INTERNAL CAPITAL MARKET AND CAPITAL MISALLOCATION:

EVIDENCE FROM CORPORATE SPINOFFS

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This study investigates the importance of reduced capital misallocation in explaining the gains in corporate spinoffs. The capital misallocation hypothesis asserts that the internal capital market of a diversified firm fails to meet the needs of the relatively low growth divisions for less investment and the needs of the relatively high growth divisions for more investment.

Higher differences in growth opportunities imply that more capital is misallocated. This study finds that the higher the difference in growth opportunities of a diversified firm's businesses, the more likely the firm is to conduct a spinoff. This finding supports the argument that diversified firms conduct spinoffs to reduce capital misallocation.

This study finds differences in managerial ownership of spinoff firms and of non-spinoff firms. This suggests that the misallocation of internal capital is an agency problem. A low management ownership stake, coupled with the existing differential in growth opportunities between parent and spunoff firms, leads to misallocation of internal capital, thus creating incentives for a spinoff.

Spinoffs should result in a shift to the "right" investment policy and to better operating performance for both the parent and spunoff firms. This improvement in

operating performance for the post-spinoff firms is expected to be higher when they are from highly different growth opportunity spinoffs.

I find mixed evidence regarding market reaction, changes in investment policy, and changes in operating performance. The evidence that supports the capital misallocation hypothesis does not appear uniformly and consistently across the proxies for growth opportunities. However, there is evidence that both parent and spunoff firms benefit from a spinoff. The magnitude of the benefits is larger for spunoff firms than for parent firms. This is as expected because the capital misallocation problem may be reduced, but does not entirely disappear, in the parent firm.

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CHAPTER 1

INTRODUCTION

A divestiture occurs when a firm reduces its operational asset base. A voluntary divestiture is an outcome of a decision made deliberately by the management of the divesting firm. Copeland and Weston (1992) discuss five forms of divestitures. These five forms of divestitures are spinoffs, splitups, splitoffs, selloffs, and equity carveouts. A spinoff occurs when a firm distributes the stock of one of its operating units to existing shareholders on a pro rata basis. The continuing entity that exists before and after a spinoff is called a parent firm, while the newly created entity subsequent to the spinoff is called a spunoff firm. After a spinoff, the control of the spunoff firm is shifted to a new management team, and the stock is traded independently of the parent firm's stock.

A splitup and a splitoff are variations of a spinoff. In a splitup, the shares of a parent are exchanged for the shares of the spunoff firm. In a splitoff, the shares of a parent are exchanged for the shares of the spunoff firm, after which the parent ceases to exist. In a selloff, one of a firm's divisions is sold to another firm for cash or other considerations, and in an equity carveout, one of a firm's divisions is sold to outsiders via an equity offering.

A spinoff is a mirror image of a merger. Jensen and Ruback (1983) have found that the gains from a merger announcement reflect the expected positive synergy from joint operations. The result of the merger is that the value of the combined firms exceeds the sum of the values of the two firms separately. In contrast, the gains from the spinoff

may reflect negative synergy from joint operations. The result of a spinoff is that the sum of the values of two firms separately exceeds the value of the combined firms. These two firms are better off if they operate independently. However, the factors determining the success or failure of joint operations are still not clear. Therefore, it is necessary to study spinoffs to better understand the costs and benefits of corporate reorganization.

Kudla and McInish (1983), Miles and Rosenfeld (1983), Hite and Owers (1983), and Schipper and Smith (1983) find that, on average, the market reacts positively to spinoff announcements. Any change in value from the reorganization accrues to existing shareholders because, at least initially, there is no change in ownership.

Researchers have proposed several factors to explain the gains of corporate spinoffs. Those factors are wealth transfer from bondholders to shareholders, merger facilitation, discontinuation of cross-subsidy, aligning the interest of management with that of shareholders, corporate refocus, and reduction of capital misallocation.

The Internal Revenue Code Section 355 distinguishes nontaxable spinoffs from taxable spinoffs. To be considered as a nontaxable corporate event, the spinoff must meet three criteria. First, the distribution must represent at least 80% of the outstanding shares of the spunoff firm, and any share retained by the parent firm must not be used to control the spunoff firm. Second, the distribution must not be a means of distributing dividends to the stockholders. Finally, the parent and the spunoff firms must conduct trades or businesses after the spinoffs. They also must have conducted trades or businesses for five years before the spinoffs. This study investigates voluntary and nontaxable spinoffs.

Purpose of the Study

This study investigates the importance of reduced capital misallocation in explaining the gains in corporate spinoffs. A diversified firm typically has a larger internal capital market. Shin and Stulz (1998) argue that a diversified firm is more valuable than a single-division firm only if the former has an efficient internal capital market; otherwise, it has less value than a single-division firm.

The internal capital market fails to perform its tasks if it does not direct corporate resources to their best uses. Mature divisions have lower growth opportunities than do growth divisions. To be efficient, the internal capital market should allocate capital based on the growth opportunities of divisions, which means allocating more capital for growth divisions and less for mature divisions.

Some firms may experience cash shortfalls. If the allocation of capital is efficient, then the high growth divisions should be less affected by these cash shortfalls than mature divisions. However, Shin and Stulz (1998) and Scharfstein (1998) find evidence that divisions with relatively higher growth opportunities do not have a higher priority in capital allocation than divisions with relatively lower growth opportunities. They contend that capital misallocation in the form of overinvestment in mature divisions and underinvestment in growth divisions is the main source of value reduction in the diversified firm. The bigger the division and the higher the insider ownership, however, the less capital is misallocated. Therefore, they argue that the practice of “socialism” in capital budgeting of diversified firms is caused by agency problems. When the capital is

grossly misallocated within a diversified firm, the firm should conduct a spinoff to maintain the objective of maximizing shareholder wealth.

The capital misallocation problem can be termed the hidden free cash flow problem. A diversified firm may have large differences in growth opportunities across divisions. When some divisions have high growth opportunities and the others have low growth opportunities, measures of free cash flow will fail to detect the existence of the free cash flow problem in this diversified firm.

There are two ways that internal capital misallocation can take place. First, the free cash flow from relatively low growth divisions, which is supposed to go to relatively high growth divisions, is kept in the relatively low growth divisions. Second, the earnings of the relatively high growth divisions, which are supposed to be reinvested in the relatively high growth divisions, are reinvested in the relatively low growth divisions.

Capital misallocation is different from cross-subsidy. In cross-subsidy, there are two kinds of divisions: successful and unsuccessful divisions. Value reduction occurs when free cash flows of successful divisions are used to subsidize the operations of unsuccessful divisions. Capital misallocation also has two kinds of divisions: relatively high growth opportunity and relatively low growth opportunity. However, both divisions in capital misallocation are unsuccessful due to the inefficiency of the internal capital market.

The difference between cross-subsidy and capital misallocation can also be expressed in term of the availability of corporate resources for investment in projects. In cross-subsidy, corporate resources are directed away from investment in positive net

present value projects to investment in negative net present value projects. In capital misallocation, on the other hand, corporate resources are shifted away from investment in high net present value projects to investment in low net present value projects.

In a recent article, Daley, Mehrotra, and Sivakumar (1997) find that increasing corporate focus is the only factor able to explain the gains of corporate spinoffs. However, it is possible that increasing corporate focus means concentrating on businesses with similar growth opportunities. The standard approach used in deciding the industry memberships of the firm's businesses in corporate focus studies is to compare the businesses' two-digit SIC codes. The similarity or dissimilarity of industries in a diversified firm's businesses may also be a proxy for low or high differences in growth opportunities. Thus, differences in growth opportunities may be an underlying factor in differences in corporate focus.

The two-digit SIC code, however, lacks the power to differentiate between growth opportunities. While it is hard to argue that two divisions with the same two-digit SIC codes have big differences in growth opportunities, two divisions with different two-digit SIC codes may have similar growth opportunities. They may have small differences in growth opportunities because both of them are in high growth opportunity industries or low growth opportunity industries.

The standard approach using the two-digit SIC code also fails to take into account that two different businesses may have similar growth opportunities because the input of one business is the output of the other business or their outputs are used by the same customers. This study uses more powerful measures to determine the differences in

growth opportunities. These measurements are discussed in detail in Chapter 4.

Research Question

Consistent with the purpose of this study, the following research question is presented as the framework from which the research hypotheses are developed. Can the capital misallocation hypothesis explain the gains from corporate spinoffs? The research hypotheses are discussed in Chapter 3.

Chapter Summary

Previous studies have found that the market reacts positively to corporate spinoff announcements. However, the source of the gains from corporate spinoffs is still not clear. The capital misallocation hypothesis asserts that the internal capital market cannot replicate the role of the external capital market in allocating capital efficiently. The higher the variability in growth opportunities in diversified firms, the higher the capital misallocation. Spinoffs, on the other hand, can reduce the variability of growth opportunities in diversified firms.

A recent article finds that increasing corporate focus is the only factor able to explain the gains in corporate spinoffs. The standard approach used to decide the industry membership of the firm's businesses in corporate focus studies compares the businesses' two-digit SIC codes. The similarity or dissimilarity of industries in a diversified firm's businesses may also be a proxy for low or high differences in growth opportunities of the firm's businesses. However, the two-digit SIC code method lacks the power to differentiate between growth opportunities. Therefore, this study uses more direct measures for determining the differences in growth opportunities.

CHAPTER 2

LITERATURE REVIEW

Kudla and McInish (1983) were the first researchers to conduct an empirical study of the capital market reaction to corporate spinoffs. The sample in their study consists of six corporate voluntary spinoffs between 1972 and 1976. To investigate the market reaction to these spinoffs, they analyze the average weekly residuals of the market model around the ex-dividend week. Kudla and McInish (1983) find that the average residual for week -40 to -15 is positive and statistically significant. They argue that this finding supports the idea that corporate spinoffs increase shareholder wealth.

Miles and Rosenfeld (1983) conduct an empirical study on the market reaction to 55 corporate spinoffs between 1963 and 1980. They define day 0 as the day preceding the spinoff announcement in the *Wall Street Journal*. The market reaction is represented by the average abnormal daily returns for each parent firm's common stock around the announcement date. The mean adjusted return model is employed to estimate these abnormal daily returns. They find that the market reacts positively and significantly around the announcement date.

The size of the spunoff firms may influence the market reaction around the announcement date. To investigate the size effects on the stock price behavior around the announcement date, Miles and Rosenfeld (1984) divide their sample into two sub-samples, depending on the size of the spunoff firms relative to their parent firms. They

find that the impact of large spinoffs on the parents' stock prices is larger than of small spinoffs. The stock market reacts more positively to larger spinoffs than to smaller spinoffs.

Wealth Transfers from Bondholders to Shareholders as A Source of Gains in Spinoffs

Black and Scholes (1973) show that a firm's shares can be viewed as European call options. The shareholders have a call option on the underlying assets of the firms. This call option has an exercise price equal to the face value of the bond. When the value of the firm exceeds the face value of the bond, the shareholders payoff the bond and keep the difference. The shareholders, however, will not payoff the bond when the value of the firm is less than the value of the bond. The shareholders simply hand the firm over to the bondholders without assuming any further obligation. In other words, the shareholders cannot lose more than their total investment in the firm. This protection is called limited liability.

Spinoffs involve a transfer of assets from parent firms to spunoff firms. Galai and Masulis (1976) show that a spinoff may put current bondholders in a riskier position in two ways. First, before the spinoff, the parent firm's bondholders have a complete claim on the assets of the combined firms. After the spinoff, however, it is possible that the parent's bondholders have a claim on only the assets of either the parent or the spunoff firm. Thus, the parent's bondholders end up having a claim on fewer assets than before the spinoff. As fewer assets serve as collateral for the bonds, the ratio of total debt to total assets increases. Therefore, after the spinoff the bondholders assume higher risk

than before the spinoff. Second, the value of a call option increases as the risk of the underlying asset increases. This is because of the increased probability that the value of the underlying assets exceeds the exercise price at maturity. Therefore, as a call option, the value of the firm's shares increases as the risk of the firm's earnings increase. If the parent spins off a division that has earnings that are less than perfectly correlated with the total earnings of the parent, the risk of the parent's earnings may increase. As a result, the value of the parent firm's shares is higher than before the spinoff. Since the bondholders cannot charge more for this riskier position once they have paid for the bond, the market value of the bond will fall. The losses suffered by the bondholders accrue to the shareholders as the residual claimants of the firm.

Hite and Owers (1983) conduct an event study on 123 spinoffs between 1962 and 1981. They use the market and risk adjusted model to estimate abnormal returns on days surrounding the announcement date. Day 0 is the day the *Wall Street Journal* announces the spinoffs for the first time. They find that the cumulative abnormal returns from day -1 to day 0 are 3.3% and are statistically significant at the 1% level. They argue that this evidence supports the contention that spinoffs increase shareholder wealth.

To find the evidence on wealth transfers from senior security holders to shareholders, Hite and Owers (1983) investigate the returns around the announcement date for convertible and nonconvertible types of bonds and preferred stocks. They find that the abnormal returns of the senior securities are positive but statistically insignificant. Therefore, there is no evidence that shareholder gains on the announcement of spinoffs are merely transfers of wealth from senior security holders.

