis.

To test the PRNI hypothesis, it is important to segregate the data into bull months, bear months, and normal months. Since the data are reported as (or can be translated into) individual monthly numbers, an obvious method for grouping months into the three aforementioned categories is to partition the data by quartile. That is, months for which the value of the index appears in the top quartile of all index values observed during the sample period are deemed to be bull months. Similarly, months for which the value of the index appears in the bottom quartile of all index values observed during the sample period are called bear months. All remaining months (those that fall into the two middle quartiles) are normal months. As before, the PRNI hypothesis may then be tested by comparing the average prediction errors from the market model on the day(s) on which a spinoff is announced across the three (bull, bear, and normal) categories.

Another potential proxy for investor sentiment is the level of aggregate economic activity. That is, it may be that investors gauge the prospects of the stock market by evaluating certain macroeconomic variables. Since it is likely that investor's beliefs about the prospects of the stock market are influenced by the level of *future* economic activity (as opposed to current economic activity), the

index of leading indicators seems a reasonable candidate for a measure of investor sentiment. The eleven-component index of leading indicators is one of three business cycle indices (leading, lagging and coincident indicators) compiled and published by the Bureau of Economic Analysis in the monthly Survey of Current Business.

Naturally, the components of the index of leading indicators are economic variables presumed to be positively correlated with future aggregate economic activity. Examples of these components include consumer goods manufacturers' new orders for materials, the number of new building permits issued for residential housing, and the money supply (M2). Importantly for this analysis, the index of leading indicators also includes the return on the S&P 500 stock index, and the monthly results of the University of Michigan's consumer confidence survey.[4] Implications of this overlap in proxies for investor sentiment are discussed later.

The index of leading indicators is reported as a monthly figure that is a weighted average of the eleven component indices. Since *changes* in the index over time (rather than its absolute value) may be likely to influence investor confidence, the percentage change in the index from one month to the next is used as the proxy for

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[4]The consumer confidence survey information became a component of the index of leading indicators in January, 1989.

investor sentiment. That is, months during which a relatively large increase in the index of leading indicators is observed are deemed to be bull months. Similarly, months during which a relatively large decrease in the index of leading indicators is observed are deemed to be bear months. Months for which there is relatively little change in the index of leading indicators from the previous month are normal months. Procedurally, this segregation is again effected by partitioning the data into quartiles, with the upper quartile labeled bull, the lower quartile labeled bear, and the two middle quartiles normal.

The fourth non-market proxy for investor sentiment proposed is the number of professional advisory services that are optimistic or bullish with regard to the prospects of the stock market. This proxy is reported as a percentage of the total number of advisory services surveyed on a monthly basis. That is, the number reported for each month is the percentage of advisory services of those surveyed that are predicting an upturn in the stock market. The data is compiled by Investor's Intelligence of Larchmont, NY. Collection of this data began in January 1974, so there exists information for 205 months of the 252 month sample period.

Again, months are separated into bull, bear, and normal categories so as to examine the share price reaction to the announcement of a spinoff in different types of

markets. The categorization into bull, bear and normal months is effected by the segregation of the data into quartiles as described above. Naturally, months with the greatest percentage of investor advisory service described as bullish are bull months. Months with the smallest percentage of investment advisory services bullish are bear months, and all other months are considered normal. Table 4.5, Panels A and B present summary statistics and number of bull, bear, and normal months for each of the non-market investor sentiment proxies, respectively.

The data are categorized using the above definitions of bull/bear markets, and the event study method (Patell, (1976)) applied to each subset. The event study method used is as follows. The market model is estimated over days -240 to -121 relative to the announcement day:

$$R_{it} = a_i + \beta_i R_{mt} + e_{it}, \quad t = -240,\ldots,-121$$

where

R_{it} = return on equity of firm i on day t,

R_{mt} = CRSP value-weighted index of returns on the NYSE and AMEX exchanges on day t,

a_i, β_i = market model intercept and slope parameters estimated by OLS regression,

e_{it} = residual return to stock i on day t.

The market model is used to compute prediction errors for the period beginning 90 days before the event day and ending 15 days after.

TABLE 4.5

Panel A SUMMARY STATISTICS FOR NON-MARKET INVESTOR SENTIMENT PROXIES

University of Michigan Index (CCS)

	N	Mean	Min	Max	Upper Quartile	Lower Quartile
Monthly	156	83.1	51.7	101.0	93.9	71.7
Quarterly	252	81.6	54.4	99.5	91.8	72.5

ABC News/Money Index (CCI)

	N	Mean	Min	Max	Upper Quartile	Lower Quartile
Monthly	61	-11.8	-43.0	7.0	-7.0	-14.0

Percent Change in Index of Leading Indicators

	N	Mean	Min	Max	Upper Quartile	Lower Quartile
Monthly	252	3.9	32.0	42.8	10.6	-2.5

Percentage of Investment Services Bullish

	N	Mean	Min	Max	Upper Quartile	Lower Quartile
Monthly	204	43.0	16.0	80.0	50.0	35.0

Panel B NUMBER OF MONTHS FOR NON-MARKET INVESTOR SENTIMENT PROXIES

University of Michigan Index

	Bull	Bear	Normal	Total
Monthly Data	39	38	79	156
Quarterly Data	64	61	127	252

ABC News/Money Index

	Bull	Bear	Normal	Total
Monthly Data	18	18	25	61

Percent Change in Index of Leading Indicators

	Bull	Bear	Normal	Total
Monthly Data	63	64	125	252

Percentage of Investment Services Bullish

	Bull	Bear	Normal	Total
Monthly Data	46	46	112	204

Prediction errors (u_{it}) for days -90 through +15 (the event period) are computed as follows:

$$u_{it} = r_{it} - (a_i + \beta_i R_{mt}), \quad t = -90,\ldots,+15.$$

Average prediction errors and cumulative average prediction errors, respectively, are given by:

$$PE_t = \frac{\sum_{i=1}^{Nt} u_{it}}{N_t}$$

and

$$CPE_l = \sum_{t=-90}^{L} PE_t \qquad L = -90,\ldots,+15$$

where

N_t = the number of firms in the sample.

T statistics are computed as:

$$T = \frac{\left[\sum_{t=t_0}^{t_1} PE_t\right]}{[(t_1 - t_0 + 1)(p)]^{1/2}},$$

where

t_0 = first day in interval,

t_1 = last day in interval,

$$p = \frac{\sum_{t=-240}^{-121} \left[PE_t - \frac{1}{119}\left\{\sum_{t=-240}^{-121} PEt\right\}\right]^2}{118}$$

Consistent with the PRNI hypothesis, if investors' decisions are influenced by their optimism or pessimism (as measured by the above-described proxies), the stock price reaction to a spinoff announced in a bull market should be larger than the reaction to a spinoff announced during a bear market. Additionally, the stock price reaction to a spinoff announced in a bull (bear) market should be larger (smaller) than the reaction to a spinoff announced during a normal market.

The null and alternative hypotheses are as follows. H_0: the stock price reaction to the announcement of a spinoff during a bull market is not significantly different from the market reaction to the same announcement made during a bear or normal market. H_1: the stock price reaction to the announcement of a spinoff during a bull market is significantly different than the market reaction to the same announcement made during a bear or normal market. Note that for all definitions of bull/bear markets a joint hypothesis is tested. Failure to reject the null hypothesis results if:

1) investor sentiment is unrelated to the stock price reaction to a corporate spinoff, or
2) the categorizations into bull/bear markets is an inappropriate proxy for investor sentiment.

The test whether a significant difference exists between bull, bear and normal announcements is Student's t-test for the difference in means between two independent samples. The t value for the difference in means test is computed as:

$$t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{(s^2_1/n_1 + s^2_2/n_2)}}$$

where

$\bar{x}_i$ = mean of group i,

n_i = number of observations in group i,

and

$$s^2_i = \frac{\Sigma (x_j - \bar{x})^2}{n - 1}$$

The announcement day (day 0) is defined as the first mention of an impending spinoff in the WSJ. The event window includes day -1, since there is usually a one day lag between an announcement and its publication in the WSJ.

4.2. Tests of PRNI Hypothesis Using Market Proxies for Investor Sentiment

Table 4.6 presents results for the two day event window (-1 to 0) and the 89 day pre-announcement period.

TABLE 4.6

PRE-ANNOUNCEMENT PERIOD AND EVENT WINDOW
AVERAGE PREDICTION ERRORS (APE)

Full Sample

Event Period (Days)	N	APE	T-Stat	Percent Positive
-1 to 0	156	0.0267	13.10**	67
-90 to -2	156	0.0399	3.59**	56

Clean Sample

Event Period (Days)	N	APE	T-Stat	Percent Positive
-1 to 0	132	0.0267	12.15**	68
-90 to -2	132	0.0369	2.97**	56

** Significant at the .01 level.

Over the two day event window, the average prediction error for the clean sample is 2.67% and is statistically significant at the .01 level.[5] The clean sample includes only observations not contaminated by the contemporaneous announcement of non-spinoff related information. During the 89 day period prior to the spinoff announcement, the sample exhibits a statistically significant upward price drift.

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[5]Results over Two Day Event Window (-1 to 0)

	# Obs	APE	T-Stat
Hite & Owers	123	0.033	13.25
Schipper & Smith	93	0.028	6.61
Miles & Rosenfeld *	55	0.033	6.55

* Miles and Rosenfeld consider day 0 to be the day *before* the announcement appears in the WSJ so these results are reported for day 0 to +1 in their article.

4.2.1. Up/Down Markets Definition of Investor Sentiment

When the clean sample is categorized according to whether the announcement occurred during a bull, bear or normal month using the Up/Down Markets definition, positive announcement effects are observed for all categorizations over the two day event window (-1 to 0). These results are summarized in Table 4.7.

Note that the APE for announcements made during months when the market return is positive is substantially larger than the APE associated with months during which the index return is negative. For the clean sample, Up market prediction errors average between 4.04 and 5.51 percent; prediction errors for announcements made during Down markets average 0.32 to 1.14 percent.[6] These differences are statistically significant for all three categorizations of the data. Recall that for this definition of bull/bear markets, the "normal" designation indicates a month at the beginning of a two or three month bull or bear period that is discarded in order to more clearly demarcate bull and bear markets. For the two and three month categorizations (Panels B and C, respectively) the difference between announcements occurring in bull and normal months is

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[6] Similar results were obtained with the market-adjusted returns model. The mean-adjusted returns model was not used, because Klein and Rosenfeld (1987) argue this technique tends to produce upward (downward) biased abnormal returns when the event under investigation occurs in a bull (bear) market.

statistically significant; the difference between announcements occurring in bear and normal months is not. Assuming that investor sentiment is accurately represented by the Up/Down Markets separation, the results support the PRNI hypothesis.[7]

4.2.2. SUD Months Definition of Investor Sentiment

The results of the analysis based on the SUD Months categorization of the data are reported in Table 4.8. Differences between the stock price reactions for the SUD disaggregations of the sample are smaller than those for the Up/Down market categorization. However, these differences (approximately 4.1 percent for one month persistence and 2.6 percent for two months) are of considerable magnitude, given that the stock price reaction to the typical spinoff *averages* 2.7 percent.
While the one month SUD disaggregation (Panel A) displays a statistically significant difference between bull and bear months, the null hypothesis of no difference between the populations cannot be rejected for the two month definition (Panel B).

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[7]It is also possible that spinoffs which most enhance shareholder wealth tend to be announced during periods of rising market prices. However, results of an investigation of the differential long-term shareholder wealth effects of spinoffs announced in bull vs bear market do not support this supposition.

TABLE 4.7

UP/DOWN MARKETS
Bull = $R_m > 0$ Bear = $R_m < 0$

Panel A — 1 Month Persistence

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	87	.0400	12.52**	69	2.75** (Bull-Bear)
Bear	69	.0098	5.65**	65	
	156				

Clean Sample

Bull	71	.0404	11.41**	70	2.47* (Bull-Bear)
Bear	61	.0105	5.55**	66	
	132				

Panel B — 2 Months Persistence

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	56	.0474	12.28**	66	3.02** (Bull-Bear)
Bear	31	.0002	1.75†	58	1.91† (Bull-Normal)
Normal	69	.0218	7.46**	73	-1.56 (Bear-Normal)
	156				

Clean Sample

Bull	46	.0508	12.22**	70	2.73** (Bull-Bear)
Bear	27	.0032	2.05*	59	2.20* (Bull-Normal)
Normal	59	.0185	5.99**	71	-1.02 (Bear-Normal)
	132				

Panel C — 3 Months Persistence

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	35	.0579	10.56**	69	2.48* (Bull-Bear)
Bear	14	.0060	1.56	64	2.46* (Bull-Normal)
Normal	107	.0192	9.21**	67	-0.79 (Bear-Normal)
	156				

Clean Sample

Bull	31	.0551	9.98**	68	1.97* (Bull-Bear)
Bear	12	.0114	1.82†	67	2.11* (Bull-Normal)
Normal	89	.0188	8.23**	69	-0.43 (Bear-Normal)
	132				

** Significant at the .01 level
* Significant at the .05 level
† Significant at the .10 level

TABLE 4.8

SUBSTANTIALLY UP AND DOWN MONTHS

Bull = $|R_m|>0.5\sigma_m$ and $R_m>0$ Bear = $|R_m|>0.5\sigma_m$ and $R_m<0$

Panel A — 1 Month Persistence

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	72	.0402	11.48**	68	2.64** (Bull-Bear)
Bear	42	.0024	3.09**	57	0.63 (Bull-Normal)
Normal	42	.0317	7.09**	81	-2.17* (Bear-Normal)
	156				

Clean Sample

Bull	61	.0413	10.79**	69	2.55* (Bull-Bear)
Bear	36	.0020	2.89**	56	0.72 (Bull-Normal)
Normal	35	.0309	6.52**	88	-2.09* (Bear-Normal)
	132				

Panel B — 2 Months Persistence

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	63	.0392	10.68**	63	1.08 (Bull-Bear)
Bear	16	.0131	2.93**	69	1.55 (Bull-Normal)
Normal	77	.0193	7.54**	72	-0.28 (Bear-Normal)
	156				

Clean Sample

Bull	53	.0398	9.89**	64	1.20 (Bull-Bear)
Bear	13	.0085	1.86†	69	1.41 (Bull-Normal)
Normal	66	.0197	7.39**	73	-0.47 (Bear-Normal)
	132				

** Significant at the .01 level.
* Significant at the .05 level.
† Significant at the .10 level.

A bull market is a one or two month period during which the market return is positive, and the absolute value of the market return is greater than one-half the standard deviation of the market return over the entire sample period.

A bear market is a one or two month period during which the market return is *negative*, and the absolute value of the market return is greater than one-half the standard deviation of the market return over the entire sample period.

Interestingly, for the one month categorization of the data, the difference between bull and normal month APE's is statistically insignificant, while the difference between bear and normal months APE's is significant at the .05 level.

4.2.3. Six Month Periods Definition of Investor Sentiment

Results for the Six Month Periods bull/bear categorization are presented in Table 4.9. These results are also consistent with the PRNI hypothesis; the difference between the APE's of the bull and bear subsamples is 4.7 %. The magnitude of this difference is second only to that of the two month Up/Down Markets categorization and is statistically significant at the .05 level.[8] In summary, results of the analysis of market oriented proxies for investor sentiment appear to be consistent with the PRNI hypothesis. That is, the stock price reaction to announcements made during months when investors are optimistic are larger, on average, than those made during months when investors are expected to be pessimistic.

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[8]The market crash of October 1987 did not have a significant effect on these results; only one spinoff announcement during this month appears in the sample. Removing this observation from the sample has no effect.

TABLE 4.9

SIX MONTH PERIODS

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	44	.0566	13.12**	80	2.69** (Bull-Bear)
Bear	18	.0023	1.58	61	1.82† (Bull-Normal)
Normal	94	.0176	6.64**	68	-0.76 (Bear-Normal)
	156				

Clean Sample

Bull	39	.0529	11.95**	79	2.17* (Bull-Bear)
Bear	16	.0059	1.79†	63	1.67† (Bull-Normal)
Normal	77	.0185	6.58**	71	-0.56 (Bear-Normal)
	132				

** Significant at the .01 level.
* Significant at the .05 level.
† Significant at the .10 level.

This categorization defines a bull market as a six month period during which the market return is positive for at least four of the six months. A bear market is a six month period during which at least four months display negative market returns.

4.3. Tests of PRNI Hypothesis Using Non-Market Proxies for Investor Sentiment

4.3.1. Consumer Confidence Indices

In order to examine the robustness of the PRNI hypothesis to different specifications of investor optimism and pessimism, alternative measures of investor sentiment are used to categorize the data. Results of the first non-market proxy categorization (the University of Michigan's consumer confidence survey) appear in Table 4.10. Recall that monthly data for the CCS begins in January 1978, so

spinoff announcements occurring prior to that date are excluded from the monthly analysis.

No statistically significant difference exists for the three possible pairings of between bull, bear and normal markets for any categorization of the data using the CCS as a proxy for investor sentiment. Interestingly, for both the monthly and quarterly data, bear market APE's are larger than those for normal and bull markets.

The second non-market proxy for investor sentiment used to test the PRNI hypothesis is the ABC News/Money magazine consumer comfort index. Since the CCI began in December 1985, only spinoff announcements that occurred during the last 61 months of the 252 month sample period are included in this analysis. Table 4.11 presents event study results obtained from a categorization of the spinoff data using the level of the CCI as a proxy for bull, bear and normal markets. Again, there exist no statistically significant differences between the APE's for bull, bear and normal categorizations of the data. For this investor sentiment proxy, however, the average prediction errors from the subset of firms that announced during *normal* months display the largest average prediction errors. While the results obtained from the two indices of consumer confidence (or comfort) seem to be evidence against the

TABLE 4.10

UNIVERSITY OF MICHIGAN'S
MONTHLY INDEX OF CONSUMER CONFIDENCE

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means	
Bull	48	.0236	9.76**	74	-0.72	(Bull-Bear)
Bear	26	.0354	6.33**	70	-0.16	(Bull-Normal)
Normal	66	.0253	6.14**	64	0.59	(Bear-Normal)
	140					

Clean Sample

Bull	44	.0246	9.73**	75	-1.01	(Bull-Bear)
Bear	21	.0417	6.88**	81	0.20	(Bull-Normal)
Normal	57	.0222	4.30**	61	0.61	(Bear-Normal)
	122					

UNIVERSITY OF MICHIGAN'S
QUARTERLY INDEX OF CONSUMER CONFIDENCE

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means	
Bull	65	.0293	11.07**	66	-0.21	(Bull-Bear)
Bear	36	.0333	6.56**	67	0.60	(Bull-Normal)
Normal	55	.0207	5.36**	67	0.70	(Bear-Normal)
	156					

Clean Sample

Bull	54	.0268	9.61**	67	-0.58	(Bull-Bear)
Bear	28	.0391	7.02**	75	0.60	(Bull-Normal)
Normal	50	.0195	4.50**	66	0.03	(Bear-Normal)
	132					

** Significant at the .01 level.
* Significant at the .05 level.
† Significant at the .10 level.

Values of the monthly and quarterly indices of consumer confidence are subdivided into quartiles. Bull months are those for which the value of the index appears in the upper quartile of the distribution. Bear months are those for which the value of the index appears in the lower quartile of the distribution. All other months are considered normal.

TABLE 4.11

ABC NEWS/MONEY CONSUMER COMFORT INDEX

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means	
Bull	26	.0299	9.63**	73	0.94	(Bull-Bear)
Bear	17	.0149	2.81**	59	-0.74	(Bull-Normal)
Normal	22	.0465	4.09**	67	-1.47	(Bear-Normal)
	65					

Clean Sample

Bull	21	.0291	9.09**	71	0.88	(Bull-Bear)
Bear	16	.0135	2.54**	56	-0.51	(Bull-Normal)
Normal	17	.0419	2.17**	65	-1.13	(Bear-Normal)
	54					

** Significant at the .01 level.

Values of the monthly index of consumer comfort are subdivided into quartiles. Bull months are those for which the value of the index appears in the upper quartile of the distribution. Bear months are those for which the value of the index appears in the lower quartile of the distribution. All other months are considered normal.

PRNI hypothesis at first glance, further consideration of the nature of consumer confidence raises questions regarding the validity of this measure as a proxy for investor sentiment.

Given the complementary nature of the investment and consumption decisions, it may be that periods during which consumption is preferred are those for which the investment climate is perceived to be poor. Conversely, when investment prospects are perceived to be good, consumers

may prefer to defer purchases to future periods in order to take advantage of superior (expected) returns. Thus, it may be that *investor* sentiment is inversely related to *consumer* sentiment. If consumer confidence (as a proxy for planned purchases over the near term) is relatively high, this may simply mean that investment prospects are relatively poor.

Note that the above argument implicitly assumes that consumer (or investor) income is fixed across periods. If income is changing from one period to the next, it is possible for consumption and investment to be positively correlated. That is, if income is rising (falling), an individual may increase (decrease) levels of both consumption and investment. Since the CCS and CCI include survey information regarding prospective levels of income, it is possible that consumer confidence may be an appropriate proxy for investor sentiment.

If consumer sentiment is inversely related to investment opportunities, one might expect the level of consumer sentiment to be negatively correlated with proxies or return to capital available. In fact, the Pearson correlation coefficient indicates that both the monthly and quarterly CCS are negatively correlated with the return on the value-weighted CRSP index. Table 4.12 presents a correlation matrix for the various proxies for investor sentiment. Both indices are also negatively correlated

with the monthly percent change in the index of leading indicators. This evidence suggests that consumer sentiment may not be a perfect representation of investor sentiment.

4.3.2. Percent Change in Index of Leading Indicators

It may be that investor sentiment is influenced by changes in macroeconomic variables; in the context of the PRNI hypothesis, it is possible that large changes in the index of leading indicators affect the stock price reaction to the announcement of a spinoff. That is, relatively large increases (decreases) in the level of macroeconomic variables that are believed to lead the overall economy may cause investor optimism (pessimism). The separation of the spinoff data using the percent change in the index of leading indicators criterion is presented in Table 4.13.

For the clean sample, the difference between the average prediction errors in bull and bear markets is 2.6 percent. This difference is statistically significant at the 10 percent level. Differences between the APE's for both bull and bear vs normal markets are not statistically significant. As discussed earlier in this chapter, two of the components of the index of leading indicators are the return on the S&P 500 and the monthly results of the University of Michigan's consumer confidence survey.