Schipper and Smith (1983) investigate the market reaction to the announcements of 93 spinoffs between 1963 and 1981. The market and risk adjusted return model is employed to estimate the abnormal returns around the announcement date. Day 0 is the day the announcement appeared in the *Wall Street Journal* or the *New York Times*. They find that the cumulative abnormal returns between day -1 and day 0 are positive and highly significant. The magnitude of the market reaction is comparable to those found by Hite and Owers (1983) and by Miles and Rosenfeld (1983).

As in Hite and Owers (1983), Schipper and Smith (1983) also attempt to reveal the evidence of a wealth transfer from bondholders to shareholders. To do so, they compare the book value of debt to total assets of the pre-spinoff firms to the spunoff firms. They find that the mean and the range of the ratio are similar for both the pre-spinoff firms and the spunoff firms. Their investigation reveals that there is no widespread reduction in bond prices at spinoff announcements or in bond ratings in the year of the announcements and in the year following the announcements.

Parrino (1997) examines a transfer of wealth from bondholders to shareholders following the decision to spin off Marriott Corporation into Host Marriott (the parent firm) and Marriott International (the spunoff firm). The spinoff gives less profitable and higher risk real estate investments to the parent firm. These businesses have revenues of $1.7 billion in 1992. At the same time, the spinoff also gives the spunoff firm profitable and stable food, lodging and facilities management segments. These businesses have revenues of $7.4 billion in 1992. Marriott management contends that the spinoff creates value for the shareholders because the spunoff firm will increase its ability to exploit its

growth opportunity due to improved financial strength. In addition, the spinoff enables the shareholders to choose between owning a growth firm or a capital-intensive firm.

Parrino (1997) argues that the reasons Marriott's management gives for the spinoff are not fully correct. He states that the real reason for the spinoff is to ease the debt burden due to the recession in the late 1980s. A weak hotel market has increased Marriott's inventory of hotel properties developed for sale. Since the development of these hotels is financed largely with debt, Marriott Corporation's debt is downgraded by Moody's in 1990 and again in 1991.

Fearing that the poor performance will lead to financial distress and to loss of control of the firm, the Marriott family announces their intention to spin off their firm in October 1992. The spinoff financial plan prescribes that the parent firm assumes almost all of long term debt of Marriott Corporation. As mentioned earlier, the parent controls smaller, less profitable, higher risk business than the spunoff firm.

Parrino (1997) uses a standard event study to estimate the market reaction to the spinoff for days surrounding the announcement. He finds that from day 0 to day +2, Marriott Corporation's shareholders gain $224.9 million in industry-adjusted returns. The bondholders, however, suffer a $358.3 million loss in value relative to the pre-announcement level. Within ten days of the announcement, the bondholders file lawsuits against Marriott. The lawsuits result in some revisions of the spinoff's financial plan. The final increase in shareholder wealth is $80.6 million, while the final decline in the senior security holder wealth is $194.6 million. Parrino (1997) argues that the Marriott spinoff causes the reduction of $114 million of the total value of the firm due to transaction costs

and inefficiencies such as legal, accounting, investment banking activity costs, tax shield loss, and the duplication of administrative functions in the post-spinoff firms. These findings imply that a wealth transfer occurs in the Marriot Corporation's spinoff, and high insider ownership creates a strong motivation to transfer wealth from the bondholders. In addition, stockholder wealth rises by less than the decline in the bondholder wealth. The difference between the increase in the shareholder wealth and the decrease in the bondholder wealth is due to the increased costs of operating two independent firms instead of operating only one firm.

Summary of the Wealth Transfer Hypothesis

Stock prices react positively to the announcement of voluntary spinoffs. The increase in stock price may not reflect the creation of new wealth if the source of the gains is a transfer of wealth from bondholders to shareholders. A spinoff provides a mechanism to put the parent's bondholders in riskier positions, as suggested by Galai and Masulis (1976). However, empirical studies by Hite and Owers (1983), Schipper and Smith (1983) find no evidence of the transfer of wealth from bondholders to shareholders. Parrino (1997), on the other hand, finds evidence of wealth transfer, but the finding in his study cannot be generalized because he only investigates one firm. The founder of this particular firm is the majority shareholder, and therefore has a strong motivation to jeopardize the position of the bondholders.

Facilitating A Transfer of Corporate Assets to Higher-Valued Uses as A Source of Gains in Spinoffs

Hite and Owers (1983) are among the first researchers who suspect that the gains

in spinoffs are not only from a transfer of wealth from bondholders to shareholders but also from a more efficient utilization of corporate assets. They argue that there must be some shifts in opportunity sets faced by firms involved in spinoffs that cause separating units to operate more efficiently than joint operations. One of the ways of reducing the costs and increasing the benefits of operating separate units is to give up control of the assets to other firms. These firms, in turn, employ a more successful utilization of the assets.

To gain some insights into the effects of merger facilitation on the stock's abnormal returns around spinoff announcement dates, Hite and Owers (1983) investigate management-stated reasons for the spinoffs in the *Wall Street Journal*. They find that 12 of 123 spinoffs are merger facilitation spinoffs. The cumulative abnormal returns from day –1 to day 0 relative to the announcement dates of these 12 spinoffs are highly significant. The magnitude is 5.6%, which is 2.3% higher than for the overall sample.

To investigate the effects of takeover activities following corporate spinoffs, Cusatis, Miles, and Woolridge (1993) examine common stock returns of spunoff firms and their parents for 146 spinoffs during the three years after they separate and become independent firms. The common stock returns of the spunoff firms and their parents are evaluated from ten days to three years following the spinoffs by using raw and matched-firm-adjusted returns. They employ a buy-and-hold strategy in estimating these returns. The control group in their study consists of firms with comparable market values in the same industries, as reflected by their two-digit SIC codes.

Cusatis et al. (1993) find that investing in the spunoff firms for periods of 6, 12, 24, and 36 months result in positive and statistically significant raw returns. The raw returns for the spunoff firms are 7.7%, 19.9%, 52%, and 76.0% respectively. The matched-firm adjusted returns for the spunoff firms, on the other hand, are only statistically significant for the 24 and 36 month periods. The matched-firm adjusted returns for the spunoff firms are –1.0%, 4.5%, 25%, and 33.6% respectively. The findings for the parent firms, however, are more pronounced. The raw and matched-firm adjusted returns for the parent firms are significant for all holding periods; 3, 12, 24, and 36 months. The raw returns are11.3%, 23.1%, 54%, and 67.2% respectively, while the matched-firm adjusted returns are 6.8%, 12.5%, 26.7%, and 18.1% respectively.

Cusatis et al. (1993) find that the spinoff firms above are more likely to be involved in subsequent takeover activities than are their matched firms. Twenty-one of 146 spunoff firms are taken over within three years after the spinoffs, while for the matched firms, only five firms are taken over. Similarly, 18 of 131 parents firms are taken over within three years after the spinoffs, while for the matched firms, only seven firms are taken over.

To further investigate the impact of takeover activities on the long-term-abnormal returns of the firms, Cusatis et al. (1993) divide their sample into two sub-samples based on whether or not the firms are taken over within three years following the spinoffs. They find that the only firms that are taken over have positive and statistically significant long-run abnormal returns. The matched-firm adjusted returns for 21 taken-over spunoff firms are significant for the periods of 24 and 36 months, and their returns are 61.3% and

99.3% respectively. None of the returns of non-taken-over spunoff firms are significant. Meanwhile, the matched-firm adjusted returns for 18 taken-over parent firms are significant for the periods of 12, 24 and 36 months, and their returns are 42.8%, 56.9%, and 69.6% respectively. As for parent firms not taken over, there is only one holding period return that is significant. That is the 24-month holding period, with 25.1% matched-firm adjusted return. They conclude that takeover activity is the force that drives the long-run superior performance of spunoff and parent firms.

Allen, Lummer, McConnel, and Reed (1995) present an alternative explanation to the gains associated with corporate spinoffs. They argue that corporate spinoffs are the consequence of unwise acquisitions in the past. Earlier studies find that unwise acquisitions cause negative market reactions. On the other hand, the announcements of corporate spinoffs result in positive market reactions. Therefore, the positive reactions on the announcement of corporate spinoffs may represent the recovery of wealth that has been destroyed on the earlier unwise acquisitions.

Allen et al. (1995) collect a sample of 94 spinoffs between 1962 and 1991. The spunoff firms in their sample are ones acquired by their parents in the past. They use a standard event study to measure the market reactions to the acquisition and to the spinoff. They find that the market reactions to acquisitions, which later become the spinoffs, are negative and statistically significant both for the acquiring firm and for the combined acquiring and acquired firms. The negative abnormal returns for day –1 to day 0 relative to the acquisition announcement date are –0.68% and –0.65% respectively. On the other hand, the market reaction to their spinoff announcements is 2.15% and is statistically

significant. However, the reactions to the spinoff announcements of divisions that originated as acquisitions and divisions that do not originate as acquisitions are not significantly different from each other.

Finally, Allen et al. (1995) find evidence that the more negative the market reaction to an acquisition announcement, the more positive the reaction to its spinoff announcement. They conclude that a positive reaction to a spinoff announcement can be partially explained by the attempt of managers to undo an unwise takeover in the past.

Summary of the Merger Facilitation Hypothesis

By separating businesses into new independent firms, spinoffs allow a low-cost method of transferring corporate assets to their best uses. Without spinoffs, potential bidders are forced to acquire all businesses. Acquiring whole businesses may be too expensive for potential bidders. Also, the synergy that is expected from combining potential bidders' assets with only a subset of the potential targets' assets is lost when the whole firm is acquired.

Hite and Owers (1983) find that when management states that the reason for a spinoff is to facilitate merger activity, the abnormal returns for this sub-sample are higher than for the overall sample. Cusatis, Miles, and Woolridge (1993) find that post spinoff firms are more likely to be taken over. Long-run abnormal returns for the post-spinoff firms only occur if the firms are taken over following the spinoffs. Finally, Allen, Lummer, McConnel, and Reed (1995) argue that spinoffs are used by diversified firms to undo unwise acquisitions in the past. They find that part of the positive reaction to the

announcement of corporate spinoffs represents the recovery of wealth that has been destroyed on earlier unwise acquisitions.

Aligning the Interests of Management with Those of Shareholders as A Source of Gains in Spinoffs

Daley et al. (1997) note that improvements in operating performance following spinoffs may occur because before spinoffs, division managers do not have strong incentives to employ value-increasing operations. The rewards received by the division managers in the pre-spinoff firms are not fully related to the performance of their divisions. Spinning off a division, on the other hand, allows improvement in incentives because management of spunoff firms receives compensation based on the performance of their newly independent firms.

Aron (1991) argues that a manager's compensation program that relates managerial rewards with the market value of a multi-division firm is not as efficient as one that relates managerial rewards with the market value of a single-division firm. In the multi-division firm, the stock price reflects the performance of the firm as a whole. This reflection provides a noisy signal about the productivity of divisional managers. Inherently, the noisier the signal, the less the compensation program is able to motivate the managers. Although in single-division firms the compensation program can be tied directly to the productivity of the manager, these firms may suffer from the loss of economies of scope. Unlike a single-division firm, a multi-division firm allows its divisions to share production technology, marketing strategy, and product characteristics. Therefore, there are costs and benefits in these two organizational forms.

Choi and Merville (1998) suggest that the productivity of a combined firm (parent-subsidiary) depends on two factors. The first factor is the nonhuman factor, such as a synergy between two operations. The second factor is the human factor, which is influenced by the internal incentive structure. The productivity of the firm is maximized when both the human factor and the nonhuman factor are optimized.

The combined firm is an optimal choice for the organization structure when the net impact of joint operation is positive because synergy gains are higher than increased agency costs. The headquarters will employ more resources in helping the management of the subsidiary, which in turn welcomes the intervention of the headquarters. In this case, designing an incentive plan that ties the managerial compensation to the performance of the combined firm is the most efficient.

In some cases, the joint operation results in a negative net impact on the performance of the combined firm. This occurs when the parent and the subsidiary are from different industries or have different growth opportunities. A spinoff provides a logical solution to this problem. This is because the spunoff firm's operations become completely independent of the headquarters and the manager of the spunoff firm is the only party who is responsible for the outcome of the firm. Thus, more efficient incentive contracts can be designed without any distortion.

Daley et al. (1997) contend that if the incentive alignment hypothesis is true, then the performance improvement should come mainly from the spunoff firms. Spinoffs lead to the creation of new publicly traded firms where managerial compensation programs can be tied directly to the market value of the firms.

The incentive alignment hypothesis does not predict any improvement in the operating performance of parent firms for two reasons. First, the parent firms have been publicly traded before the spinoffs; therefore, the spinoff does not lead to new market-based incentives. Second, the spinoffs do not necessarily cause the parent firms to be single-division firms. Since it is only in single-division firms that the least noisy signals to the productivity of managers can be achieved, the performance of the parent firms may not improve after the spinoffs. However, they find no evidence that the spunoff firms experience improvements in operating performance following the spinoffs. Thus, the data refutes the notion that incentive alignment is a source of gains in corporate spinoffs.

Summary of the Incentive Alignment Hypothesis

The price of stocks reflects the performance of the firm as a whole. Division managers in a multi-division firm may find that their productivity is not efficiently rewarded because their contribution is only a part of total productivity in the firm. Aron (1991) and Choi and Merville (1998) contend that a spinoff leads to a more efficient managerial compensation program since the managers of the spunoff firm are now the only parties responsible for the outcome of their firm. This sole responsibility allows the implementation of market-based compensation programs that rely on the stock price as a noise-free-signal of the productivity of the manager.

The empirical study by Daley et al. (1997) does not find evidence that the role of incentive alignment is a source of gains in corporate spinoffs. The operating performance of the spunoff firm is not significantly different from that of the pre-spinoff firms.

Increasing Corporate Focus as A Source of Gains in Spinoffs

Hite and Owers (1983) note that one of the stated reasons expressed by firms involved in spinoffs is to get back to their core businesses. Firms with the intention of getting back to their core businesses divest the units that are not closely related to their primary business lines. For firms that conduct spinoffs to get back to their core businesses, Hite and Owers (1983) find that the abnormal returns of their stocks on day –1 to day 0 relative to the announcement date is positive and statistically significant. The magnitude of the market reaction to the increasing focus spinoffs is 1.4%. However, the magnitude of the market reaction to the overall sample of spinoffs is 3.3%. The market reaction to the increasing focus spinoffs is less than to the overall sample. This finding, therefore, does not support the notion that increasing corporate focus is the main factor that able to explain the gains in corporate spinoffs.

Daley, Mehrotra, and Sivakumar (1997) state that previous studies find that corporate restructuring which increases corporate focus appears to increase corporate value. They argue that an increase in corporate focus leads to an increase in corporate value because management skills were obtained from managing core businesses, and therefore, the skills are only applicable to manage core businesses. Increasing focus, then, allows management to fully utilize its expertise without any distraction from the need to manage non-core businesses.

Daley et al. (1997) collect a sample of 85 spinoffs between 1975 and 1994. They divide their sample into two sub-samples based upon whether or not the parent and the spunoff firm have the same two-digit SIC codes. Their event study on day -1 and day 0

relative to the announcement date reveals that the market reaction is positive and statistically significant when the parent and the spunoff firms are not from the same industries. The magnitude of the abnormal returns for these cross-industry spinoffs is 4.3%, while the magnitude of the abnormal returns for the overall sample is 3.4%. The market reaction for own-industry spinoffs, on the other hand, is positive but not statistically significant. These findings support the corporate focus hypothesis that going back to basics is a source of value creation in spinoffs.

To investigate whether or not operating performance of both sub-samples are improved after the spinoffs, Daley et al. (1997) compare the Return on Assets (ROA) of the pre-spinoff firms to the combined parent and spinoff firms in the post-spinoff period. They find that the improvement in the operating performance as proxied by the changes in the ROA is positive and statistically significant when the parent and the spunoff firms are from different industries. The change in the ROA when the parents and the spunoff firms are from the same industry is negative but statistically insignificant.

Finally, Daley et al. (1997) argue that if the corporate focus hypothesis is supported by the data, then the performance improvement should come mainly from the parent firms of the cross-industry spinoffs. There are two reasons why these parent firms should be the only ones to show improvements in operating performance. First, only in cross-industry spinoffs do parent firms increase their focus in core businesses. Second, spinoffs do not lead to an increase in corporate focus for the spunoff firms because with or without spinoffs, the spunoff firms have been focused in their businesses all along. Their study find that improvement in operating performance only occurs in the parent

firms from the cross-industry spinoffs. The findings in Daley et. al (1997) support the corporate focus hypothesis.

Summary of the Corporate Focus Hypothesis

Spinning off unrelated business increases the focus of the parent firms. Focusing on core business raises the value of the parent firms because the management skills are only suitable to manage core businesses. Hite and Owers (1983) find that if management expressed an intention to return to core business as a reason for the spinoff, the market reacted positively and significantly. The magnitude of the market reaction to the increasing focus spinoffs is 1.4%. However, the magnitude of the market reaction to the overall sample of spinoffs is 3.3%.

Judging from the magnitudes of the market reactions above, increasing corporate focus may not the primary factor that drives spinoffs to increase shareholder wealth. By using a different methodology, Daley et al. (1997), however, find support for the corporate focus hypothesis. They find that only when the parent firms spin off unrelated businesses do they show a positive market reaction and improvement in operating performance.

A Bonding Mechanism to Not Cross-Subsidize as A Source of Gains in Spinoffs

Berger and Ofek (1995) argue that diversification has two costs that reduce the value of a diversified firm. First, managers have higher benefits from managing large firms than from small ones because their compensations are tied to the size of their firms. The size of firms can be expanded if they keep investing in firms' businesses, regardless

of growth opportunities of the businesses. Since diversified firms have larger free cash flows if all of their businesses are in mature industries, low growth divisions of diversified firms can get more internal capital than they would if the divisions were single-division firms. Consequently, division managers of diversified firms with unused borrowing power and large free cash flows are more likely to be involved in empire building, regardless of the negative effects of such activity on shareholder wealth.

Secondly, single-division firms cannot continue destroying value without being forced out of business. Diversified firms, on the other hand, are able to cross-subsidize their failing divisions. The ability to cover up failing divisions has a negative impact on firm value and is harder to detect if the firm is highly diversified.

According to Meyer, Milgrom, and Roberts (1992), the practice of cross-subsidy in a diversified firm is due to rent-seeking behavior of division managers of failing divisions. Any strategic decision in an organization affects the welfare of all members in the organization. The authors define rent-seeking behavior as an attempt to affect the distributive results of the organizational decisions. This activity includes individual employees conducting campaigns for their own promotions or their own choices of assignment and a division promoting its own projects, regardless of the effects of those projects on the value of the whole firm. The bad effects of rent-seeking behavior are termed influence costs.

Influence costs occur when rent seeking results in sub-optimal decisions being made and in the decline of the firm's performance due to an effort to limit the rent seeking in the firm. They argue that job protection is a primary motive for rent seeking. A

failing division with a positive probability of layoffs has strong incentives to use resources to protect the jobs of its employees. The jobs in the failing division can be saved if extra capital is allocated from the parent to the division. This extra capital can be secured by exaggerating or concealing information about the efficiency of the investment in this failing division.

Meyer et al. (1992) contend that the best way to avoid the bad effects of rent-seeking behavior is to divest the failing division so that it stops claiming firm resources. Avoiding influence costs while maintaining a troubled division in the firm is not viable because top management has to maintain a communication channel with all of its divisions including the troubled division. The failing division, in turn, uses this channel to seek rents.

To investigate the effects of overinvestment and cross-subsidy on the value of diversified firms, Berger and Ofek (1995) collect a sample 5,233 multi-segment firms and 10,948 single-segment firms for the period of 1986 to 1991. The researchers define the excess value as a percentage difference between a firm's total value and the sum of imputed value for its segments as single-division firms. This sum of the imputed value represents the theoretical value of the firm if all of its segments were operated as single-division firms. The imputed value is estimated by multiplying the median ratio, for single-segment firms in the same industry, of total capital to one of three accounting items (assets, sales, or earnings) by the segment level of the corresponding accounting item (segment's assets, sales, or earnings). Specifically,

$$I(V) = \sum_{i=1}^{n} AI_i * (Ind_i (V/AI)_{mf})$$

Where I(V) is the imputed value of the sum of a firm's segments as stand-alone firms, and n is the total number of segments. AI_i is the segment i's value of the accounting item (sales, assets, or EBIT). $Ind_i(V/AI)_{mf}$ is the ratio of firm's total capital to an accounting item (sales, assets, or EBIT) for the median single-segment firm in segment i's industry.

Berger and Ofek (1995) find that for all three accounting multipliers, the median and the mean of excess value of multi-segment firms are always negative, while for single-segment firms they are always positive. These findings imply that the operating performance of diversified firms is always less than what it would have been if their segments had been operated as single-segment firms.

To find further evidence on this matter, Berger and Ofek (1995) regress the excess value on a dummy variable that takes the value of one if the firm is a multi-segment. The regression also includes other independent variables that control for firm size, profitability and growth opportunities. They find that the coefficient of the dummy variable is negative and statistically significant, which means that diversifying firms' businesses leads to value reduction.

To identify the sources of losses from diversification, Berger and Ofek (1995) regress excess value on a measure of overinvestment. The measure of a firm's overinvestment is proxied by the sum of depreciation-adjusted capital expenditures of all its segments operating in industries with Tobin's Qs in the lowest quartile (below 0.76), scaled by total sales. They find that the coefficient of overinvestment is negative and

statistically significant. This implies that one of the sources of the negative effects of diversification on firm value is overinvestment.

Finally, Berger and Ofek (1995) regress excess value on a dummy variable, which takes a value of one if the firm has one or more segments with negative earnings, and zero otherwise. The regression also includes other control variables. The dummy variable represents the existence of a cross-subsidy in the firms. They find that the coefficient of the dummy variable is negative and statistically significant, which means that a cross-subsidy is associated with the reduction in the value of diversified firms.

The study by Berger and Ofek (1995) seeks to find evidence on the costs of firm diversification. There are two major differences between their study and this study. First, their study is based on the free cash flow and the cross-subsidy hypotheses. My study, on the other hand, is based on the capital misallocation hypothesis. The free cash flow problem leads to overinvestment in diversified firms, while the capital misallocation problem leads to overinvestment in relatively low growth divisions and underinvestment in relatively high growth divisions. The cross-subsidy hypothesis asserts that diversified firms lose value because successful divisions subsidize unsuccessful divisions. The capital misallocation hypothesis, on the other hand, asserts that diversified firms lose value if their businesses have high differences in growth opportunities.

Secondly, Berger and Ofek (1995) do not look at corporate spinoffs. However, my study is conducted on corporate spinoffs to find evidence on the costs of firm diversification. A spinoff provides a mechanism for reducing the variability of growth opportunities in diversified firms. Gains in spinoffs, therefore, may reflect the recovery of

wealth that has been destroyed by combining businesses with different growth opportunities.

Daley et al. (1997) note that cross-subsidies occur when management uses free cash flow from successful divisions to finance activities of failing divisions. They argue that spinoffs can limit the practice of cross-subsidies within diversified firms. A spinoff provides a mechanism for bonding management against future subsidies to failing divisions.

A spinoff results in two new publicly traded firms, after which both of them are subjects to market scrutiny when raising new funds. Daley et al. (1997) contend that a promise not to cross subsidize is most beneficial when the firms need to raise external funds. The reduction of the cross subsidy will be reflected in the pricing of their new securities. The authors, however, find no evidence of a significant change in the frequency of equity and debt offerings before and after the spinoffs.

Daley et al. (1997) also investigate the changes in debt-to-equity ratio and in dividends, since the increased used of leverage and an increases in cash dividends can also be used as bonding mechanisms by the firms. Again, they find no systematic relationship between the spinoffs and the increase in leverage or between the spinoffs and the increase in dividends. These findings, therefore, do not support the hypothesis that diversified firms use spinoffs to reduce cross-subsidies.

Cross-subsidies imply that there are two kinds of divisions in the firm: successful divisions and failing divisions. Although the cross subsidy hypothesis requires at least

one division be a failing division, Daley et al. (1997) do not identify which division that is. In testing the cross-subsidy hypothesis, Daley et al. (1997) use indirect tests to look at cross subsidies. They look at changes in debt, dividends, and new capital issuance. In their tests, they do not use measures of growth opportunities, free cash flows, and cross subsidies.

The study that I conduct here, on the other hand, is based on the capital misallocation hypothesis. This hypothesis implies that all divisions in the firm may have lost value from the misallocation of internal capital. Since the source of value reduction is the misallocation of capital, it is possible to test directly for improved performance and better capital allocation after the spinoff. In my tests, I use measures of growth opportunities, free cash flows, and cross subsidies.

Daley et al. (1997) find that there is no systematic relationship between the spinoff and a significant change in the frequency of equity and debt offerings. They also do not find a systematic relationship between the spinoff and a significant change in the debt-to-equity ration or dividends. These findings, however, are still consistent with the insights of the capital misallocation hypothesis. Each division may have sufficient funds to finance its own projects, but the problem is that these funds are transferred to another division that has relatively lower growth opportunities than the original owner of these funds.

Summary of the Cross-Subsidy Hypothesis

Cross-subsidies occur when the free cash flow of successful divisions is used to subsidize the operations of failing divisions. Meyer et al. (1992) argue that cross-

subsidies are the results of rent-seeking activity conducted by the managers of the failing divisions to protect the jobs in their divisions. The jobs in the failing division can be saved if extra capital is allocated from the parent to the failing divisions. This extra capital can be secured by exaggerating or by concealing information about the efficiency of the investment in these failing divisions.

Berger and Ofek (1995) find that cross-subsidies are associated with the reduction in the value of the diversified firms. Daley et al. (1997), however, find no evidence of the use of spinoffs as a bonding mechanism to not cross-subsidize the failing divisions. They also find no significant change in the frequency of equity offerings, in the frequency of debt offerings, in leverage, or in cash dividends before or after the spinoffs.

The Internal Capital Market and Capital Misallocation

Miller and Modigliani (1961) note that a firm is labeled a growth firm not because its assets and sales are growing over time, but because it earns rates of return, on its projects, in excess of its cost of capital. The term growth, therefore, does not refer to the expansion conducted by the firm but to the existence of profitable investment opportunities.

Myers (1977) shows that the market value of a firm consists of the present value of assets already in place and the present value of growth opportunities. The present value of growth opportunities measures the value of projects in the future, with rates of return that are expected to exceed the opportunity cost of capital. Because the firm does not have to take all its future investment opportunities, the value of growth opportunities

can be expressed as the present value of the firm's options to make future discretionary investments.