TABLE 4.12

PEARSON CORRELATION COEFFICIENTS FOR INVESTOR SENTIMENT PROXIES *

	Percent Change in Index of Leading Indicators	Percentage of Investment Services Bullish	Monthly CCI	Quarterly CCS	Monthly CCS
Return on Value Weighted CRSP Index	.1588 (.0128)	.1064 (.1299)	-.0013 (.9920)	-.2167 (.0005)	-.1204 (.1294)
Monthly CCS **	-.1671 (.0417)	.4662 (.0001)	.8756 (.0001)	.9808 (.0001)	
Quarterly CCS	-.1353 (.0322)	.4085 (.0001)	.8916 (.0001)		
Monthly CCI †	.1434 (.3250)	.2583 (.0444)			
Percentage of Investment Services Bullish	.0234 (.1092)				

* P-Values in parentheses
** University of Michigan's Consumer Confidence Survey
† ABC News/Money Consumer Comfort Index

TABLE 4.13

PERCENT CHANGE IN INDEX OF LEADING INDICATORS

Full Sample

Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	47	.0402	7.53**	70	1.45 (Bull-Bear)
Bear	71	.0221	7.68**	64	0.98 (Bull-Normal)
Normal	38	.0134	4.28**	65	0.76 (Bear-Normal)
	156				

Clean Sample

Bull	39	.0481	8.47**	70	1.94† (Bull-Bear)
Bear	64	.0221	7.68**	64	1.50 (Bull-Normal)
Normal	29	.0101	4.08**	68	0.78 (Bear-Normal)
	132				

** Significant at the .01 level.
† Significant at the .10 level.

Monthly percentage change in the index of leading indicators is subdivided into quartiles. Bull months are those for which the percentage change of the value of the index appears in the upper quartile of the distribution. Bear months are those for which the percentage change of the value of the index appears in the lower quartile of the distribution. All other months are deemed normal.

The results presented in Table 4.13 are consistent with those obtained by market proxies for investor sentiment, but inconsistent with results obtained for consumer confidence proxies for investor sentiment. From these relationships, one might suspect that changes in the index of leading indicators are more strongly correlated with the return of the stock market than the results of

consumer confidence surveys. In fact, the percent change in the index of leading indicators is positively and significantly correlated with the contemporaneous market return; it is also negatively and significantly correlated with the quarterly CCS. (See Table 4.12)

The negative correlation between consumer confidence and percent change in the index of leading indicators can be interpreted as evidence in support of the argument that consumer confidence (indices) and the value of investment opportunities are inversely related. Unfortunately, since the percent change in the index of leading indicators seems to closely follow the stock market, it is difficult to construe this index as a "different" proxy for investor sentiment.

4.3.3. Percentage of Investment Advisory Services Bullish

Results obtained using the percentage of investment advisory services that are bullish as a proxy for investor sentiment are presented in Table 4.14.

The categorization of spinoff announcements according to type of market prevailing when the announcement takes place reveals no statistically significant differences between categorizations. Interestingly, the percentage of investment services that are bullish is positively and significantly correlated with the indices of consumer

confidence, but not with the contemporaneous market return or the percent change in the index of leading indicators. Therefore, it is possible that the results reported in Table 4.14 would be consistent with those obtained using the indices of consumer confidence as proxy for investor sentiment. In fact, this is the case.

TABLE 4.14

PERCENTAGE OF INVESTMENT ADVISORY SERVICES BULLISH

			Full Sample		
Market	N	APE	T-Stat	% Pos	T-Statistic for Difference in Means
Bull	36	.0302	11.62**	78	-0.04 (Bull-Bear)
Bear	38	.0309	6.61**	63	0.53 (Bull-Normal)
Normal	80	.0239	5.66**	65	0.42 (Bear-Normal)
	154				
			Clean Sample		
Bull	30	.0275	10.40**	77	-0.68 (Bull-Bear)
Bear	32	.0403	7.68**	69	0.52 (Bull-Normal)
Normal	65	.0207	4.41**	65	1.06 (Bear-Normal)
	127				

** Significant at the .01 level.

Monthly data for the percentage of investor services that are bullish are subdivided into quartiles. Bull months are those for which the percentage of services that are bullish appears in the upper quartile of the distribution. Bear months are those for which the percentage of services that are bullish appears in the lower quartile of the distribution. All other months are deemed normal.

4.4. Integrated Tests

It appears that the PRNI hypothesis cannot be rejected when a "market" proxy (or one closely correlated with the market) is used to represent investor sentiment. Results of tests of the PRNI hypothesis using non-market proxies do not support the hypothesis. In order to test the hypothesis using *all* previously employed proxies for investor sentiment, an ANOVA model is formulated and tested. Consider the model

$$Y_{ijk} = U + P_i + M_j + P*M_k + e_{ijk}$$

where

Y is the cumulative (over the two day event window) prediction error;

U is the main effect;

P is the proxy of investor sentiment
- i = Up/Down Markets,
- i = SUD Months,
- i = Six Month Periods
- i = Percent Change in Index of Leading Indicators
- i = CCS,
- i = CCI,
- i = Percentage of Advisory Services Bullish;

M is the type of market
- j = bull,
- j = bear,
- j = normal;

P*M is the interaction of proxy and market effects and the e_{ijk} are random errors with zero mean and equal variances.

The Up/Down Markets and SUD Months sentiment proxies have more than one bull/bear market definition. The following definitions are used in this integrated analysis: for Up/Down markets, three months of persistence, and SUD Months, two months of persistence. For the University of Michigan's CCS, quarterly data are used since observations are available for the entire sample period (in contrast to the monthly data). Again, the PRNI hypothesis is tested. In the ANOVA framework, the null hypothesis is that M, the type of market, has no statistically significant effect on the cumulative prediction errors (Y_{ijk}). Naturally, the alternative hypothesis is that prediction errors observed across the three different types of markets are significantly different from one another.

The ANOVA model is fitted to all 841 clean observations. Results are presented in Table 4.15.

TABLE 4.15

ANALYSIS OF VARIANCE FOR ALL INVESTOR SENTIMENT PROXIES

Source	Degrees of Freedom	Sums of Squares	Mean Square	F-Value	Pr>F
Proxy	6	0.000166		0.01	1.0000
Market	2	0.064284		6.09	0.0024
Proxy*Market	12	0.070748		1.12	0.3425
Model	20	0.135198	0.006759	1.28	0.1833
Error	820	4.260561	0.005279		
Total	840	4.395759			

$R^2 = 0.03076$
Grand Mean = 0.02701

The choice of proxy for investor sentiment has no effect on the size of the market model prediction errors, since the same data are evaluated using each market proxy. In contrast, the type of market prevailing on the day the spinoff is announced has an effect on the cumulative prediction error that is statistically significant at the .01 level. Consistent with the PRNI hypothesis, the average prediction error for announcements occurring during a bull market is larger than those associated with announcements during normal or bear months (.0397 vs .0206 and .0224, respectively). Tukey's studentized range test, a Bonferroni t test, and Scheffe's test all indicate that the difference between the stock price reaction in bull months and that in bear and normal months is statistically significant at the .10 level. There is no statistically significant interaction effect.

The above analysis investigates market and proxy effects on the cumulative prediction errors by using all proxies for investor sentiment developed in this study. By separating the investor sentiment proxies into two groups - market and non-market proxies - it is possible to draw a clear distinction between the market (bull, bear, normal) effects when using market vs non-market proxies. The "market" proxies are the Up/Down Markets, SUD Months and Six Month period definitions of investor sentiment. The percent change in the index of leading indicators is

included in this group, since this proxy seems to be correlated with the other three. The group of non-market proxies includes the two consumer confidence indices, and the percentage of investor advisory services bullish. Separate ANOVA models are fitted to the data for each of the two groups of market proxies. Results of these analyses are in Tables 4.16 and 4.17.

TABLE 4.16

ANALYSIS OF VARIANCE FOR MARKET INVESTOR SENTIMENT PROXIES

Source	Degrees of Freedom	Sums of Squares	Mean Square	F-Value	Pr>F
Proxy	3	0.000012		0.00	1.0000
Market	2	0.108422		10.27	0.0024
Proxy*Market	6	0.004867		0.15	0.9883
Model	11	0.113302	0.001030	1.95	0.0313
Error	516	2.655785	0.005279		
Total	527	2.769086			

R^2 = 0.04092
Grand Mean = 0.02689

TABLE 4.17

ANALYSIS OF VARIANCE FOR NON-MARKET INVESTOR SENTIMENT PROXIES

Source	Degrees of Freedom	Sums of Squares	Mean Square	F-Value	Pr>F
Proxy	2	0.000135		0.01	0.9873
Market	2	0.006028		0.57	0.5656
Proxy*Market	4	0.015714		0.74	0.5625
Model	8	0.021877	0.002735	0.52	0.8427
Error	304	1.604776	0.005279		
Total	312	1.626653			

R^2 = 0.01345
Grand Mean = 0.02721

From the above tables, it is evident that when market effects are analyzed according to the type of investor sentiment proxy used to segregate the data, only market proxies are associated with statistically significant differences in stock price reaction across types of markets. For the non-market proxies, market effects (along with proxy and interaction effects) are not statistically significant. For the models in Tables 4.16 and 4.17, Tukey's studentized range test, the Bonferroni t test, and Scheffe's test indicate statistically significant differences across market types with market proxies, and insignificant differences with non-market proxies.

The results of these integrated tests support the marginal t tests reported earlier: use of market-oriented investor sentiment proxies result in failure to reject the PRNI hypothesis, while analyses using non-market proxies lead to rejection of the hypothesis.[9] There exist two possible explanations for this set of circumstances. Either the market proxies are representative of investor sentiment and the non-market proxies are not, or neither group of proxies characterizes investor sentiment and the market proxies are capturing some entirely different phenomenon (or phenomena).

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[9]Marginal analyses are also conducted using a nonparametric test (Corrado, 1989) and an event study method that corrects for event-induced variance (Boehmer, et.al., 1991). The results of these analyses are similar to those reported above.

Finally, it should be pointed out that a statistically significant positive announcement effect is observed even during periods categorized as "bear" for all proxies of investor sentiment investigated. For one non-market proxy (the CCS), bear month APEs are larger than those of bull and normal months. For market proxies of investor sentiment (Up/Down Markets, SUD Months and Six Month Periods) the bear period announcement day APEs are much smaller than those observed during bull periods, but positive, nonetheless. If investor sentiment is symmetric and periods of low market returns induce pessimism, then these returns are *smaller* than those that might be expected based on strictly on the economic effects of the restructuring. Therefore, it appears that though investor sentiment may play a role in the positive stock price reaction to the announcement of a spinoff, it cannot be the sole explanation for the observed response.