Jensen (1986) defines free cash flow as cash flow in excess of funds required to finance positive net present value projects. He argues that reducing free cash flow increases the value of a firm. By paying free cash flows to shareholders, managers reduce the sources under their control and allow the market to evaluate and to monitor their performance. He argues that there are some incentives for managers to grow their firms beyond their optimal sizes. Managerial power and reputation are positively related with the sizes of their firms. Moreover, some managers have their compensations tied to the growth in sales and are rewarded by promotions instead of monetary instruments. Therefore, it is imperative to motivate managers to distribute their firms' free cash flows to shareholders. Otherwise, the funds may be wasted in negative net present value projects.

Jensen (1986) suggests several ways to ease the conflict over free cash flow between managers and shareholders. Instead of investing the free cash flow in value-reducing projects, managers can increase dividends or repurchase stocks. These solutions are not the best, however, because the dividend payout may be reduced in the future, and the stock repurchase may not be repeated. He argues that issuing debt in exchange for stock or issuing debt to buy back stock provides effective bonding for managers to pay out future free cash flows. Finally, Jensen (1986) notes that controlling the free cash flow of firms in mature or declining industries will force them to obtain external capital and thus incur the monitoring of the capital markets.

Jensen (1989) argues that one of the advantages of debt is that it can be an agent for change. Firms have to service their debt, and failing to do so may lead to bankruptcy. Consequently, management is forced to reconsider the overall strategy and structure of its firms when signs of financial distress appear.

Berger and Ofek (1995) suggest that diversification may have positive effects on firm value. Value enhancing effects can be traced to at least three sources. First, managing diversified firms requires a high degree of controlling and coordinating skills. These additional skills cause managers of diversified firms to be superior to managers of single-division firms in guiding the firm to more efficient and profitable operations. Second, firms may forego positive net present value projects due to information asymmetry in the external capital markets. This effect is explained in detail in Myers and Majluf (1984).

Myers and Majluf (1984) assume that managers have better information about the "true" value of their firm than anybody else. Also, these managers act in the best interest of the current shareholders. Acting in the best interest of the current shareholders means that a firm will only issue new equity and will invest the proceeds from this issuance in positive net present value projects when the shares are overvalued. The new shareholders, on the other hand, cannot be fooled. The decision to issue new equity may signal that the shares are overvalued. Accordingly, the value of the firm will decrease when the decision to issue new equity is announced. To prevent this from happening, the firm does not issue new shares and, therefore, passes up the positive net present value projects.

Some firms may issue debt and invest the proceeds in the projects. The issuance of new debt, however, entails an incentive problem known as the agency cost of debt. Firms may switch to invest in riskier projects. They do so because shareholders have a limited liability in the event of bankruptcy but capture most of the gains when an investment succeeds. Switching to riskier projects, therefore, causes a transfer of wealth from bondholders to shareholders. To compensate for possible wealth expropriation by shareholders, debt holders must charge higher yields. It is possible that at some point the yields demanded by debt holders are higher than the expected returns from the projects. Consequently, the firm elects to pass up the projects.

Berger and Ofek (1995) argue that for diversified firms, free cash flow from mature divisions is readily available to be used by growth divisions. Thus, diversifying in various growth opportunity businesses leads to larger internal capital markets and less reliance on the external capital markets. It follows that diversified firms are able to invest more in positive net present value projects than single-division firms.

Finally, the last source of value enhancing effects from diversification as advanced in Berger and Ofek (1995) is that diversified firms are able to use losses from some divisions to lower taxes on earnings from other divisions. More importantly, combining businesses with imperfectly-correlated earnings streams increases the debt capacity due to the coinsurance effect. This effect is explained in detail in Lewellen (1971).

Lewellen (1971) notes that the coinsurance effect refers to combining two less-than-perfectly correlated income streams, thus reducing the probability of bankruptcy. He

shows that a diversified firm not only benefits from operating synergies but also from financial synergies. Financial synergies arise from the tax deductibility of interest payments. The tax deductibility of the interest benefits firms if the firms can reassure the debtholders of their ability to service the debts. When the firms have reached their optimal point, an increase in interest demanded by debtholders exceeds the tax savings from debt.

Lewellen (1971) argues that combining businesses into a single firm increase the debt capacity of the firm as long as the earnings of the combined businesses are not perfectly correlated. The earnings of the combined firm can support a higher debt level because the dispersion of the combined earnings is less and, therefore, the company is able to service its debt in more states of the world.

Comment and Jarell (1995) conduct a study to investigate whether diversification allows a greater use of debt, a greater reliance on internal capital markets, or causes a firm to be a takeover target. Their sample consists of all exchange-listed firms for the period between 1978 and 1989. They use four proxies for the level of diversification; the number of segments reported by management, the number of SIC codes assigned to each company, a revenue-based Herfindahl index, and an asset-based Herfindahl index.

A revenue-based Herfindahl index is the sum of the squares, of each segment's revenue as a proportion of total revenue. An asset-based Herfindahl index is the sum of the squares, of each segment's assets as a proportion of total assets. Specifically,

$$H = \sum_{i=1}^{N} (X_i / \sum_{i=1}^{N} X_i)^2$$

Where H is the Herfindahl index, and X is the revenue (assets) of segment's i. A single-division firm has the index of one, and as the number of segment increases, the index decreases toward zero.

Comment and Jarrel (1995) regress stock returns for the year the diversification level changes, and for the following year, on the four measures of diversification and on other control variables. They find that when a firm reduces its diversification level, the two-year stock returns are positive. A decrease by one segment causes the stock returns to increase by 5%. A decrease by one SIC code leads to an increase of 3% in the stock returns. Finally, a reduction of 0.1 in the revenue- (asset-) based Herfindahl index is associated with an increase in stock returns of 4.3% (3.5%). These results mean that the less diversified the firm, the greater the wealth of its shareholders.

Comment and Jarrel (1995) also compare debt levels of firms with varying degrees of diversification. Diversification levels are measured by the number of segments and by the revenue-based Herfindahl index. They argue that if an increase in debt usage or capacity is associated with an increase in the level of diversification, then there should be a positive systematic relationship between the two.

Comment and Jarrel (1995) find that for both measures of diversification level, single-segment firms have the lowest debt ratios (33.5% for both measures). They also find that the most highly diversified firms have the highest debt ratios (38.2% for the number of segments measure, and 39.8% for the revenue-based Herfindahl index). However, the level of debt does not increase systematically as the level of diversification increases. The second most highly diversified firms, as measured by their number of

segments, have a 33.9% debt ratio, while the second least diversified firms, as measured by the Herfindahl index, have a 38.4% debt ratio. These findings imply that the relationship between debt and diversification is weak, at best.

Comment and Jarrel (1995) also fail to find evidence of a relationship between equity beta and diversification level. Diversification does not appear to increase or decrease the systematic risk of the firms' stocks.

To find evidence on whether highly diversified firms have less reliance on external capital markets, Comment and Jarrel (1995) compare the ratio of the cash inflow to total capital, and the ratio of the cash outflow to total capital, for firms with varying levels of diversification. The levels of diversification are measured by the number of segments and by the revenue-based Herfindahl index. They argue that less reliance on external capital market means more reliance on internal capital market. Consequently, the least diversified firms should have the highest cash outflow and inflow, and the most diversified firms should have the lowest cash outflow and inflow. Cash inflow includes long-term borrowing and proceeds from the issuance of common and preferred stock. Cash outflow includes interest and principal payments on debt, cash dividends on preferred and common stocks, and security repurchases.

Comment and Jarrel (1995) find that the cash inflow and outflow for the least diversified firms, using both measures, are 10.1% and 8.9%. Cash inflow for the most diversified firms, using both measures, are 9.5% and 10.2% when using the number of segments as a measure of diversification, and 9.0% and 9.8% when using the Herfindahl

index as a measure of diversification. These findings show no evidence that diversification leads to more reliance on the internal capital market.

Finally, Comment and Jarrel (1995) find evidence of a relationship between the level of diversification and the probability of hostile takeover offers. Only 1.8% of single-segment firms, on average, experienced hostile offers, while 3.2% of six - and more-segment firms received hostile offers. The reduced value of diversified firms makes them targets for takeover by other firms.

Comment and Jarrel (1995) apparently fail to realize that highly diversified firms do not always have large internal capital markets. The authors do not differentiate between diversified firms that are more likely to have large internal capital markets and diversified firms that are less likely to have large internal capital markets.

Firms have large internal capital markets if there are large differences in the growth opportunities of their various businesses. In contrast, firms do not have large internal capital markets if all of their businesses are in high growth industries. For these firms, most capital is obtained externally. Also, if all of their businesses are in low growth industries, the internal capital market has no function at all, because all of the free cash flow should be distributed to their shareholders to avoid overinvestment problems. Therefore, the size and the importance of internal capital markets have less to do with the number of business segments, and more to do with the variability of growth opportunities between the business segments.

Lamont (1997) looks at the interdependence of financing among divisions of diversified firms. He examines the effects of cash shortfalls experienced by a company's

oil segment on the level of capital expenditure of the company's non-oil segments. The oil segments of the firms experience the cash shortfall due to a sharp decline in oil price in 1986. The segments of the firm are defined as non-oil segments if the profits of these segments are not positively correlated with the oil price. For his sample, he chooses oil segments that contributed at least 25% of the firm's total cash flow. The final sample in his study consists of 26 oil-dependent firms.

Lamont (1997) finds that for non-oil segments, the average change in the cash flow to sales ratio between 1985 and 1986 is positive and statistically significant. If capital expenditures in one segment depend only on the cash flows of that segment, then capital expenditures should increase in response to the increase in cash flows.

The researcher finds that for non-oil segments, the opposite is true; the mean and the median of the capital expenditures to sales ratio in 1986 are significantly less than in 1985. The capital expenditures of non-oil segments in 1985 are comparable with the capital expenditures of their corresponding industries, while in 1986 their capital expenditures are significantly less than of their industries. The findings hold even when the ratio is industry-adjusted to control for industry-wide changes in the profitability of investment. The decline in capital expenditures of non-oil segments, however, increases their industry-adjusted profitability. The industry-adjusted ratio of operating income to sales and of operating income plus depreciation to sales for non-oil segments in 1985 are negative and statistically significant. However, in 1986, these ratios are positive but not significantly different from zero.

Lamont (1997) argues that whether or not the cash shortfall affects the performance of the non-oil divisions depends on whether there is overinvestment or underinvestment in the non-oil segment before the cash shortfall. It appears that before the cash shortfall the firms overinvest in their non-oil segments. The findings in Lamont (1997) imply that interdependence with other divisions in the firm is an important factor in determining the investment level in each division.

Shin and Stulz (1998) note that a diversified firm is more valuable than a matching portfolio of single-division firms if the former has an efficient internal capital market. Firms may not be able to invest in profitable projects because they have difficulty in raising external funds due to information asymmetry and agency costs. The internal capital market, on the other hand, offers easier monitoring and better asset redeployability. The advantage of having an efficient internal capital market is that a segment is able to invest regardless of its own cash flows as long as it has profitable projects and the firm as a whole has sufficient funds.

Shin and Stulz (1998) argue that the internal capital market may fail to perform its tasks if either the internal capital market treats each division as a single-division firm, which relies mostly on its own cash flow to fund its projects, or it does not direct corporate resources to their best uses. A diversified firm should allocate more capital to its division with higher growth opportunities. The performance in the firm as a whole should affect these divisions less than the divisions with lower growth opportunities.

Opler and Titman (1993) note that financial economists use Tobin's Q as a proxy for a firm’s growth opportunities. Tobin's Q is defined as the ratio of the market value of

a firm to its replacement cost (current price of the firm's assets). Replacement cost is a proxy for the present value of assets in place. Myers (1977) shows that market value of a firm is equal to the sum of the present value of assets in place plus the present value of growth opportunities. Consequently, the higher the Tobin's Q, the higher the growth opportunities.

Shin and Stulz (1998) investigate the efficiency of capital allocation by the internal capital market. They collect a sample of diversified firms from 1980 to 1992. The sample is divided into two sub-samples: moderately and highly diversified firms. For each firm in the sub-samples, the researchers analyze the firm's smallest and the largest segments.

The researchers examine the sensitivity of the capital expenditures of these segments to their own and other segments' cash flows. They regress the investment level of the segment on sales growth, the segment's own cash flow, other segments' cash flows, and its Tobin's Q ratio. They find that the coefficients of sales growth and Tobin's Q ratio are positive and statistically significant: evidence that the internal capital market considers growth opportunities in making funds available for investment. The coefficients of its own cash flow and other segments' cash flows are also positive and significant, which means that the level of investment in one segment is affected by its own cash flow as well as by other segments' cash flow. More importantly, they find that the sensitivity of the level of investment in the large segments to other segments' cash flow is up to three times as high as the one in the small segments. This finding suggests

that large segments have more access to the firms' resources as a whole than smaller segments.

Next, the researchers investigate the relationship between growth opportunities and capital expenditures. If the internal capital market is efficient, a segment with more growth opportunities has priority in the allocation of funds. The availability of funds for the segment with more growth opportunities should be less affected by the performance of the firm as a whole than for the segment with lower growth opportunities. Finally, the investment in the segment with higher growth opportunities should be higher. This difference in investments is necessary for the firm to pursue the shareholder wealth maximization objective.

To investigate the relationship between growth opportunities and capital expenditures, the researchers include new independent variables. The first variable is a dummy variable that takes the value of one if the segment has the highest growth opportunities in the firm and zero otherwise. For the second and the third independent variables, the authors allow the interaction between the dummy variable above with the segment's cash flow and with other segments' cash flow. Finally, the last independent variable is other segments' growth opportunities.

Shin and Stulz (1998) find that the coefficients of dummy interaction variables and of other segments' growth opportunities are not significantly different from zero both for the large and the small segments. These findings imply that the internal capital market does not allocate capital efficiently. Segments with better growth opportunities are treated in the same way as segments that have lower growth opportunities. They conclude that

the internal capital market's failure to direct corporate resources to their best uses, as measured by their growth opportunities, plays a major role in the value reduction of diversified firms.

The study by Shin and Stulz (1998), above, is conducted to find evidence of the role of capital misallocation problems in the value reduction in diversified firms. To find this evidence, they test the efficiency of capital expenditure in diversified firms. Unlike in Shin and Stulz (1998), my study is an attempt at investigating the source of gains in corporate spinoffs. A spinoff is an expensive corporate event and an extreme method of solving corporate problems. If capital misallocation is the major source of the inefficiency in diversified firms, then the firms involved in spinoffs are those that suffer the most from capital misallocation. A spinoff can be used to reduce the variability of growth opportunities in the diversified firms. This reduction reduces capital misallocation, and leads to an improvement in the operation of the firms. Thus, my study complements the study of Shin and Stulz (1998).

Scharfstein and Stein (1997) observe that, on average, the stocks of diversified firms are traded at lower values than comparable portfolios of single-division firms. Moreover, the incidence of dismantling diversified firms into single-division firms has been increasing in recent years. They argue that the way diversified firms are organized increases managerial agency problems, which leads to inefficiency in investment.

Scharfstein and Stein (1997) note that there are two agency problems associated with investment inefficiency in diversified firms. First, managers may invest free cash flows in negative net present value projects. Due to the coinsurance effect, a diversified

firm is able to borrow more against its assets than a comparable portfolio of single-division firms. Thus, diversified firms, potentially, have more resources that may be wasted in negative net present value projects.

Secondly, although diversified firms do not have, on average, more free cash flows than single-division firms, their internal capital markets cannot allocate this cash as efficiently as external capital markets. As a result, diversified firms suffer from capital misallocation by overinvesting in low growth opportunity divisions and underinvesting in high growth opportunity divisions. Scharfstein and Stein (1997) argue that the inefficiency of internal capital markets is a major factor in explaining the loss of value in diversified firms.

Scharfstein (1998) notes that earlier studies find that diversified firms have lower Tobin's Q than portfolios of comparable single-division firms, and their shares are traded at discounts. When these discounts get larger, the diversified firms are more likely to be broken up. He contends that the main reason diversification destroys value is poor capital allocation. Diversified firms follow “socialism” in capital budgeting. Socialism in capital budgeting occurs when efficiency is not the primary factor in determining the amount of the capital received by each business unit. This practice may lead to underivestment in divisions with relatively high growth opportunities and overinvestment in divisions with relatively low growth opportunities.

To find evidence of socialism in capital budgeting of diversified firms, Scharfstein (1998) collects a sample of 165 diversified firms in 1979. Segments of each firm in the sample are grouped into divisions based on whether or not their businesses are

related to each other. The standard approach in grouping the sample is to use the two-digit SIC code. Unlike other researchers, he uses personal judgment in deciding whether or not businesses are related to each other.

Scharfstein (1998) argues that the two-digit SIC code has two weaknesses. First, divisions may have different two-digit SIC codes, but produce related products and provide related services. For example, Gifford-Hill Co has two divisions. The first division produces concrete-related products, with a two-digit SIC code of 32, and the second division produces roll-formed metal buildings and custom-designed metal building products, with a two-digit SIC code of 34. Using the two-digit SIC approach results in two different businesses, but these two divisions are actually both manufacturing products for the construction industry.

Secondly, the two-digit SIC approach cannot identify vertical connections between divisions with different two-digit SIC codes. For example, Brunswick CO. has two divisions; the first division produces bowling products, with two-digit SIC code of 39, and the second division operates bowling alleys, with a two-digit SIC code of 79. Although, these two divisions are related to each other, the two-digit SIC code approach cannot identify their relationship. Therefore, Scharfstein (1998) uses personal judgment in grouping business segments into divisions. He bases this judgement on the business descriptions contained in *Moody's Industrial Manual*.

To estimate Tobin's Q for a division, Scharfstein (1998) first obtains the median of the Tobin's Qs of single-division firms in the same industry as the segments. The weighted average of these Tobin's Qs is then estimated for each division. The weight is

the fraction of the divisional sales that is attributable to the segment. He regresses industry-adjusted divisional capital expenditures on the division's Q to investigate whether or not growth opportunities are less important in the capital allocation of diversified firms.

Scharfstein (1998) finds that the coefficient of the division Q is negative and statistically significant, even after controlling for industry-adjusted cash flow for the division. These findings suggest that the divisions of diversified firms in relatively high Q industries invest less than single-division firms, in the same industries. Also, the divisions of diversified firms in relatively low Q industries invest more than single-division firms, in the same industries.

Next, the researcher examines the relationship between the size of divisions and capital misallocation in diversified firms. He introduces two new variables in his model. The first new variable is the division's share of overall sales. This is a proxy for the size of the division. The second new variable is an interaction between sales share and Q. This interaction variable reflects the responsiveness of capital expenditure of the division to its Q, for a given size. He finds that the coefficient of the interaction term is positive and statistically significant. This finding suggests that larger divisions tend to behave like their single-division peers; their investment level is sensitive to an increase in growth opportunities.

Scharfstein (1998) also examines the effect of insider ownership on capital misallocation in diversified firms. He argues that without agency problems, diversified firms will behave like single-division firms. Capital misallocation is a waste to a firm's

resources; therefore, high insider ownership will prevent waste by distributing capital more appropriately across divisions in the firm. He finds that the coefficient of the interaction term between managerial ownership and Q is positive and statistically significant. This finding implies that the higher the insider ownership, the lower the capital misallocation.

Lastly, he finds that by 1994 only 53 of these firms still survive as diversified firms. Fifty-five of these firms become single-division firms through spinoffs or selloffs, while another 57 cease to exist as independent firms. The capital expenditures of the 55 firms, which become single-division firms, are found to be more sensitive to growth opportunities than before.

Like Shin and Stulz (1998), Scharfstein (1998) attempts to find evidence on the role of capital misallocation in the value reduction of diversified firms. My study, on the other hand, seeks to explain capital misallocation as the reason for corporate spinoffs. My investigation into the benefits of corporate spinoffs is a complement to their investigations into the costs of firm diversification. The firms that gain the most from spinoffs are those that lose the most from joint operations. If the source of value reduction in diversified firms is the misallocation of capital, then I should be able to find evidence that the source of gains from corporate spinoffs is the reduction of capital misallocation. Spinoffs can be used to reduce the variability of growth opportunities in diversified firms, and, therefore, reduce misallocation of capital. This reduction will lead to an improvement in the operation of the firms.

Although Scharfstein (1998) finds that after 15 years (from 1979 to 1994) 55 of 165 firms in his sample become single-division firms and their capital expenditures are more sensitive to growth opportunities, he does not provide a systematic relationship between corporate spinoffs and reduced capital misallocation. Specifically, he does not show that capital misallocation is the major reason for spinning off divisions. Firms may be forced to be single-division firms for reasons other than capital misallocation.

The finding that the capital expenditure of single-division firms is more sensitive to growth opportunities does not provide evidence that post-spinoff parent firms will have better internal capital allocation. This is because, after spinoffs, parent firms are not necessarily single-division firms. In addition, 15 years pass before Scharfstein reinvestigates the capital expenditure of his sample firms. In 15 years, many other factors can affect the firm. These factors may have nothing to do with the misallocation of internal capital.

Summary of the Capital Misallocation Hypothesis

Scharfstein and Stein (1997) observe that, on average, the stocks of diversified firms are traded at a lower value than comparable portfolios of single-division firms. Moreover, the incidence of dismantling diversified firms into single-division firms has been increasing in recent years. A diversified firm is more likely to have a larger internal capital market, and thus, it has less reliance on the external capital market to raise funds.

The existence of the information asymmetry and agency costs creates difficulty in raising external funds. This difficulty limits the ability of the single-division to invest in profitable projects. Shin and Stulz (1998) argue that a diversified firm is more

advantageous than a single-division firm only if the former has an efficient internal capital market; otherwise, it is a major source of value reduction in the diversified firm. They argue that the internal capital market may fail to perform its tasks. This will happen when the internal capital market treats each division as a single-division firm that relies mostly on its own cash flow to fund its projects. This will also happen when the internal capital market does not direct corporate resources to their best uses.

Lamont (1997) and Shin and Stulz (1998) find evidence on the interdependence of the investment level in one division on the cash flow of other divisions. Shin and Stulz (1998) and Scharfstein (1998) find that a division with higher growth opportunities does not have a higher priority in capital allocation, than a division with lower growth opportunities.

Shin and Stulz (1998) and Scharfstein (1998) suggest that the capital misallocation in the form of overinvestment in relatively low growth divisions, and of underinvestment in relatively high growth divisions, is the main source of the value reduction the diversified firm. The bigger the division and the higher the insider ownership, however, the less capital is misallocated. They, therefore, argue that agency problems cause the practice of socialism in capital budgeting of the diversified firm.

CHAPTER 3

THEORY AND HYPOTHESES

Hypothesis 1_A

The objective of a firm is to maximize shareholder wealth. Thus, a diversified firm will spin off its division(s) voluntarily when the benefits of the combination of these divisions into a single diversified firm are less than the costs. There are two conditions that lead to the decision to spin off a division. First, the combination was previously optimal, but changes in external and internal factors caused the combination to become non-optimal. Second, the combination was not an optimal combination from the start because the division was developed internally or was acquired with a motive other than maximizing shareholder wealth.

The capital misallocation hypothesis focuses on the costs of diversified firms. It asserts that the internal capital market cannot replicate the role of the external capital market in allocating capital efficiently. Berger and Ofek (1995) argue that the major advantage of a diversified firm over a single-division firm is that the diversified firm has a larger internal capital market and, therefore, relies less on the external capital market. This has the benefits of reduced transaction costs and asymmetric information costs in the external capital market.

Shin and Stulz (1998), Scharfstein and Stein (1997), and Scharfstein (1998), on the other hand, find that the internal capital market follows socialism in capital allocation,

which leads to overinvestment in relatively low growth divisions and underinvestment in relatively high growth divisions. These findings imply that having a large internal capital market is not necessarily a source of strength for the diversified firm. It may be a source of weakness for the firm.

The capital misallocation hypothesis is different from both the free cash flow hypothesis and the corporate focus hypothesis. The free cash flow hypothesis asserts that management is wasting the firm's resources in negative net present value projects. This waste leads to overinvestment in a diversified firm. The level of the free cash flow in a firm does not depend on whether it is a single-division firm or a diversified firm. What determines the level of the free cash flow in a firm is whether it operates in mature industries or in growth industries.

More importantly, the capital misallocation hypothesis asserts that when a diversified firm has businesses in different growth opportunity industries, there will be overinvestment in relatively low growth businesses and underinvestment in relatively high growth businesses. The free cash flow problem, on the other hand, only leads to an incidence of overinvestment in the firm's businesses. The existence of capital misallocation is harder to detect because the growth opportunity of a diversified firm is the average of the growth opportunities of the diversified firm's businesses. Therefore, it is possible that capital misallocation cannot be detected using growth measures or using free cash flow measures on a diversified firm.

There are two ways that capital misallocation can take place. First, the free cash flow from relatively low growth divisions, which is supposed to go to relatively high

growth divisions, is kept in the relatively low growth divisions instead. Second, the earnings of the relatively high growth divisions, which are supposed to be reinvested in the relatively high growth divisions, are reinvested in the relatively low growth divisions. Therefore, capital misallocation can also be termed the hidden free cash problem.

The corporate focus hypothesis asserts that management skills are more suited to managing core businesses. It is not clear, however, whether this refers to the skills of divisional managers, or to the skills of top management. If it refers to the skills of divisional managers, then diversified firms, which are typically big firms with a lot of resources, can easily hire experts in the field. Berger and Ofek (1995) show that the top management of a diversified firm has higher degree of controlling and coordinating skills. Also, Roll (1986) suggests that successful operations in the past often lead to a decision to diversify in the future. In addition, some non-core businesses are developed internally. Developing non-core businesses internally allows the management to become acquainted with all aspects of the businesses.

The corporate focus hypothesis and the capital misallocation hypothesis have different predictions regarding which diversified firms will be successful or unsuccessful. The corporate focus hypothesis predicts that only diversified firms, which are operated within the same line of businesses as indicated by their two-digit SIC codes, are likely to be successful. The capital misallocation hypothesis, on the other hand, predicts that only diversified firms that have less variation in the growth opportunities of their businesses are likely to be successful.

It is hard to argue that two divisions whose two-digit SIC codes are the same, have highly different growth opportunities. However, two divisions whose two-digit SIC codes are different, may have similar growth opportunities. Scharfstein (1998) argues that the use of the two-digit SIC code, the standard approach in the corporate focus literature, fails to take into account the vertical and the horizontal relationships of businesses. This argument implies that two different businesses may have similar growth opportunities because the input of one business is the output of the other business, or both of their outputs are used by the same customers.