CHAPTER 5: PORTFOLIO ANALYSIS

5.1. Data and Method

5.1.1. Portfolio Analysis Sample

The data used in the analysis of the long-term effects on shareholder wealth are a subset of that used in the event study analysis. More information is required to create and analyze the performance of spinoff portfolios; observations are "lost" whenever information on the subsidiary firm, for example, is unavailable. Specifically, for this analysis of the long-term or portfolio effects of corporate spinoffs it is required that:

1) the spun off subsidiary be traded on either the New York or American exchanges, or on NASDAQ, and

2) at least three years (720 days) of trading data be available for both the parent and subsidiary following the ex-date, (and prior to the ex-date as well, but the latter constraint was not violated by any firm in the sample)

3) the ex-date be reported.[1]

Of the total sample of 156 firms, the spun off subsidiaries of 144 are traded on one of the three above-listed exchanges. Table 5.1 presents the number of parent and spun off firms that trade on each exchange. The remaining 12 are either offshore subsidiaries of a US

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[1]For several firms in the event study sample, no ex-date is reported in Moody's Dividend Record. A statement such as "No ex-dividend date has been set by the NYSE" appeared where the ex-date is typically reported. These firms are deleted from the portfolio analysis sample.

parent that do not trade on a US exchange, firms that are listed on a regional exchange, or firms that changed names during the spinoff process and remain undetected by this investigation. For 54 of the 144 firms for which price information is available, either:

1) one or both of the parent and subsidiary firms listed for less than the requisite three years,

2) or the ex-date was not reported.

Accordingly, the final sample for portfolio analysis consists of 90 firms. Summary statistics for the size of the parent and subsidiary firms, as well as relative size are presented in Table 5.2.

TABLE 5.1

SPINOFF FIRMS BY EXCHANGE LISTING

	Parent	Subsidiary
NYSE	71	41
ASE	39	21
OTC	46	82
	156	144

TABLE 5.2

SUMMARY SIZE STATISTICS FOR PORTFOLIO ANALYSIS
(Parent & Subsidiaries in 000's, Relative Statistics in %)

	N	MEAN	MEDIAN	MINIMUM	MAXIMUM
Parent	90	$1,218,341	290,854	1,252	14,691,094
Subs	90	227,836	59,675	2,305	2,767,856
Relative Size	90	24.71	16.38	1.76	96.68

Both the parents and subsidiary firms are larger for the subset of companies for which sufficient information is available for the portfolio analysis. This result is not surprising, since more information tends to be available for larger firms. Relative size, however, remains essentially unchanged (24.71% vs 25.16%).

5.1.2. Portfolio Analysis Method

Although the short-term announcement effects of corporate spinoffs have been examined in some detail, the long-term effects on shareholder wealth of this form of corporate restructuring are left unexplored. As noted earlier, Cusatis, Miles, and Woolridge (1991) (CMW) investigate the post-spinoff performance of a portfolio of spun off subsidiaries and find that this portfolio has returns that are superior to those of a market portfolio or one composed of a sample of matched firms.

However, CMW investigate only the post ex-dividend date (day on which the parent and subsidiary begin trading as separate entities) performance of the spun off firms ignoring the performance of the parent company. Parent firms are typically much larger than spun off subsidiaries; the performance of the former is more important than that of the latter in determining overall efficiency accruing to the investor. Therefore, the post-event performance of

both the parent and subsidiary firms are investigated in the following analysis.

Another issue that has thus far not been addressed in the finance literature is the relative risk-adjusted performance of demerged firms before and after the event of the spinoff. A useful technique for examining the general performance of groups of firms is to create portfolios consisting of the firms under investigation, and then evaluate the performance of the portfolio. In the demerger case, two portfolios are created: one comprising the pre-spinoff parent firms, and another composed of the post-spinoff parent and subsidiary firms. The relative risk-adjusted performance of these two portfolios has implications for the general success of corporate spinoffs as a shareholder wealth-enhancing strategy.

If it is found that the post-spinoff portfolio has a risk-adjusted return superior to that of the pre-spinoff portfolio, then this may be interpreted as evidence supporting the idea that spinoffs increase shareholder wealth, on average. Similarly, if the risk-adjusted performance of the two portfolios is not significantly different, then on average, shareholder wealth has been enhanced (by the amount of the increase in share price on the announcement day). On the other hand, if the post-spinoff portfolio underperforms the pre-spinoff portfolio

on a risk-adjusted basis, the generally accepted view that demergers increase shareholder wealth can be questioned.

In order to compare the risk-adjusted return of the pre and post-spinoff portfolios (Before and After portfolios, respectively), the sample of firms that have announced and subsequently undertaken a divestiture of a business segment via spinoff is created, as described in Section 5.1.1.

As reported above, the final sample consists of 90 firms. The pre-spinoff evaluation period begins three years (720 trading days) prior to each firm's ex-date and ends the day before the ex-date. The 90 days immediately prior to the announcement of the spinoff and the two-day event window are excluded from the analysis so as to abstract from the share price effects directly associated with the spinoff announcement. The post-spinoff evaluation period begins on the ex-date and ends three years after this date for parent firms. For subsidiary firms, the evaluation period begins on the first day the stock begins trading and ends 720 trading days later.[2] Naturally, the After portfolio is twice as large as the Before portfolio (180 vs 90 firms).

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[2]Generally, the first trading day is within two weeks of the ex-date. For firms which trade on a when-issued basis, stock price data is gathered from Standard & Poors Daily Stock Price Records.

Three different measures of portfolio performance are used to achieve a broad assessment of the risk/return characteristics of the two portfolios. Perhaps the most appropriate measures of portfolio performance for the purposes of this analysis are those that consider systematic risk as the true estimate of risk. Since it is unlikely that any investor would retain all of his wealth in a portfolio consisting exclusively of spinoff firms, non-diversifiable risk should be a more valid gauge than total risk.

The Treynor measure of portfolio performance examines "excess" return (above that of the risk-free asset) when β is the risk measure. The Treynor measure appears as:

$$(R_p - R_f)/\beta_p$$

where

$$R_t = \sum_{t=1}^{M} r_{it},$$

M = number of days in evaluation period,

r_{it} = return for security i on day t,

$$R_p = \sum_{i=1}^{N} W_i R_t$$

N = number of firms in portfolio,

W_i = proportion of firm i's equity value to the summed equity value of all firms in portfolio,[3]

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[3]The weight of each firm is the ratio of its average equity value across the three year evaluation period to the total average equity value for all firms in the portfolio.

R_f = return on the risk-free asset,

$$\beta_i = \frac{Cov(R_i, R_m)}{\sigma^2(R_m)}$$

R_m = return on the market portfolio,

$$\beta_p = \sum_{i=1}^{N} W_i \beta_i.$$

Before and After portfolio excess returns and βs are calculated in the above described manner.[4] In this analysis daily stock returns from the CRSP Master daily file are used. The risk-free rate is proxied by the 30-day Treasury-bill rate. Excess return is annualized (excess return over three year period/three) to provide a more familiar measure of return. Since β estimates vary depending on the market proxy chosen, three market indices are used for the market return. These three benchmark portfolios are the value-weighted CRSP index, the equal-weighted CRSP index, and the Standard & Poors 500 index.

Another measure of portfolio performance using β as the measure of risk is the Jensen performance index. This measure is:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$$

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[4]However, since this analysis is being conducted over event rather than calendar time, the risk-free return (R_f) is also a "portfolio", with the values of the monthly Treasury bill rate being weighted by the portfolio weight of the firm with which it is associated.

Procedurally, weekly (five trading days) portfolio returns are computed, then the contemporaneous risk-free rate of return is subtracted to create the weekly excess return. Excess returns so obtained are regressed against the weekly market risk premium (market return less risk-free return) using OLS. Naturally, this means that for the three year (720 trading days) evaluation period, the number of observations used in the regression is 144 and that 48 observations are available for the yearly analyses.

If the portfolio under investigation earns more than the "normal" (Jensen's term) risk premium for its level of risk, the intercept term (α) will be significantly positive. Conversely, α will be negative for any portfolio that earns a return less than that commensurate with its systematic risk. Portfolios earning a normal return for the level of non-diversifiable risk borne will have α's not significantly different from zero.

The use of this measure to assess portfolio performance is problematic, of course, since Roll (1978) demonstrates that rankings of portfolio performance can vary with different benchmark portfolios. However, Peterson and Rice (1980) use the Jensen measure (as well as the Sharpe and Treynor measures) to rank the performance of fifteen mutual funds using four different benchmark portfolios. Examining the degree of correlation between rankings and across benchmark portfolios, the authors

report that "little change in ranking occurred when the market index was varied".

Therefore, although ambiguous evidence may result from the use of the Jensen measure, it can be a meaningful technique for assessing portfolio performance, especially when combined with other portfolio performance evaluation methods. In this analysis three market proxies are used to mitigate (and examine) the severity of the variable ranking problem for this particular dataset.

Finally, the (excess) return to variability measure first proposed by Sharpe (1966) is used to evaluate the comparative performance of portfolios of spinoff firms before and after the event. The Sharpe measure is defined as:

$$(R_p - R_f)/\sigma_p$$

where

σ_p = the standard deviation of portfolio p.

This criterion defines total risk as the risk relevant to holders of the portfolio when, in fact, systematic risk is more likely to be germane, as discussed above. However, when combined with the results of the Treynor and Jensen indices, the results of an analysis using the Sharpe index provides additional information with respect to the risk-return characteristics of the two portfolios to be compared.

Next, the performance of both the Before and After portfolios is analyzed on a year by year basis. This is in order to ascertain patterns over time in the risk and market-adjusted returns for each of the two portfolios. The After portfolio is also decomposed into parent and subsidiary portfolios, which are evaluated using the three techniques described above. This analysis provides evidence regarding the source of After portfolio risk-adjusted returns.

If the division of the firm into two entities has little effect on the risk-return characteristics of the spinoff firms in general, the differences in pre and post-spinoff portfolio performance will be small. Therefore, it will not be possible to draw a clear conclusion regarding the long-term effectiveness of the spinoff decision.

In order to more clearly differentiate the two portfolios, an empirical test is conducted to determine whether or not there exists a statistically significant difference between estimates of the parameters of the market model for the combined (pre-spinoff) and separated (post-spinoff) firms. The Chow test is used to determine whether changes in parameter estimates are statistically significant. The formulation of the Chow test is as follows.

The market model appears as:

$$R_{i,t}=\alpha_i+\beta_i R_{m,t}$$

where

R_{it} = return on stock i at time t,

R_{mt} = return on market at time t

To test whether the estimates of the parameters of the market model change for each firm after the spinoff, the unrestricted model is estimated and appears as:

$$R=\begin{bmatrix}R_1\\R_2\end{bmatrix}=\begin{bmatrix}M_1 & 0\\0 & M_2\end{bmatrix}\begin{bmatrix}\alpha_1\\\beta_1\\\alpha_2\\\beta_2\end{bmatrix}+u$$

Note that the estimates for both the intercepts and slopes may be different before and after spinoff in this formulation. An ordinary least squares regression produces vectors β (slope vector) and **e** (residual vector). The β vector appears as:

$$\beta=(\acute{M}M)^{-1}\acute{M}R$$

and **e'e** is the unrestricted residual sum of squares.
The null hypothesis of no difference between the parameters estimates of the market model before and after the spinoff appears as:

$$H_o=\begin{bmatrix}\alpha_1\\ \beta_1\end{bmatrix}=\begin{bmatrix}\alpha_2\\ \beta_2\end{bmatrix}$$

or

$$H_o=\begin{vmatrix}1 & 0 & -1 & 0\\ 0 & 1 & 0 & -1\end{vmatrix}\begin{vmatrix}\alpha_1\\ \beta_1\\ \alpha_2\\ \beta_2\end{vmatrix}=\begin{bmatrix}0\\ 0\end{bmatrix}$$

The restricted model is as follows :

$$\begin{bmatrix}R_1\\ R_2\end{bmatrix}=\begin{bmatrix}M_1\\ M_2\end{bmatrix}\begin{bmatrix}\alpha\\ \beta\end{bmatrix}+u$$

from this equation, the restricted residual sum of squares $e_*'e_*$ can be calculated. Then, the S statistic is computed using the formula:

$$S=\frac{\dfrac{(e_*'e_*-\acute{e}e)}{q}}{\dfrac{\acute{e}e}{(n-k)}}\sim F_{(q,n-k)}$$

where

q = the number of restrictions,

k = number of parameters

n = n_1 + n_2 = total number of observations.