Two different businesses may also have a small difference in growth opportunities because both of them have high growth opportunities, such as the computer (SIC code 35) and pharmaceutical (SIC code 28) industries, or have low growth opportunities, such as the brewing (SIC code 20) and the cigarette (SIC code 21) industries. In other words, differences in the industries of the firm's businesses do not always mean that the firm's businesses have high differences in growth opportunities.

Similarity or dissimilarity of industries of a diversified firm's businesses, however, may still be a proxy for low or high differences in growth opportunities. Differences in growth opportunities may underlie differences in corporate focus. Thus, it is possible that tests for corporate focus may be picking up a capital misallocation effect.

The capital misallocation hypothesis implies that the costs of combining businesses into a single firm are higher for businesses with higher differences in growth opportunities. Higher differences in growth opportunities imply that more capital is misallocated. The internal capital market fails to meet the needs of the relatively low

growth opportunity divisions for less investment and the needs of the relatively high growth divisions for more investment. As a result, the actual performance of the diversified firm is less than its potential performance. This suggests that when capital is grossly misallocated within the diversified firm, the firm will conduct a spinoff to maintain the objective of maximizing shareholder wealth. This provides my first hypothesis.

Hypothesis 1_A *The parent and the spunoff firms have different growth opportunities.*

Hypothesis 2_A

Recent studies have suggested that the sources of gains in spinoffs may be from corporate refocus, wealth transfer from bondholders to shareholders, and merger facilitation. These three hypotheses have one factor in common regarding the relationship between managerial ownership and the spinoff event: high managerial ownership makes the spinoff more likely.

The corporate focus hypothesis asserts that management lacks skills in managing non-core businesses. Management skills can only be obtained from education and experience, not from a lack of motivation resulting from low managerial ownership in the firm. Although the level of managerial ownership has nothing to do with the skills required to manage non-core businesses, high managerial ownership leads to exploration of better ways operating non-core businesses. One of these ways is to let a new management team operate the non-core businesses, through spinoffs.

The wealth transfer hypothesis asserts that spinoffs do not create value; the increase in share prices after a spinoff announcement only reflects the wealth transfer from bondholders to shareholders. Clearly, the higher the managerial ownership, the higher the motivation to transfer the wealth from bondholders to shareholders through spinoffs.

Finally, the merger facilitation hypothesis implies that joint operations between the parent and its division are not optimal due to lack of operational synergy. The optimal performance can only be achieved if corporate assets are merged with their would-be acquirers. Since the current shareholders of the firms will be the benefactors of the transfer of corporate assets to their best uses, higher managerial ownership leads to higher incidence of spinoffs. A spinoff provides a mechanism that allows all benefits from separating the two businesses to accrue to the shareholders of the pre-spinoff combined firm; thus, high management ownership induces a stronger incentive to break up the firm.

The capital misallocation hypothesis, on the other hand, asserts that capital misallocation is a waste of corporate resources. Scharfstein (1998) find that the higher the managerial ownership, the less the capital misallocation. Higher insider ownership forces the diversified firms to behave like their single-division peers, for managers themselves bear the punitive costs of capital misallocation. Accordingly, the existence of divisions with different growth opportunities within a diversified firm will not lead to capital misallocation as long as management ownership is high. Therefore, without capital misallocation the diversified firm has less incentive to spin off its divisions.

Hypothesis 2_A *Firms that subsequently spin off their divisions have lower managerial ownership than firms that do not spin off their divisions.*

Hypothesis 3_A

A spinoff is an expensive way to solve corporate problems. It involves substantial costs to cover registration and distribution of new shares, tax shield loss, and the duplication of administrative activities in the post-spinoff firms. The capital misallocation hypothesis asserts that the higher the difference in growth opportunities among the firm's businesses, the higher the costs of joint operations. This is because the incidence of the misallocation of capital increases as the difference in growth opportunities increases.

Some of the spunoff firms may have small differences in growth opportunities with their parent firms, but still, their parents spin them off. The explanation of this phenomenon may lie with the debt level of the pre-spinoff combined firms. Jensen (1989) argues that debt can play a role as an agent for change. With less debt in its capital structure, a firm is able to destroy more of its value or to have poorer performance before signs of financial distress occur. With high debt in its capital structure, on the other hand, the signs of financial distress occur faster. This is because in highly leveraged firms, a high percentage of the earnings go to bondholders on a fixed basis.

Highly leveraged firms have less of a cushion than less leveraged firms. Once the firm fails to fulfill the obligation to service its debt, bondholders can force it into bankruptcy. Highly leveraged firms, therefore, conduct spinoffs as soon as they find out that the combination of businesses with different growth opportunities is leading to

operational inefficiency. So, when capital misallocation is the problem in pre-spinoff combined firms, a firm with very diverse growth opportunities can carry much less debt than a firm with less diverse growth opportunities.

Hypothesis 3_A *Pre-spinoff combined firms from highly different growth opportunity spinoffs have less debt than pre-spinoff combined firms from less different growth opportunity spinoffs.*

Hypothesis 4_A

The massive departure from a diversification strategy into a specialization strategy began in the 1980s. Firms abandoned the conventional wisdom popular in the 1950s and the 1960s that diversification lead to better operating performance. Spinoffs allow diversified firms to concentrate on certain growth opportunity businesses.

Donaldson (1990) argues that General Mills is forced to restructure its businesses because of the difficulty in allocating capital between higher growth divisions and lower growth divisions. Spinning off a division that has different growth opportunities with the parent will reduce the differential in growth opportunities within the firm. The higher the difference in growth opportunities, the less the capital misallocation in the future. Accordingly, the market will react more positively to the spinoff announcement that involves a high difference in growth opportunities between the spunoff firm and the parent firm.

Hypothesis 4_A *Stock price reaction to the spinoff announcement is more positive if the parent firm and the spunoff firm have a high difference in growth opportunities.*

Hypothesis 5_A and Hypothesis 6_A

Kudla and McInish (1983), Miles and Rosenfeld (1983), Hite and Owers (1983), Schipper and Smith (1983) find that, on average, the market reacts positively to spinoff announcements. The spinoff removes negative synergies between the parent and the spunoff firms. The efficient market hypothesis assumes that the market anticipates the positive effect of the spinoff and reflects this anticipation at the time of the spinoff announcement.

In the context of the capital misallocation problem, the cause of the negative synergy is combining businesses with different growth opportunities into a single firm. The headquarters cannot allocate firm resources efficiently. A relatively low growth opportunity business receives more capital than is warranted by its growth opportunities. At the same time, a relatively high growth opportunity business receives less capital than is justified by its growth opportunities. The free cash flow hypothesis, on the other hand, asserts that pre-spinoff firms are overinvesting in their businesses.

If the main source of value reduction in the diversified firm is the inefficiency of its investment policy, and the spinoff is carried out to solve this problem, then following the spinoff, the post-spinoff firms will adjust their investment policy on a basis consistent with the industries within which they compete. Thus, the investment level in the post-spinoff firms with relatively low growth opportunities is lower than before the spinoffs, whereas the investment level in the post-spinoff firms with relatively high growth opportunities is higher than before the spinoffs. In contrast, the free cash flow hypothesis

only predicts that all post-spinoff firms will decrease their investment level following the spinoffs.

Changes in the firms' investment policy following spinoffs are only predicted by the capital misallocation and by the free cash flow hypotheses. The other hypotheses are silent in this matter.

Hypothesis 5_A *Relatively high growth firms increase their capital expenditure after the spinoffs.*

Hypothesis 6_A *Relatively low growth firms decrease their capital expenditure after the spinoffs.*

Hypothesis 7_A

As mentioned earlier, Miles and Rosenfeld (1983), Hite and Owers (1983), Schipper and Smith (1983) find that, on average, the market reacts positively to a spinoff announcement. The positive market reaction does not always mean the operating performance is expected to be better following the spinoff. In the context of the wealth transfer hypothesis, the increase in stock prices reflects the wealth transfer from bondholders, not the expectation of wealth creation following the spinoff. Similarly, the merger facilitation hypothesis does not imply that the operating performance of a spinoff firm will improve between the period after the spinoff and the period before the firm is taken over by another firm.

Lastly, the cross-subsidy avoidance hypothesis is silent on whether or not the parent and the spunoff firms will have better operating performance. The cross-subsidy avoidance hypothesis asserts that free cash flow from successful divisions is used to cross

subsidize failing divisions. With or without the spinoff, the successful divisions have been successful, and this hypothesis provides no insight to what will happen to the operating performance of the failing divisions following the spinoff.

The wealth transfer, the merger facilitation, and the cross-subsidy avoidance hypotheses fail to predict whether there will be any improvement in operating performance of the firms following the spinoffs. The increasing focus, the incentive alignment, and the capital misallocation hypotheses, on the other hand, predict that the operating performance of the firms will improve following the spinoff. However, these three competing hypotheses have different predictions regarding parent and spunoff firms.

Daley et al. (1997) show that the corporate focus hypothesis predicts that only the parent firm from cross-industry spinoff will have an improvement in the operating performance because the parent is more focused after the spinoff, while the spunoff firm is focused in its industry with or without the spinoff. They also note that the incentive alignment hypothesis predicts that only spunoff firms will improve because the spinoffs allow compensation programs to be tied directly to the performance of the spunoff firm. The capital misallocation hypothesis predicts that the improvement of the operating performance will be experienced both by the parent and the spunoff firms. The shift to the “right" investment policy will lead to better operating performance for both post-spinoff firms.

The level of improvement in the operating performance depends on the severity of capital misallocation in the pre-spinoff firm. The capital misallocation hypothesis asserts

that the higher the difference in growth opportunities of divisions in the pre-spinoff combined firm, the more severe the capital misallocation. Therefore, the improvement in operating performance will be more pronounced the higher the difference in growth opportunities.

Hypothesis 7_A *The higher the difference in growth opportunities between the parent firm and the spunoff firm, the higher the operating performance of both the parent firm and the spunoff firm following the spinoff.*

CHAPTER 4

RESEARCH METHODOLOGY

Sample Selection

The sample in this study consists of the New York Stock Exchange, American Stock Exchange, and NASDAQ firms engaged in nontaxable voluntary spinoffs over a 17-year period between 1980 and 1996. An initial list of the firms in this study is obtained from the *CRSP* files by using a distribution code of 3763. Using this code on the *CRSP* files allowed me to have 224 possible spinoff events.

As noted by Vijh (1994), the code of 3763 also applies to new issues of another class of shares by the same firm. *The Moody's Dividend Records,* the *Wall Street Journal Index*, the *Newspaper Abstracts Ondisc,* and the *Nexis* database are used to identify whether or not an event is a bona fide spinoff (a pro-rata distribution of at least 80% of a division to the original stockholders). There are 45 events that are excluded from the initial sample because the events are the issuance of different classes of shares by the same firms. Anand Vijh has been very generous in making his sample available. A part of my sample period is the same as Vijh's sample period. I compare my initial spinoff sample with Vijh's sample to ensure that I do not miss any spinoff event. I find that my initial sample from the same sample period is similar to his sample.

There are seven hypotheses in this study. Data requirements for testing some hypotheses are different from the data requirements for testing others. The criteria for including a spinoff event in the testing of hypothesis 1 are as follows:

1. The spinoff is a voluntary spinoff; it is not undertaken to satisfy requirements of various government agencies or to control damages from lawsuits.
2. The spinoff does not involve a royalty trust, a Real Estate Investment Trust, or a limited partnership. As in Daley et al. (1997), I am also not interested in spinoffs where the source of gains is clearly tax reduction.
3. The parent and the spunoff firms have necessary data for testing hypothesis 1 and 2 in various sources available at the University of North Texas library. These sources are the *Standard & Poor's Research Insight*, the *Nexis* database, and the *SEC* file.

The criteria for including a spinoff event in the testing of hypothesis 2 are all of the above plus an additional criterion as follows:

4. The announcement date for the spinoff is available in the *Wall Street Journal Index*, the *Newspaper Abstracts Ondisc,* or the *Nexis* database.

In testing hypothesis 3 and hypothesis 4, one more criterion is added. This additional criterion is as follows:

5. The spinoff results in a single spunoff firm, not multiple spunoff firms.

Finally, for testing hypotheses 5 through 7, I use criteria 1, 2, 3, and 5, plus two additional criteria as follows:

6. The parent and the spunoff firms are not involved in any other spinoff within the four-year window period (from year 0 to year +3).

7. Both the parent and the spunoff firms survive as independent firms for at least three years after the spinoff is consummated and have annual financial data needed for testing hypotheses 5 through 7, from sources available at the University of North Texas library. Those sources are the *Standard & Poor's Research Insight* and the *SEC* file.

Testing Hypothesis 1_A

Hypothesis 1_A *The parent firm and the spunoff firm have different growth opportunities.*

To test hypothesis 1_A above, the growth opportunities of both parent and spunoff firms in the sample are estimated. The proxies for growth opportunities of both firms are estimated for year +1 relative to the ex-dividend year of the stock distribution. There are four proxies of growth opportunities in this study. The most commonly used measures of growth opportunities in the literature are Tobin's Q and the market/book ratio.

Barclay and Litzenberger (1998), Pilotte (1992), Opler and Titman (1993), Denis (1994), Berger and Ofek (1995), Shin and Stulz (1998), and Scharfstein (1998) use Tobin's Q as a measure of growth opportunities in their studies. Dierkens (1991), Smith and Watts (1992), and Denis (1994) use the market/book ratio as a measure of growth opportunities in their studies. Denis (1994) notes that the reason for using both measures above is that the difference between market value, and book value or replacement cost depends on the profitability of assets in place, as well as of expected investment opportunities. Given decreasing marginal returns on capital, which means the next investment is less profitable than the current investment, if new investment opportunities

are expected to be profitable, then the assets in place must also be profitable. Therefore, Tobin's Q and the market/book ratio of a company that has profitable investment opportunities will be high. Also, as mentioned earlier in Section 2.6, Myers (1977) shows that the market value of a firm is equal to the sum of the present value of assets in place plus the present value of growth opportunities. Consequently, the market/book ratio and Tobin's Q are positively correlated with the profitability of new investment.

The market/book ratio used in this study is estimated by dividing the market value of assets with the book value of total assets. The market value of assets is represented by the sum of the market value of equity and the book value of long term debt.

There are some variants of Tobin's Q that have been proposed by researchers in earlier studies. Because the sample firms in this study are essentially new firms following the spinoffs and, therefore, have no past data, Tobin's Qs in this study are estimated using the methodology proposed by Chung and Pruitt (1994). The formula for calculating the Q of Chung and Pruitt is as follows:

$$Q = \frac{MV(CS) + BV(PS) + BV(LTD) + BV(CL) - BV(CA)}{BV(TA)} \quad (1)$$

Where MV(CS) is the market value of the firm's equity, BV(PS) is the book value of the firm's preferred stock, BV(LTD) is the book value of the firm's long term debt, BV(CL) is the book value of the firm's current liabilities, BV(CA) is the book value of the firm's current assets, and BV(TA) is the book value of the firm's total assets.

Chung and Pruitt (1994) compare the variation of their Q with the Q of Lindenberg and Ross (1981). The procedure to estimate Q proposed by Lindenberg and Ross is an iterative procedure that demands at least two years of firm-reported replacement cost values in the past. Large firms were required to report their replacement cost estimates only between 1976 and 1986, while small firms were not required to do so at all. Since both parent and spunoff firms are essentially new firms after the spinoff, and my sample period is between 1980 and 1996, the procedure proposed by Lindenberg and Ross (1981) cannot be used in my study. Chung and Pruitt (1994), however, find that their Q is able to explain at least 96.6% of the total variability in the Q of Lindenberg and Ross.

The third proxy for growth opportunities is the unadjusted cash flow measure of growth opportunities (UCF). This measure is the ratio of operating income before interest, taxes and depreciation in year +1 to the market value of assets in year 0, where year 0 is the ex-dividend year. The market value of assets is represented by the sum of the market value of equity and the book value of long- term debt.

Opler and Titman (1995) use the ratio of operating income before interest, taxes and depreciation in year 1 to the market value of assets in year 0 as a proxy for growth opportunities. They argue that the market value of assets is equal to the risk-adjusted sum of discounted future cash flows. It follows that a firm that provides greater cash flow relative to its market value today is expected to have less cash flow growth in the future. Consequently, the ratio of operating income before interest, taxes and depreciation to the market value of assets is negatively correlated with growth opportunities.

The fourth proxy for growth opportunities is the risk adjusted cash flow measure of growth opportunities (RACF). This measure is simply the unadjusted cash flow measure (UCF) divided by the intrinsic business risk of the firm. I construct this measure to overcome a major problem of the UCF measure.

The unadjusted cash flow measure of growth opportunities (UCF), can only be used to proxy for growth opportunities if all firms have the same required rate of return. Opler and Titman (1995) apparently assumed that their sample firms are in a homogeneous risk class. This assumption may not always be true. The market value of a firm depends on the stream of cash flows in the future and the required rate of return. The required rate of return, in turn, depends on the risk of these future cash flows. Therefore, the ratio of operating income before interest, taxes and depreciation to the market value of assets needs an adjustment before it can be used as a proxy for growth opportunities. I make this adjustment by dividing the UCF with the intrinsic business risk of the firm.

Rhee (1986) argues that equity beta can be decomposed into three components. These components are the degree of operating leverage, the degree of financial leverage, and the intrinsic business risk. Rhee (1986) shows a necessary formula to extract the intrinsic business risk from the equity beta as follows:

$$\$^0 = \$/[(1-T)(C/S + D/S) +1] \quad (2)$$

Where $\$^0$ is the intrinsic business risk, $\$$ is the equity beta of common stock, T is the firm's tax rate, C is the present value of total fixed costs, S is the market value of common stock, and D is the book value of debt. Like the unadjusted cash flow measure

(UCF), the risk adjusted cash flow measure (RACF) is also negatively correlated with growth opportunities.

All of the above data are obtained from the *Standard and Poor's Research Insight and* the *CRSP* file. Some of the fixed costs mentioned in Rhee (1986) are depreciation expenses, rent expenses, interest expenses on long term debt, pension expenses, and R&D expenses. These costs are discounted at the risk free rate to find the present value of total fixed costs.

Since the capital misallocation hypothesis does not provide any prediction as to whether the parent firm or the spunoff firm has higher growth opportunities than the other, the difference in their growth opportunities is expressed in absolute value. The mean of the differences in growth opportunities between the parent and the spunoff firms are tested using the paired t-test. The procedure above is repeated four times because there are four measures of growth opportunities here. The hypothesis and the test are as follows:

$$H1_A : \left| GO_{pf} - GO_{sf} \right| \neq 0$$

$$t_d = \frac{\bar{d}}{S_d / \sqrt{n}} \tag{3}$$

$$S_d = \sqrt{\frac{\sum d^2 - (\sum d)^2 / n}{n-1}} \tag{4}$$

Where GO_{pf} represents the growth opportunities of the parent firms, GO_{sf} represents the growth opportunities of the spunoff firms, $\bar{d}$ is the difference between the mean of growth opportunities of the parent firms and the mean of growth opportunities of the spunoff firms, S_d is the standard deviation of the differences, and n is the number of pairs of spinoff firms.

Testing Hypothesis 2_A

Hypothesis 2_A *Firms that subsequently spin off their divisions have lower managerial ownership than firms that do not spin off their divisions.*

In testing hypothesis 2_A above, it is necessary to find firms that have the same characteristics as the pre-spinoff combined firm but do not spin off their divisions. There are two sets of comparative managerial ownership data for each pre-spinoff combined firm. The first set consists of the mean managerial ownership of firms with the same two-digit SIC code, and with total assets values that are comparable to the total asset value of the pre-spinoff combined firm. To find the mean managerial ownership of control firms I use six firms that meet SIC and asset value requirements. For 32 of the sample firm, I am unable to find managerial ownership for four or more control firms. For these cases, I use only three control firms.

The second set consists of the managerial ownership of firms with the same two-digit SIC code, and with total asset values that are closest to the pre-spinoff combined firm. The *Standard & Poor's Research Insight* is the source for finding control firms. The managerial ownership data is obtained from the proxy statements filed both by the pre-

spinoff combined firms, and by matched firms with the Securities and Exchange Commissions, a year before the spinoff announcement. Following Agrawal and Mandelker (1987), managerial ownership data is collected separately for the highest ranked executive, for the two highest ranked executives, and for all officers and directors, of each pre-spinoff parent and matched firm. The hypothesis is tested as follows:

$$H2_A : MO_{pspf} - MO_{mf} < 0$$

Where MO_{pspf} is managerial ownership of a pre-spinoff combined firm, and MO_{mf} is managerial ownership of a matched firm. Since each pre-spinoff combined firm is paired with its matched firm, the differences in managerial ownership between the pre-spinoff combined firms and their matched firms are tested using the paired t-test.

The paired t-test uses the difference in the means to estimate the t-statistics. Because means are sensitive to outliers, the results of the test may be misleading. To ensure that outliers did not grossly affect the results of the test, I also use the Wilcoxon Signed Ranks test to investigate the difference in growth opportunities between the parent and its corresponding spunoff firm. The Wilcoxon Signed Ranks test is the nonparametric counterpart of the paired t-test. The procedure is as follows:

1. For each pair of a parent and a spunoff firm, calculate the difference in growth opportunities. Since I have n pairs of spinoff firms, I will have n differences in growth opportunities.
2. Assign a rank to the absolute value of each difference, where the lowest difference in growth opportunities is assigned a rank of 1, the second lowest is assigned a rank of

2, and so on. Assign the average ranks involved to tied differences, and drop the pair from the sample when the difference is zero.

3. Reaffix the sign (+ or -) to the associated ranks, and calculated the sum of the ranks (sum of R_i) and the sum of ranks squared (sum of R_i^2).
4. Let T be the calculated Wilcoxon Signed Ranks statistic. The distribution of T is approximately normal.

$$T = \frac{\sum R_i}{\sqrt{\sum R_i^2}} \tag{5}$$

Testing Hypothesis 3_A

Hypothesis 3_A *Pre-spinoff combined firms from highly different growth opportunity spinoffs have less debt than pre-spinoff combined firms from less different growth opportunity spinoffs.*

Jensen (1989) notes that debt can be an agent for change. A firm that has high debt in its capital structure will find that signs of financial distress occur more quickly. It follows that pre-spinoff combined firms from highly different growth opportunity spinoffs have less debt than do pre-spinoff combined firms from less different growth opportunity spinoffs.

To test hypothesis 3_A, the sample is divided into two equal sub-samples based on the absolute value of the difference in growth opportunities between the spunoff and its parent firms using the four proxies for growth opportunities mentioned earlier. Let the high difference growth opportunity spinoff sub-sample and the low difference growth

opportunity spinoff sub-sample be called the high difference spinoffs and the low difference spinoffs respectively.

The four proxies do not result in a consistent classification into high difference and low difference sub-samples. A fifth classification is generated consisting of only those firms that are consistently classified as high difference or as low difference, irrespective of the proxy used. This fifth, consistent, classification results in a smaller sample size. Tests on this consistent sample are included in the tables under a new proxy name; COMB. Of course, this is not another proxy, it is simply a classification where all the four proxies give the same classification.

The level of debt of each pre-spinoff combined firm is represented by the ratio of the book value of long-term debt to the market value of equity in the year preceding the spinoff announcement. Univariate and multivariate tests are conducted for hypothesis 3_A.

The data needed for the test are taken from the *Standard & Poor's Research Insight*, the *Moody's Industrial Manuals*, and the *SEC* file. The differences in the debt level between pre-spinoff combined firms from the high difference spinoffs and pre-spinoff combined firms from the low difference spinoffs are tested using the two-sample t-test and its nonparametric counterpart, the Mann-Whitney U test. The reason for using the nonparametric test is the same as the reason given in the section for hypothesis 2_A. The hypothesis used in the tests is as follows:

$$H3.1_A : D_{phg} - D_{plg} < 0$$

Where D_{phg} is the debt of the pre-spinoff combined firms from the high-difference spinoffs, D_{plg} is the debt of the pre-spinoff combined firms from the low-difference spinoffs. The formula for calculating the two-sample t statistics is as follows:

$$t_d = \frac{\overline{D}_{phg} - \overline{D}_{plg}}{\sqrt{\left(\frac{S^2_{phg}}{n_{phg}} + \frac{S^2_{plg}}{n_{plg}}\right)}} \qquad (6)$$

Where D_{phg} is the mean debt of the pre-spinoff combined firms from the high-difference spinoffs, and $\overline{D}_{plg}$ is the mean debt of the pre-spinoff combined firms from the low difference spinoffs, S is the standard deviation of the debt in each sub-sample, and n is the number of the firms in each sub-sample.

The procedure for the Mann-Whitney U test is as follows:

1. Pool all the data from both sub-samples and rank them in order of increasing debt. In ranking, tied debts receive the average of tied ranks.
2. Separate the ranked data back into the original sub-samples.
3. Compute T and Z using the formulas below, where the distribution of Z is approximately normal.

$$T = \sum_{j=1}^{n} RD_{plg,j} \tag{7}$$

$$Z = \frac{T - n\frac{N+1}{2}}{\sqrt{\left(\frac{nm}{N(N-1)}\sum_{i=1}^{N} RD_i^2 - \frac{nm(N+1)^2}{4(N-1)}\right)}} \tag{8}$$

Where $RD_{plg,j}$ is the rank of the debt of firm j from the low difference spinoffs, n is the number of firms in the low difference spinoffs, m is the number of firms in the high-difference spinoffs, N is the number of all firms in the total sample, and RD_i is the rank of the debt of firm i from the combined sample.

In the multivariate test, a linear regression analysis is employed. The dependent variable is the ratio of the book value of long term debt to the market value of equity of the parent firm a year before the announcement year (LEV_j). The main independent variable is the dummy ( ) $GROWTH_j$) that takes the value of one if the parent firm is from the high difference spinoffs and zero otherwise. The sign of the dummy coefficient is expected to be negative. I also include some control variables to incorporate other factors which may affect the level of the debt. These control variables are the natural log of a parent's book value of total assets ($SIZE_j$), the ratio of earnings before interest and taxes to sales of the parent firm ($PROFIT_j$), and the natural log of standard deviation of the parent's earnings before interests and taxes, over year t-1 to t-5 relative to the announcement year ($RISK_j$).

Rozef (1982) notes that the larger the firm, the harder it is for shareholders to monitor the firm. Bondholders, on the other hand, are more specialized in monitoring activities (Diamond, 1989). It is expected, therefore, that the sign of the coefficient of SIZE is positive.

Baskin (1989) argues that the existence of flotation costs in issuing new securities, coupled with its negative impact on shareholders' wealth, forces managers to rely on internally-generated cash flow. Since only profitable firms have abundant internally-generated cash flow, the sign of PROFIT's coefficient is expected to be negative.