If the value of the test statistic exceeds the critical value of the F statistic then the null hypothesis of no change in the parameters of the market model post-spinoff may be rejected.

For firms that display a statistically significant difference in the parameter estimates of the market model before and after the spinoff, the long-term shareholder wealth effects of corporate spinoffs are investigated using the Treynor, Jensen, and Sharpe measures.

Finally, portfolios are created using the timing of the announcement of the spinoff as selection criterion. That is, portfolios are created based on whether a firm announced its spinoff during a bull or a bear market (using the definitions of bull/bear markets used in the event study analysis.) Evaluation of the before spinoff/after spinoff risk-adjusted performance of these portfolios is conducted using the above-described techniques to ascertain whether the timing of the demerger announcement affects the long-term performance of spinoff firms in general.

The method described above conducts the portfolio performance analysis over event time. The portfolios thus constructed are in some sense fictional, since this technique presumes that each firm's ex-date is the same as that of all other firms. Although appropriate for evaluating the long-term wealth effects of a corporate event, this approach does not address the returns actually

available to investors. An alternative procedure is to conduct the analysis over calendar, rather than event time. The focus of this investigation is the risk-adjusted returns available to investors who purchase the shares of spinoff firms two years prior to the ex-date and hold these shares for two years after the ex-date. Therefore, firms are added to the portfolio on the date 24 months prior (480 trading days) to their respective ex-dates and removed 24 months after their ex-date.

Rather than a comparison of pre and post-spinoff portfolio performance, the calendar time analysis examines the risk-adjusted returns actually available to investors who hold portfolios of spinoff firms throughout the demerger process. Note that the pre-announcement period and two-day event window returns are *not* excluded in this analysis. The calendar time portfolios consist of the 90 firms that are examined in the event time analysis. The firms are segregated into three portfolios, using the year in which the parent firm went ex-dividend as the criterion by which portfolios are constructed.

Accordingly, the first portfolio consists of firms for which the ex-date occurred between January 1970 and December 1980. The second portfolio consists of firms for which the ex-date occurred between January 1980 and December 1985. Firms for which the ex-date occurred between January 1986 and December 1988 comprise the third

portfolio. Risk-return characteristics of these portfolios are analyzed using the portfolio performance measurement techniques described above. The contribution of the calendar time analysis is to examine risk-adjusted returns that are actually available to investors from spinoff firms that exist contemporaneously.

5.2. Portfolio Analysis Results

5.2.1. Performance of the Full Sample Portfolio

Evaluation of the performance of the Before and After portfolios on a market and risk-adjusted basis yields the results presented in Tables 5.3 and 5.4. The annualized excess returns for the Before and After portfolios are presented in Panel A of Table 5.3. The After portfolio displays an annualized excess return of approximately 14.7 percent, while the annualized return for the Before portfolio is approximately 11.5 percent. The difference between the excess returns of these two portfolios is not statistically significant at the .05 level.[5]

Recall that the evaluation period for the Before portfolio does not include the ninety days prior to the announcement of the spinoff or the two day announcement window. The After portfolio also has greater returns (or smaller negative returns in the case of the equal-weighted

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[5]A t-test of difference in means is conducted on the daily portfolio excess return for the Before and After portfolios. This t-statistic is 1.49.

CRSP index) than the Before portfolio on a market-adjusted basis for all three of the proxies for market return.

TABLE 5.3

FULL SAMPLE THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Annualized Excess and Market-Adjusted Returns

	Before Portfolio	After Portfolio
Annualized Excess Return	11.46	14.69
Value-Weighted CRSP Adjusted	2.19	6.35
Equal-Weighted CRSP Adjusted	-4.53	-0.88
S&P 500 Adjusted	7.14	9.95

Panel B

Estimated Market Model Parameters

		Parameter Estimates	
Benchmark	Parameter	Before	After
Valued-Weighted	α	0.0007	0.0001
CRSP Index	β	1.082	1.025

		Parameter Estimates	
Benchmark	Parameter	Before	After
Equal-Weighted	α	-0.0002	-0.0001
CRSP Index	β	1.125	1.093

		Parameter Estimates	
Benchmark	Parameter	Before	After
Standard &	α	0.0002	-0.0001
Poors 500	β	1.008	1.093

TABLE 5.4

FULL SAMPLE THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Risk-Adjusted Performance

$$\text{Treynor's Measure} = (R_p - R_f)/\beta_p$$
$$\text{Sharpe's Measure} = (R_p - R_f)/\sigma_p$$

	Treynor's Measure			
Benchmark	Value Weighted CRSP	Equal Weighted CRSP	S&P 500	Sharpe's Measure
Before Portfolio	0.106	0.102	0.114	26.96
After Portfolio	0.143	0.134	0.134	21.02

Panel B

Jensen's Measure of Portfolio Performance

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$$

Before Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0309 (0.26)	-0.0890 (-1.36)	0.0509 (2.21*)
β	1.394 (13.65**)	1.316 (11.05**)	1.358 (13.63**)

After Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0743 (1.51)	-0.0496 (-0.96)	0.0964 (1.99*)
β	0.690 (6.23**)	0.596 (5.36**)	0.686 (6.48**)

** Significant at the .01 level
* Significant at the .05 level

Interestingly, both portfolios have positive market adjusted returns when the S&P 500 and the CRSP value-weighted indices are used as the market proxy. In contrast, *negative* returns are observed for each portfolio for the equal-weighted CRSP index. This pattern of greater returns for the CRSP equally-weighted index relative to the other two indices is observed throughout the analysis of portfolio performance. One possible explanation for the superior performance of the equally-weighted index is the small firm effect; the S&P 500 consists primarily of large capitalization firms and the value-weighted index, naturally, is more heavily influenced by the performance of larger firms.[6] If small firms earn risk-adjusted returns that are greater than those earned by large capitalization firms, this would be reflected in higher returns for an equally-weighted index than a value-weighted index consisting of the same firms or an index comprised primarily of large firms.

Examining risk-adjusted performance (Table 5.4, Panels A and B), the After portfolio again outperforms the Before portfolio. Specifically, since Before and After average portfolio βs are almost the same, (Before = 1.072, After = 1.070) values for the Treynor measure of portfolio performance reflect the relationship between the annualized

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[6]For a discussion of the small firm effect, see Reinganum (1981) or Roll (1982).

excess returns of the two portfolios. The After portfolio is exactly twice as large as the Before portfolio so it might be expected that the standard deviation of the former is larger than that of the latter. On the other hand, half of the After portfolio is comprised of small firms (the spun off firms) that yield returns that tend to be more volatile than those of the larger firms that comprise the Before portfolio. In fact, the standard deviation of the daily portfolio return over the three year evaluation period of the Before portfolio is lower than that of its After counterpart (.0043 vs .0069). Therefore, the result obtained using the Sharpe measure of portfolio performance is not consistent with that obtained with Treynor's measure; the Sharpe measure indicates superior performance for the Before portfolio. For this sample of spinoff firms, the demerger has virtually no effect on systematic risk, but increases the level of total risk of the portfolio.

Finally, the Jensen measure of portfolio performance (Table 5.4, Panel B), using three proxies for the market return, indicates abnormal performance in the case of both the Before and After portfolios when compared to the excess return on the S&P 500 index. (T statistics are in parentheses.) This abnormal performance is significantly positive, but is not supported by results obtained using the CRSP value and equally-weighted indices as market

proxies. Note that estimates of the β coefficient for Jensen's measure seem unusually high for the Before portfolio (average = 1.36), and unusually low for the After portfolio (average = 0.66). These results can be attributed to the fact that the analysis is being conducted over event, rather than calendar time.

5.2.2. Performance of Before Portfolio

An examination of the performance of the Before portfolio on a yearly basis is presented in Tables 5.5 and 5.6. The designation "one year prior" denotes the 240 trading day period immediately before the ex-date for each firm in the spinoff portfolio. (Excluding, of course, the 90 day pre-announcement period and the two day event window.) Similarly, "two years prior" represents the 240 day trading period between the 241st and 480th (inclusive) trading days prior to the spinoff. Finally, the "three years prior" period is comprised of the 240 trading days between the 481st and 720th trading days before the ex-date for each demerger firm in the portfolio.

The decomposition of Before portfolio results over the total evaluation period into each of the three component years reveals relatively even performance for excess returns. Raw excess returns seem to be flat over the periods two and three years before the spinoff, and then

TABLE 5.5

FULL SAMPLE BEFORE THE EX-DATE

Panel A

Yearly Excess and Market-Adjusted Returns

	1st Year Prior	2nd Year Prior	3rd Year Prior
Annualized Excess Return	8.75	12.68	11.35
Value-Weighted CRSP Adjusted	8.01	-2.75	6.72
Equal-Weighted CRSP Adjusted	3.84	-15.12	6.51
S&P 500 Adjusted	11.95	2.35	9.60

Panel B

Estimated Market Model Parameters

		Parameter Estimates		
Benchmark	Parameter	1 Year Prior	2 Years Prior	3 Years Prior
Valued-Weighted CRSP Index	α	-0.0002	-0.0002	0.0004
	β	1.125	1.138	0.925

		Parameter Estimates		
Benchmark	Parameter	1 Year Prior	2 Years Prior	3 Years Prior
Equal-Weighted CRSP Index	α	-0.0003	-0.0008	0.0003
	β	1.179	1.272	1.020

		Parameter Estimates		
Benchmark	Parameter	1 Year Prior	2 Years Prior	3 Years Prior
Standard & Poors 500	α	0.0001	0.0001	0.0005
	β	1.062	1.057	0.856

TABLE 5.6

FULL SAMPLE BEFORE THE EX-DATE

Panel A

Risk-Adjusted Performance

Treynor's Measure = $(R_p - R_f)/\beta_p$
Sharpe's Measure = $(R_p - R_f)/\sigma_p$

Benchmark	Treynor's Measure: Value Weighted CRSP	Treynor's Measure: Equal Weighted CRSP	Treynor's Measure: S&P 500	Sharpe's Measure
1 Year Prior	0.079	0.074	0.082	18.08
2 Years Prior	0.111	0.099	0.120	29.35
3 Years Prior	0.123	0.111	0.133	32.33

Panel B

Jensen's Measure of Portfolio Performance

$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$

One Year Prior to Ex-Date

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0665 (1.61)	0.0890 (1.36)	0.0509 (1.89†)
β	1.421 (9.84**)	1.419 (8.36**)	1.390 (9.58**)

Two Years Prior to Ex-Date

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	-0.1066 (-0.89)	-0.2661 (-2.02*)	0.0235 (0.463)
β	1.675 (7.26**)	1.608 (5.89**)	1.586 (7.12**)

Three Years Prior to Ex-Date

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0778 (1.00)	0.1039 (1.19)	0.1210 (1.63)
β	0.990 (5.73**)	0.829 (4.18**)	0.982 (5.95**)

** Significant at the .01 level
* Significant at the .05 level
† Significant at the .10 level

decline slightly in the year immediately prior to the spinoff. However, on a market-adjusted basis, the Before portfolio shows the best performance in the first year prior to the spinoff, with market-adjusted return actually negative for the second year prior to the spinoff for two of the market proxies. The relatively good market-adjusted performance of the Before portfolio in the year immediately prior to the spinoff may reflect information leakage *before* the 90 day pre-announcement period for some firms in the portfolio.

On a risk-adjusted basis (Table 5.6, Panel A), Treynor's measure indicates that the performance of the Before portfolio is best in the third year prior to the spinoff (average Treynor's index = .122) and worst in the year immediately prior to the spinoff. Similarly, Sharpe's measure suggests that portfolio performance is best during the third year prior to the spinoff.

For the Jensen measure, the results show that performance during the first year prior to the spinoff is significantly positive when compared to the S&P 500 index. In contrast, performance during the second year prior to the spinoff is significantly negative when measured against the equally-weighted CRSP index. In summary, it appears that the risk-adjusted performance of the Before portfolio is best during the third year before the spinoff and best

on a market-adjusted basis during the year immediately prior to the spinoff.

5.2.3. Performance of After Portfolio

An examination of the performance of the After portfolio on a yearly basis is presented in Tables 5.7 and 5.8. The period designated "first year after" represents the 240 trading days immediately following the ex-dividend date of each firm in the portfolio. "Second year after" and "third year after" periods consist of trading days 241-480 and 481-720 relative to the ex-date, respectively.

Of the three years constituting the sample period, the After portfolio displays the best performance during the second year following the spinoff, on both a raw excess return and market-adjusted return basis. The above-market returns reported for the After portfolio appear to be concentrated in the second year following the spinoff, with returns over the first and third years approximating those of the market proxies. These results are consistent with those of Cusatis, Miles and Woolridge (1991), who report that spun off subsidiaries show the strongest market-adjusted performance during the second year after the spinoff. These authors also report relatively poor performance over the first year (primarily because of poor

performance in the distribution month), but good performance during the third year following the spinoff.[7]

TABLE 5.7

FULL SAMPLE AFTER THE EX-DATE

Panel A

Yearly Excess and Market-Adjusted Returns

	1st Year After	2nd Year After	3rd Year After
Annualized Excess Return	2.77	20.09	13.32
Value-Weighted CRSP Adjusted	0.89	10.55	2.16
Equal-Weighted CRSP Adjusted	2.32	4.85	-5.66
S&P 500 Adjusted	4.04	13.12	3.05

Panel B

Estimated Market Model Parameters

		Parameter Estimates		
		1st Year	2nd Year	3rd Year
Benchmark	Parameter	After	After	After
Valued-Weighted	α	-0.0001	-0.0001	0.0005
CRSP Index	β	1.096	1.084	0.855

		Parameter Estimates		
		1st Year	2nd Year	3rd Year
Benchmark	Parameter	After	After	After
Equal-Weighted	α	-0.0026	-0.0001	0.0001
CRSP Index	β	1.200	1.221	0.976

		Parameter Estimates		
		1st Year	2nd Year	3rd Year
Benchmark	Parameter	After	After	After
Standard &	α	0.0001	0.0001	0.0006
Poors 500	β	1.028	1.007	0.791

[7]Mean raw return for subsidiaries over the distribution month for CMW's sample: -0.09%. Mean raw return for subsidiaries over the distribution month for this sample: -0.19%.

TABLE 5.8

FULL SAMPLE AFTER THE EX-DATE

Panel A

Risk-Adjusted Performance

Treynor's Measure = $(R_p - R_f)/\beta_p$
Sharpe's Measure = $(R_p - R_f)/\sigma_p$

Benchmark	Treynor's Measure: Value Weighted CRSP	Treynor's Measure: Equal Weighted CRSP	Treynor's Measure: S&P 500	Sharpe's Measure
1st Year After	0.025	0.023	0.027	4.44
2nd Year After	0.185	0.165	0.199	25.93
3rd Year After	0.155	0.136	0.168	19.33

Panel B Jensen's Measure of Portfolio Performance

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$$

First Year After Ex-Date

	Parameter Estimates: Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0808 (0.83)	0.0503 (1.43)	0.0953 (1.41)
β	0.550 (3.00**)	0.552 (3.09**)	0.561 (3.19**)

Second Year After Ex-Date

	Parameter Estimates: Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.1151 (1.74†)	0.0704 (0.74)	0.1391 (1.95†)
β	0.822 (5.11**)	0.900 (5.29**)	0.785 (5.02**)

Third Year After Ex-Date

	Parameter Estimates: Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0303 (0.42)	0.0128 (0.16)	-0.0539 (-0.76)
β	0.718 (5.64**)	0.543 (4.05**)	0.714 (5.88**)

** Significant at the .01 level
† Significant at the .10 level

For this sample, spinoff portfolio returns over the third year following the demerger outperform the value-weighted CRSP and S&P 500 index market proxies, but not the equal-weighted CRSP index. (The Jensen measure indicates, nevertheless, that these differences are not statistically significant.)

Risk-adjusted returns over the second year following the spinoff are also superior to those of the other two years comprising the sample period. The average Treynor measure (across market proxies) is larger for the second year (.183) than for either the first (.025) or third (.153) years. Similarly, the Sharpe measure of portfolio performance is largest for the second year. The Jensen measure reveals that the only significantly positive α's are observed during the second year following the spinoff using the value-weighted CRSP and the S&P 500 indices as market proxies. In summary, the performance of the After portfolio during the second year following the spinoff appears to be superior to that of the market in general (for the market proxies used here). The performance of the spinoff portfolio during the first and third years following the demerger is not significantly different from that of the market.

5.2.4. After Portfolio by Parent and Subsidiary

The After portfolio is separated into two portfolios; one comprised of parent firms and the other consisting of subsidiary firms. This decomposition allows analysis of the relative contribution of parent and subsidiary firms to overall portfolio performance. Annualized excess returns and market-adjusted returns are presented in Table 5.9.

TABLE 5.9

PARENT AND SUBSIDIARY PORTFOLIOS
Three Years After Ex-Date

Panel A

Annualized Excess and Market-Adjusted Returns

	Parent Portfolio	Subsidiary Portfolio
Annualized Excess Return	15.27	11.31
Value-Weighted CRSP Adjusted	6.93	2.97
Equal-Weighted CRSP Adjusted	-0.30	-4.26
S&P 500 Adjusted	10.53	6.57

Panel B

Estimated Market Model Parameters

		Parameter Estimates	
Benchmark	Parameter	Parent	Subsidiary
Valued-Weighted CRSP Index	α	0.0001	0.0004
	β	1.068	0.772

		Parameter Estimates	
Benchmark	Parameter	Parent	Subsidiary
Equal-Weighted CRSP Index	α	0.0001	0.0001
	β	1.107	1.015

		Parameter Estimates	
Benchmark	Parameter	Parent	Subsidiary
Standard & Poors 500	α	-0.0001	0.0001
	β	1.106	1.016

TABLE 5.10

PARENT AND SUBSIDIARY PORTFOLIOS

Panel A

Risk-Adjusted Performance

Treynor's Measure = $(R_p - R_f)/\beta_p$
Sharpe's Measure = $(R_p - R_f)/\sigma_p$

	Treynor's Measure			
Benchmark	Value Weighted CRSP	Equal Weighted CRSP	S&P 500	Sharpe's Measure
Parent Portfolio	0.143	0.153	0.138	31.42
Subsidiary Portfolio	0.147	0.111	0.111	13.79

Panel B

Jensen's Measure of Portfolio Performance
$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$

Parent Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0140 (1.54)	-0.0011 (-1.38)	0.0173 (2.34*)
β	0.693 (6.28**)	0.599 (5.41**)	0.688 (6.52**)

Subsidiary Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0012 (0.69)	-0.0154 (-0.30)	0.0212 (1.18)
β	0.797 (4.42**)	0.863 (4.66**)	0.716 (4.15**)

** Significant at the .01 level
* Significant at the .05 level

Table 5.10 contains risk-adjusted returns for the Parent and Subsidiary portfolios.

Over the three year post-spinoff evaluation period, the Parent portfolio outperforms the Subsidiary portfolio on both a raw excess return and market-adjusted excess return basis. However, a comparison of the mean daily excess portfolio returns does not indicate a statistically significant difference between the return of the two portfolios. Surprisingly, systematic risk, as measured by average portfolio β across market proxies, is lower for the Subsidiary portfolio (0.93) than for the Parent portfolio (1.09). This result is unexpected since subsidiary firms are typically much smaller than the parent firms, and thus might have larger βs. The Subsidiary portfolio β estimate for the value-weighted CRSP index (0.77) is considerably lower than that for the other two indices (avg. = 1.02). This result may indicate the inappropriateness of the value-weighted CRSP index as a benchmark portfolio for a sample of small firms.

The average Treynor measure for the Parent portfolio is .144 and the corresponding average measure for the Subsidiary portfolio is .123, indicating superior risk-adjusted performance by the former, despite the lower β of the latter. It should be noted, however, that the β estimate computed using the value-weighted CRSP index influences these results; the average Treynor measure for

the Subsidiary portfolio using only the equal-weighted and S&P 500 indices is .111. Total risk as measured by portfolio standard deviation is considerably higher for the Subsidiary portfolio (.0082 vs .0048), and thus the Sharpe measure indicates superior risk-adjusted performance by the Parent portfolio. Evaluating results from the Jensen measure of portfolio performance, significant abnormal performance is observed only for the Parent portfolio when using the S&P 500 index.

These results for the Subsidiary portfolio are similar to those reported by CMW for their sample of spun off firms; however, the portfolio return for this sample is somewhat smaller than the portfolio return described by CMW. These authors report an annualized three year return of 27.4 percent, while the annualized three year return for this sample of subsidiary (spun off) firms is 20.6 percent.[8] Consequently, the market-adjusted annualized return for this sample is also smaller than that reported by CMW, and is not significantly greater than any of the three market proxies used. Choice of market proxy is important, however. Compared to the benchmark portfolio used by CMW (the S&P 500), this sample of spun off firms

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[8]The difference between the results obtained by CMW and those for this sample may be partially explained by the fact that CMW's sample consists of 21 firms (of a total of 146) that are merged into another firm *during* the evaluation period. The positive and statistically significant abnormal returns accruing to merger targets may influence the returns for CMW's sample portfolio.

has positive market adjusted returns but compared to the equal-weighted CRSP index, market adjusted returns are *negative*. Although CMW use the S&P 500 as their market proxy, it is by no means clear that this index of (relatively) large firms is an appropriate benchmark with which to evaluate the performance of a portfolio of small firms.

5.3. *Portfolio Performance When a Post-Spinoff Change in the Estimates of the Market Model Parameters is Detected*

In order to examine changes in the risk-return characteristics of firms that have undertaken a spinoff, a subset of the complete spinoff portfolio is created. The criterion for any given firm's inclusion in this new portfolio is a statistically significant change in the estimates of the parameters of the market model after the demerger. Of the full sample of 90 firms, for 34 it is possible to reject the null hypothesis of no statistically significant change in the parameters of the market model after the spinoff. This sample of 34 firms is designated the "Reject" portfolio. The Reject portfolio is expected to be comprised of firms that have experienced the most dramatic changes in risk-return characteristics, and thus a comparison of Before and After portfolios may clarify results observed in the full sample spinoff portfolio. The results obtained in an analysis of the risk-return performance of a portfolio of firms for which there is a

significant change in the estimates of the parameters of the market model after the event of the spinoff (the Reject portfolio) are somewhat surprising.

It was expected that the results of this analysis would amplify the changes observed in the risk-return characteristics for the portfolio of all firms in the sample.

TABLE 5.11

REJECT PORTFOLIO THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Annualized Excess and Market-Adjusted Returns

	Before Portfolio	After Portfolio
Annualized Excess Return	8.73	5.93
Value-Weighted CRSP Adjusted	1.18	1.64
Equal-Weighted CRSP Adjusted	-5.62	-9.94
S&P 500 Adjusted	6.03	1.86

Panel B

Estimated Market Model Parameters

		Parameter Estimates	
Benchmark	Parameter	Before	After
Valued-Weighted	α	0.0001	-0.0002
CRSP Index	β	1.109	1.069

		Parameter Estimates	
Benchmark	Parameter	Before	After
Equal-Weighted	α	-0.0002	-0.0001
CRSP Index	β	1.126	1.104

		Parameter Estimates	
Benchmark	Parameter	Before	After
Standard &	α	0.0002	0.0003
Poors 500	β	1.036	0.992

TABLE 5.12

REJECT PORTFOLIO THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A *Risk-Adjusted Performance*

Treynor's Measure = $(R_p-R_f)/\beta_p$
Sharpe's Measure = $(R_p-R_f)/\sigma_p$

Benchmark	Treynor's Measure: Value Weighted CRSP	Treynor's Measure: Equal Weighted CRSP	Treynor's Measure: S&P 500	Sharpe's Measure
Before Portfolio	0.079	0.078	0.084	10.25
After Portfolio	0.056	0.054	0.060	5.59

Panel B

Jensen's Measure of Portfolio Performance

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$$

Before Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0846 (0.48)	-0.0874 (-0.46)	0.1314 (0.77)
β	0.863 (5.24**)	0.744 (4.08**)	0.861 (5.61**)

After Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0719 (0.62)	-0.0313 (-0.26)	0.1039 (0.91)
β	0.654 (5.71**)	0.604 (5.33**)	0.636 (5.72**)

** Significant at the .01 level

That is, since the risk-return characteristics of each firm in the Reject portfolio have been altered more than those of the average firm in the larger (full sample) portfolio, it seems likely that analysis of the smaller portfolio would reveal risk-return changes in the same direction, but of greater magnitude than those observed for the full sample.

Recall that the After portfolio outperforms the Before portfolio on both a market and risk-adjusted basis when the full sample is considered. However, for the sample of firms for which the null hypothesis of no significant change in the parameters of the market model can be rejected, the Before portfolio outperforms the After portfolio on both a market and risk-adjusted basis. (The difference is not statistically significant.) Explanations for the observed results differing from those expected include the possibility that firms most affected by the event of the spinoff are affected in a negative (at least in a risk-return sense) manner, while the general effect of the demerger is more benign and less pronounced. Why the effect is not more uniform across firms, of course, is the obvious question prompted by this scenario.

As reported above, the Before portfolio displays larger raw excess and market-adjusted returns than the After portfolio for this sample of firms. Systematic risk, as measured by β, declines slightly for the Reject

portfolio after the event of the spinoff (average Before = 1.09 vs average After = 1.06). However, this decline in β is insufficient to induce superior risk-adjusted performance in the After portfolio as evaluated using the Treynor measure criterion. The fact the βs for the Before and After portfolios are so similar is surprising, since this *is* a sample of firms that exhibits significantly different market model parameter estimates before and after the demerger. On the other hand, the difference between Before and After βs is larger for this portfolio is larger than that for the full sample (for which the Before and After βs are virtually identical).

Total risk, as measured by portfolio standard deviation, is also similar for the Before and After portfolios, with the result that the Sharpe criterion indicates superior performance by the Before portfolio. Examination of the results of an analysis conducted using Jensen's measure reveals no significantly abnormal performance by either the Before or After portfolios.

5.4. Bull and Bear Market Portfolios

Since it appears that the short-term share price effect associated with the announcement of a corporate spinoff is influenced by prior period market returns, a natural extension of the event study analysis is to examine whether the timing of the announcement affects long-term

share price performance. The long-term performance of demerger firms that make the spinoff announcement in bull markets versus the long-term performance of firms that announce the spinoff during bear markets is conducted using the same method used to analyze the relative long-term performance of previously discussed portfolios.

The particular definition of bull and bear markets used to create the portfolios is the "Six Month Periods" delineation. Recall that this categorization defines a bull (bear) market as a six month period during which the market return is positive (negative) for at least four of the six months prior to the announcement. Since the Six Months Periods definition of bull/bear markets provides large differentials between bull and bear market APE's in the event study analysis, it is believed to be a good candidate to examine differences in long-term performance associated with timing of the announcement. Use of this definition of bull/bear markets results in small portfolio sizes, however; the bull portfolio consists of 26 firms, and the bear portfolio 11. Performance of portfolios created using the bull/bear market announcement criteria is presented in Tables 5.13-5.14.

Excess returns for both the Before and After portfolios created using the Bull market announcement criterion are lower than their full sample counterparts. This result is surprising, since it might be expected that

excess returns for a portfolio of stocks evaluated during a period of relatively high market returns would be superior to those of a portfolio of stocks chosen at random (with respect to contemporaneous market return).

TABLE 5.13

BULL MARKET PORTFOLIO THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Annualized Excess and Market-Adjusted Returns

	Before Portfolio	After Portfolio
Annualized Excess Return	9.98	13.22
Value-Weighted CRSP Adjusted	2.55	1.55
Equal-Weighted CRSP Adjusted	-2.30	-7.30
S&P 500 Adjusted	7.54	5.35

Panel B

Estimated Market Model Parameters

		Parameter Estimates	
Benchmark	Parameter	Before	After
Valued-Weighted	α	0.0002	0.0003
CRSP Index	β	1.026	0.961

		Parameter Estimates	
Benchmark	Parameter	Before	After
Equal-Weighted	α	0.00003	0.0001
CRSP Index	β	1.149	1.119

		Parameter Estimates	
Benchmark	Parameter	Before	After
Standard &	α	0.0004	0.0005
Poors 500	β	0.951	0.880

TABLE 5.14

BULL MARKET PORTFOLIO THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Risk-Adjusted Performance

Treynor's Measure = $(R_p - R_f)/\beta_p$
Sharpe's Measure = $(R_p - R_f)/\sigma_p$

	Treynor's Measure			
Benchmark	Value Weighted CRSP	Equal Weighted CRSP	S&P 500	Sharpe's Measure
Before Portfolio	0.097	0.087	0.105	12.50
After Portfolio	0.138	0.118	0.150	15.72

Panel B

Jensen's Measure of Portfolio Performance
$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$

Before Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0093 (0.24)	-0.0651 (-0.37)	0.0969 (1.54)
β	1.157 (5.86**)	1.086 (5.97**)	1.060 (5.62**)

After Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500
α	0.0415 (0.59)	-0.0016 (-1.30)	0.0817 (1.19)
β	0.968 (7.33**)	0.917 (6.11**)	0.926 (7.50**)

** Significant at the .01 level

Recall that the Six Month Periods bull market definition concerns the six month period prior to the announcement date, and that this analysis evaluates the portfolios over the three year period prior to and after each firm's ex-date. Therefore, it is not clear that the evaluation period for the bull market portfolio should be a period of relatively high market returns.

While excess returns are larger for the After bull market portfolio, the Before portfolio returns are higher on a market-adjusted basis for two of the three market proxies. Consistent with results obtained for the Reject portfolios, systematic risk as measured by portfolio β declines from the Before portfolio (avg.= 1.04) to the After portfolio (avg. = .99). As a result, the After portfolio displays superior risk-adjusted returns for each of the benchmark portfolios using the Treynor criterion. Total risk as measured by portfolio standard deviation increases for these firms as a result of the spinoff (.0079 vs .0088). (Note that the small sample size of the bull market portfolio increases portfolio standard deviation over that of the full sample.) Nonetheless, results of an analysis using the Sharpe measure are consistent with those obtained using the Treynor measure; superior performance by the After portfolio. Portfolio performance as measured by Jensen's criterion is not significantly different from that of the three market proxies. In contrast to the results

obtained for the bull market portfolio, the period of evaluation for the bear market Before portfolio appears to be truly "bear", with the annualized excess return on the Before portfolio the smallest observed for any portfolio (6.27%).

TABLE 5.15

BEAR MARKET PORTFOLIO THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Annualized Excess and Market-Adjusted Returns

	Before Portfolio	After Portfolio
Annualized Excess Return	6.27	21.00
Value-Weighted CRSP Adjusted	2.93	1.51
Equal-Weighed CRSP Adjusted	-2.90	-6.31
S&P 500 Adjusted	7.44	6.27

Panel B

Estimated Market Model Parameters

		Parameter Estimates	
Benchmark	Parameter	Before	After
Valued-Weighted	α	0.0002	0.0002
CRSP Index	β	1.089	0.974

		Parameter Estimates	
Benchmark	Parameter	Before	After
Equal-Weighted	α	-0.00002	-0.0001
CRSP Index	β	1.195	1.079

		Parameter Estimates	
Benchmark	Parameter	Before	After
Standard &	α	0.0003	0.0003
Poors 500	β	1.008	0.902

TABLE 5.16

BEAR MARKET PORTFOLIO THREE YEARS BEFORE/AFTER THE EX-DATE

Panel A

Risk-Adjusted Performance

Treynor's Measure = $(R_p - R_f)/\beta_p$
Sharpe's Measure = $(R_p - R_f)/\sigma_p$

Benchmark	Treynor's Measure: Value Weighted CRSP	Treynor's Measure: Equal Weighted CRSP	Treynor's Measure: S&P 500	Sharpe's Measure
Before Portfolio	0.058	0.053	0.062	4.60
After Portfolio	0.215	0.195	0.233	17.56

Panel B

Jensen's Measure of Portfolio Performance
$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$

Before Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.2420 (1.09)	-0.2999 (-0.11)	0.2931 (1.31)
β	1.077 (6.23**)	1.094 (4.90**)	0.996 (6.17**)

After Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0076 (0.11)	-0.0972 (-0.72)	0.0525 (0.96)
β	1.216 (8.59**)	1.099 (7.90**)	1.156 (8.41**)

** Significant at the .01 level

This result cannot be attributed to unusually poor performance by the Before portfolio, since market adjusted returns are comparable to those observed for portfolios throughout this analysis. The After portfolio, on the other hand, has relatively large excess returns (21.0%, which is significantly different from the excess return earned by the Before portfolio at the .05 level) and rather typical market adjusted returns, indicating a higher level of market return during the post-spinoff evaluation period.

Average portfolio β declines slightly (by .101) as does portfolio standard deviation (.014 vs .012) after the spinoff. These results, combined with the superior excess return performance of the After portfolio, suggest superior risk-adjusted performance by the After portfolio. Again, the Jensen measure reveals no significantly abnormal performance.

Based on the above results, it does not appear that the type of market in which a spinoff is announced has a pronounced effect on the long-term shareholder wealth effects of the demerger. That is, although differences in excess returns for the Before and After portfolios for the bear announcements are greater than those observed for any Before/After pair in this analysis, when the portfolio returns are adjusted for contemporaneous market return, these differences become very small. Similarly, market adjusted returns for both bull and bear announcements (for

Before and After portfolios) are comparable to those of portfolios constructed without regard to the level of investor sentiment proxies in the month of announcement.[9]

5.5. Calendar Time Portfolios

The performance of portfolios grouped by the year of the ex-date over calendar time is presented in Tables 5.17 and 5.18. Recall that the evaluation period for firms comprising these portfolios is a four year span; two years (480 trading days) prior to the ex-date of the spinoff, and two years after. Parent firms are added to the portfolio at the beginning of this four year period, and deleted from the portfolio at the end of the period. Subsidiary firms are added to the portfolio when trading in the security begins, and deleted two years after the ex-date. In contrast to the technique used to analyze the relative performance of the Before and After portfolios, returns observed over the 90 day pre-announcement period and two day event window *are* included in the analysis.

The data are separated into three calendar time portfolios using the year of the ex-date as the criterion of portfolio selection. Dates selected as boundaries for each of the calendar time portfolios are chosen so as to

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[9]Results of analyses of portfolios created using other bull/bear market definitions indicate no clear relationship between the timing of the announcement and portfolio performance.

balance the number of firms in each portfolio. Since relatively fewer spinoffs occur during the decade of the 1970's, firms with ex-dates during the 11 year period between January 1970 and December 1980 (inclusive) were included in the first portfolio (n=36).

The number of spinoffs increased during the 1980's, so the eight year period between January 1981 and December 1988 is divided into two segments. The second calendar time portfolio consists of 31 firms that went ex-dividend between January 1981 and December 1985, and the third portfolio is comprised of 23 firms that have an ex-dividend date between January 1986 and December 1988. Naturally, firms that have ex-dates after 1988 are not included in the third portfolio since sufficient price data is not available for these firms. The raw excess annualized returns for the calendar time portfolios are larger than those observed for the event time portfolios discussed above (average excess annualized return = 18.99%). This result is not surprising, since the former contain the (statistically significant) positive returns that are associated with the 90 day pre-spinoff announcement period and two day event window, while the latter do not.

The impressive performance of the calendar time portfolios is particularly evident in the market-adjusted returns, where the return of these portfolios is (slightly) less than that of the market for only the 1981-1985

portfolio using the equal-weighted CRSP index as market proxy. For all other portfolios and market proxies, the portfolio return is higher than that of the market.

TABLE 5.17

CALENDAR TIME PORTFOLIOS

Panel A

Annualized Excess and Market-Adjusted Returns

	1970-1980 Portfolio Return	1981-1985 Portfolio Return	1986-1988 Portfolio Return
Annualized Excess Return	17.74	22.24	17.50
Value-Weighted CRSP Adjusted	11.20	13.44	9.57
Equal-Weighted CRSP Adjusted	8.72	-0.95	11.03
S&P 500 Adjusted	19.63	21.17	13.08

Panel B

Estimated Market Model Parameters

1970-1980 Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500 Index
α	0.0004	-0.0001	0.0005
β	0.976	1.105	0.927

1981-1985 Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500 Index
α	0.0003	-0.0001	0.0005
β	0.902	1.087	0.825

1986-1988 Portfolio

	Parameter Estimates		
	Value-Weighted CRSP Index	Equal-Weighted CRSP Index	S&P 500 Index
α	0.0002	0.0001	0.0003
β	0.918	1.037	0.825

TABLE 5.18

CALENDAR TIME PORTFOLIOS

Panel A

Risk-Adjusted Performance

Treynor's Measure = $(R_p - R_f)/\beta_p$
Sharpe's Measure = $(R_p - R_f)/\sigma_p$

Benchmark	Treynor's Measure: Value Weighted CRSP	Treynor's Measure: Equal Weighted CRSP	Treynor's Measure: S&P 500	Sharpe's Measure
1970-1980 Portfolio	0.182	0.161	0.191	21.79
1981-1985 Portfolio	0.247	0.205	0.269	42.33
1986-1988 Portfolio	0.191	0.169	0.212	46.15

Panel B

Jensen's Measure of Portfolio Performance

$$(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + e_{pt}$$

1970-1980 Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0143 (2.37*)	0.0388 (0.62)	0.0192 (3.19**)
β	1.125 (13.68**)	0.955 (12.71**)	1.107 (13.43**)

1981-1985 Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0076 (1.27)	0.0057 (0.87)	0.0118 (2.02*)
β	0.912 (9.98**)	0.805 (8.21**)	0.716 (10.16**)

1986-1988 Portfolio

	Parameter Estimates: Value-Weighted CRSP Index	Parameter Estimates: Equal-Weighted CRSP Index	Parameter Estimates: S&P 500
α	0.0118 (0.73)	0.0012 (0.73)	0.0253 (1.66†)
β	1.065 (11.35**)	1.107 (10.63**)	0.984 (11.16**)

Annualized excess return is higher for the subset of firms that have an ex-date between January 1981 and December 1985. This likely reflects the effect of the bull market of the early-mid 1980's on stock prices in general and the fact that the analysis begins in a year (1981) when stock prices were depressed. The average market-adjusted return is largest for the 1970-1980 portfolio of firms, as is the portfolio's level of systematic risk as measured by average β (Please see Table 5.17, Panel B) across market proxies (1.0). Average βs for the 1981-85 and 1986-88 portfolios are 0.94 and 0.93 respectively. As a result, the 1981-85 portfolio displays superior performance relative to the other groupings based on the Treynor criterion.

The Sharpe measure of portfolio performance indicates that the two portfolios comprised of firms with ex-dates during the 1980's have risk-adjusted returns that are superior to the portfolio of firms that went ex-dividend during the 1970's. Results of an analysis using Jensen's measure of portfolio performance are consistent with the results reported above; on the whole, the calendar time portfolios perform well relative to the market. Each of the three portfolios has significantly positive abnormal returns when measured against at least one market proxy. The portfolio formed of firms that went ex-dividend during the 1970's appears to be the best performer when evaluated

against market proxies, consistent with the results of an analysis of market-adjusted excess returns.

The strong performance of portfolios consisting of spinoff firms over calendar time might be anticipated, given the results of the analysis of the Before and After portfolios. Since the performance of both these portfolios is, in general, not significantly different from that of the market, adding the significantly positive returns earned over the pre-spinoff period (APE = 2.67%) and the event-day window (APE = 3.69%), should boost the performance of the calendar time portfolio to significantly positive levels.

It appears that an investor who pursues a strategy of purchasing spinoff firms two years prior to the ex-date and who holds those firms for a four year period *can* earn positive returns relative to holding the market portfolio. This is not inconsistent with (semi-strong form) market efficiency, of course, since the announcement of a spinoff and the ex-date are typically much closer in time than two years. Furthermore, much of the positive return is earned during the pre-announcement period and on the announcement day, so it seems that an investor must have inside information to exploit this strategy.

CHAPTER 6: SUMMARY AND CONCLUSION

Perhaps the most important - and most consistently obtained - result of the spinoff literature is the association between an announcement of a spinoff and wealth gains for shareholders of the announcing firm. The empirical evidence indicates that these wealth gains do *not* come at the expense of the senior security holders. The source(s) of these wealth gains has (have) been the subject of investigation since this phenomenon was first reported, with less than satisfactory results. That is, there does not yet exist a generally accepted explanation for the wealth gains that accrue to shareholders of firms that announce a spinoff.

This work offers (and tests empirically) a new hypothesis regarding the positive share price reaction to spinoff news. This is the PRNI hypothesis, which suggests that the market response to a demerger announcement is driven by investor sentiment during the announcement period. The PRNI hypothesis is tested by separating a sample of spinoff announcements using the criterion of market sentiment as a basis for categorization. That is, the stock price reaction induced by announcements that take place during periods when investors are assumed to be optimistic is compared to that observed for announcements during pessimistic periods. A result indicating higher

share price reactions during periods of market optimism would be consistent with the PRNI hypothesis.

In fact, when market (return) oriented proxies for investor sentiment are applied to segregate the data into optimistic and pessimistic groups, in general, the null hypothesis of no difference between the groups can be rejected. On the other hand, when non-market proxies for investor sentiment are used in the analysis, the stock price reaction to the announcement of a spinoff is not significantly different for the optimistic and pessimistic groups. The single exception to the general inconsistency of non-market proxies with the PRNI hypothesis is the percent change in the index of leading indicators. This surrogate for investor sentiment is significantly correlated with the return on the market, however. Thus, it can be inferred that market-based factors are good proxies for investor sentiment.

For the PRNI hypothesis to be acceptable, it must be agreed upon that the market return is an appropriate representation of investor sentiment and that other proxies are not. Given the decision-making heuristics and biases that the PRNI hypothesis is predicated on, prior period market return seems a natural choice as a proxy for investor sentiment. However, it is also possible that prior period market return represents some other phenomenon entirely, and it is not investor sentiment that drives the

results reported in Chapter 4 of this study. A final point concerning the short-term effects of demergers is that positive share price effects are observed even for announcements that take place during periods of investor pessimism. Thus, although investor sentiment may influence the stock price reaction to the announcement of a spinoff, it cannot be entirely responsible for the observed response.

Another aspect of corporate spinoffs is the long-term performance of the shares of these firms. Extant research on this issue is scant and has focused on the post-spinoff performance of the subsidiary firm. For example, Cusatis, Miles, and Woolridge (1991) find that a sample of spun off firms outperform a market proxy and a sample of matched firms, especially in the second year following the distribution date.

The long-term post-spinoff performance of both parent and subsidiary firms is examined here. The result of this examination indicates that the post-spinoff performance of parent and subsidiary firms is not significantly different from that of the market (with the exception of that of the Parent portfolio relative to the S&P 500 index). Differences between the results reported by Cusatis, Miles and Woolridge and those obtained in this analysis for the Subsidiary portfolio can be ascribed to choice of market proxy and sampling technique, among other possibilities.

The relative performance of spinoff firms before and after the demerger is also investigated. It is found that the risk and market-adjusted performance of these firms does not appear to change significantly post-spinoff. Therefore, it appears that the separation of the subsidiary from the parent firm does not substantially change the risk-return characteristics of the whole, on average. Thus the long-term effect on shareholder wealth of a corporate spinoff appears to be minimal.

Because share price performance is not significantly lower post-spinoff, the short term effects of the demerger announcement (the significant upward price drift prior to the spinoff and the positive returns associated with spinoff firms on the announcement day) *do* accrue to investors. As discussed above, investor sentiment may influence the share price response to the announcement of a spinoff, but cannot be solely responsible for it. Given the combination of long-term and short-term wealth effects of spinoffs reported in this study, it is possible that there exists some additional explanation (other than investor sentiment) that is responsible for the wealth gains associated with spinoffs.

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