Finally, Rozef (1982) implies that when the parent firm's earnings are highly volatile, the probability of being unable to service its financial obligation is higher. Consequently, the sign of the coefficient of RISK is expected to be negative.

$$LEV_j = \$_0 + \$_1)Growth_j + \$_2 SIZE_j + \$_3 PROFIT_j + \$_4 RISK_j + \varepsilon_j \quad (9)$$

The model above is estimated using the ordinary least squares. The T-test is used to test each beta. The hypotheses for the signs of betas are as follows:

$$H3.2._A : \beta_1 < 0$$
$$\beta_2 > 0$$
$$\beta_3 < 0$$
$$\beta_4 < 0$$

Testing Hypothesis 4_A

Hypothesis 4_A *Stock price reaction to the spinoff announcement is more positive if the parent firm and the spunoff firm have a high difference in growth opportunities.*

To test for the hypothesis above, I conduct an event study on two sub-samples separately. The sample is divided into two equally-sized sub-samples based on the absolute difference in growth opportunities between the spunoff and its parent firms using the four proxies for growth opportunities mentioned earlier. A test of the hypothesis is also conducted on the smaller sample, obtained from the consistent classification of all four proxies. The results of the tests on this consistent sample are reported under the proxy name COMB.

The data on daily stock returns are obtained from the *CRSP* files. Following Loderer and Mauer (1992), the parameters for calculating the abnormal return are estimated using a linear market model as follows:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad (10)$$

Where R_{jt} is the rate of return of the parent firm's stock in time period t, R_{mt} is the return of equally weighted market index in time period t, and ε_{jt} is the random error term representing unique risk. The abnormal return is defined as follows:

$$\hat{\varepsilon}_{jt} = R_{jt} - (\hat{\alpha}_{jt} + \hat{\beta}_{jt} R_{mt}) \quad (11)$$

The cumulative abnormal return is estimated as follows:

$$\hat{CAR}_j = \sum_{t=-1}^{0} \hat{\varepsilon}_{jt} \quad (12)$$

The parameters in equation (10) are estimated using the estimation period from day t-280 to day t-30 relative to the event date as announced in the the *Wall Street Journal Index*, the *Newspaper Abstracts Ondisc*, or the *Nexis* database. The cumulative abnormal returns for each sub-sample during the announcement period are standardized and tested using z statistic as described in Patell (1976). The equality of the cumulative abnormal returns across the two sub-samples is tested using the two-sample t-test and the Mann-Whitney U test. The procedures for these two tests are the same as those for testing hypothesis 3_A. The hypothesis is as follows:

$$H4.1._A : CAR_{hdg} - CAR_{ldg} > 0$$

Where CAR_{hdg} is the cumulative abnormal return of the high difference spinoffs, and CAR_{ldg} is the cumulative abnormal return of the low difference spinoffs.

A linear regression analysis is used to find further evidence on the relationship between the market reaction on the spinoff announcement and the difference in growth opportunities between the spunoff and its parent firms. The dependent variable in the model is the cumulative abnormal return around the announcement date for the parent's stock (CAR_j). The main independent variable is a dummy variable (DGO_j) that takes the value of 1 if the firm is from the high-difference spinoff sub-sample and zero otherwise. It is expected that the sign of DGO_j is positive.

The second independent variable is another dummy variable (IND_j) that takes the value of one if both parent and spunoff firms have different two-digit SIC codes and zero otherwise. The inclusion of IND_j in the model is necessary because Section 3 argues that the differences in growth opportunities may underlie the differences in corporate focus. Thus, similarity or dissimilarity of the two-digit SIC codes of the firm's businesses may be a proxy for low or high differences in growth opportunities of the firm's businesses. Therefore, the inclusion of dummies DGO_j and IND_j in the same model is an attempt to separate the capital misallocation hypothesis from the corporate focus hypothesis.

The third independent variable is the size of the spinoff ($SIZE_j$). Miles and Rosenfeld (1983), and Kudla and McInish (1988) find a positive relationship between the market reaction and the size of the spunoff firm relative to that of its parent firm. Following the procedure in the two studies above, the size of the spunoff firm is computed by multiplying the number of its outstanding shares with the closing price of its stock on the ex-dividend date. The size of the parent firm is calculated by multiplying the number of its outstanding shares with the closing price of its stock on the announcement date. The data on the stock prices and the number of the outstanding stocks are obtained from the *CRSP* files.

The fourth independent variable in the model is a dummy variable (CS_j) that takes the value of one if the would-be spunoff firm suffers losses in the year the spinoff decision is made and zero otherwise. The Accounting Principle Board Opinion No. 30 requires the parent firm to segregate the results of the would-be spunoff firm's operations from the parent firm's operations in the year the spinoff decision is made by the board of

directors. The results of the would-be spunoff firm's operations in that year are reported in the discontinued operation section of the income statement of the parent firm. The inclusion of this dummy variable in the model is an attempt to separate the capital misallocation hypothesis from the cross-subsidy hypothesis. Berger and Ofek (1995) find that a cross-subsidy is associated with value reduction in diversified firms. The sign of the dummy's coefficient is expected to be positive because the spinoff may be undertaken to reduce cross-subsidy.

The last independent variable in the model is a measure of free cash flow (FCF_j) in a firm as proposed by Lehn and Poulsen (1989). They propose a formula to estimate free cash flow (FCF_j) of a firm at certain periods of time as follows:

$$FCF_j = (OIBD_j - TAX_j - INTEXP_j - DIV_j)/EQUITY_j \quad (13)$$

Where $OIBD_j$ is operating income before depreciation, TAX_j is total income taxes minus change in deferred taxes from the previous year to the current year, $INTEXP_j$ is total interest expenses, DIV_j is the total amount of the dividend for both preferred and common stock, and $EQUITY_j$ is market value of common stock. The data for calculating the free cash flow for each firm is obtained in the year before the spinoff announcement from the *Standard & Poor's Research Insight*. Some pre-spinoff combined firms may have abundant free cash flow that leads to overinvestment. Since overinvestment is a waste of firm resources and spinoff might be used as a means to overcome this problem, the sign of FCF_j is expected to be positive.

$$CAR_j = \$_0 + \$_1 DGO_j + \$_2 INDj + \$_3 SIZE_j + \$_4 CS_j + \$_5 FCF_j + \mathtt{0}_j \quad (14)$$

The model above is estimated using the ordinary least squares. The T-test is used to test each beta. The hypotheses for the signs of betas are as follows:

H4.2A: $\$_1 > 0$
$\$_2 > 0$
$\$_3 > 0$
$\$_4 > 0$
$\$_5 > 0$

Testing Hypothesis 5_A

Hypothesis 5_A *Relatively high growth firms increase their capital expenditure after the spinoffs.*

To test for hypothesis 5_A, it is necessary to look at each parent-spunoff pair to identify which firm, the parent or the spunoff, has higher growth opportunities. Each of the four proxies for growth opportunities mentioned earlier is used to find this relatively high growth firm.

A test of the hypothesis is also conducted on the smaller sample, obtained from the consistent classification of all four proxies. The results of the tests on this consistent sample are reported under the proxy name COMB.

The capital expenditure is represented by the ratio of total capital expenditures to total assets. For each relatively high growth spinoff firm (either the post- spinoff parent firm or the post-spinoff spunoff firm, depending on which one has higher growth opportunities) in the sample, there are six matched firms. All of the requirements for finding the matched firms are evaluated in year 0 (the ex-dividend year).

There are two sets of comparative capital expenditure for each relatively high growth spinoff firm's capital expenditure. The first set consists of the mean capital

expenditure of firms with the same two-digit SIC code, and with total assets values that are comparable to the total asset value of each relatively high growth firm. For one of the sample firms, I am unable to find five or more matched firms. For this case, I only use four matched firms. In addition, I use eight matched firms for 12 of the sample firms because their total asset values are very close to each other. The second set consists of the capital expenditure of firms with the same two-digit SIC code, and with total asset values that are closest to each relatively high growth spinoff firm.

Following Daley et al. (1997), the adjusted capital expenditure of each relatively high growth firm is found by subtracting the capital expenditure of matched firms from the capital expenditure of each relatively high growth firm. This procedure is repeated twice to find the mean adjusted capital expenditure and the closest adjusted capital expenditure.

The change in the capital expenditure of a relatively high growth firm is calculated by comparing its adjusted capital expenditure in one period with a previous period. The procedures above can be summarized as follow:

$$ACEX_{j,T} = CEX_{j,T} - SCEX_{j,T} \quad (15)$$

$$) ACEX_{j,T+t} = ACEX_{j,T+t} - ACEX_{j,T} \quad (16)$$

Where $ACEX_{j,T}$ is the adjusted capital expenditure for firm j at time T, $CEX_{j,T}$ is the capital expenditure for firm j at time T, and $SCEX_{j,T}$ is the capital expenditure of its matched firm at time T. The change in the adjusted capital expenditure for firm j from period T to period T+t is $) ACEX_{j,T+t}$.

The changes in adjusted capital expenditure are calculated from year 0 to year +1, year 0 to year +2, and year 0 to year +3. Note that year 0 is the year when both firms start becoming two independent firms. Since the firms are not always separated in the beginning of the year, the capital expenditure of the firm in year 0 may consist of two parts. The first part is the capital expenditure of the firm when it is still a part of the pre-spinoff combined firm, while the other part is the "pure" capital expenditure of the post-spinoff firm.

The capital misallocation hypothesis asserts that the level of the capital expenditure of the firm before the spinoff is different from after the spinoff. Therefore, the capital expenditure of the firm in year zero can provide a basis for comparison because it still contains the capital expenditure of the firm when it was still part of the pre-spinoff combined firm.

The changes in capital expenditure of the relatively high growth firms in the sample over time are tested using the paired t-test and the Wilcoxon Signed Ranks test. The procedure for these two tests is the same as that used for testing Hypothesis 2_A. The hypothesis to be tested in this section is as follows:

$H5_A$:) $ACEX_{T+t} > 0$

Testing Hypothesis 6_A

Hypothesis 6_A *Relatively low growth firms decrease their capital expenditure after the spinoffs.*

The procedure to test hypothesis 6_A is similar to the procedure to test hypothesis-5_A. The only difference is that the sample firm (either the post-spinoff parent firm or the

post-spinoff spunoff firms) is the one that has lower growth opportunities than the other. The hypothesis is tested as follows:

$H6_A$:) $ACEX_{T+t} < 0$

Testing Hypothesis 7_A

Hypothesis 7_A *The higher the difference in growth opportunities between the parent firm and the spunoff firm, the higher the operating performance of both the parent firm and the spunoff firm following the spinoff.*

In testing hypothesis 7_A, the changes in operating performance of both the parent and spunoff firms from high and low difference in growth opportunity spinoffs are evaluated separately following the spinoff. This procedure results in four equal sub-samples: the parent firms from the high difference spinoffs, the spunoff firms from the high difference spinoffs, the parent firms from the low difference spinoffs, and the spunoff firms from the low difference spinoffs.

The groupings are conducted using the four proxies for growth opportunities mentioned earlier. A test of the hypothesis is also conducted on the smaller sample, obtained from the consistent classification of all four proxies. The results of the tests on this consistent sample are reported under the proxy name COMB.

The change in operating performance is represented by the change in the return on assets ratio. The return on assets ratio (ROA) is calculated by dividing earnings before interest and taxes, with total assets.

The adjusted operating performance is found by subtracting the operating performance of matched firms from the operating performance of each sample firm (Daley et al., 1997). The procedure for finding matched firms is the same as that used in testing hypothesis 5_A.

The change in operating performance is calculated by comparing the adjusted operating performance in one period with a previous period. The procedure can be summarized as follows:

$$AOP_{j,T} = OP_{j,T} - SOP_{j,T} \quad (17)$$

$$) OP_{j,T+t} = AOP_{j,T+t} - AOP_{j,T} \quad (18)$$

Where $AOP_{j,T}$ is the adjusted operating performance for firm j at time T, $OP_{j,T}$ is the raw operating performance for firm j at time T, $SOP_{j,T}$ is the operating performance of its matched firm at time T and $) OP_{j,T+t}$ is the change in the adjusted operating performance for firm j from period T to period T+t.

The changes in the operating performance are calculated from year 0 to year +1, year 0 to year +2, and year 0 to year +3, where year 0 is the ex-dividend year. For all of the spinoff firms, the changes in operating performance are tested using the paired t-test and the Wilcoxon Signed Ranks test.

The capital misallocation hypothesis asserts that spinoffs reduce the variation of growth opportunities in post-spinoff firms. The reduction in the variation of growth opportunities leads to the reduction in the misallocation of internal capital. The reduction in the misallocation of internal capital is translated into better operating performance for the post-spinoff firms. The hypothesis tested is as follows:

$H7.1_A$:) $AOP_{T+t} > 0$

The difference in the increase in operating performance between the parent firm from the high difference spinoffs and the parent firm from the low difference spinoffs is tested using the two-sample t-test and the Mann-Whitney U test. Similarly, the difference in the increase in operating performance between the spunoff firms from the high difference spinoffs and the spunoff firms from the low difference spinoffs is tested using the two-sample t-test and the Mann-Whitney U test.

The level of improvement in operating performance depends on the severity of capital misallocation in the pre-spinoff combined firm. The internal capital market hypothesis asserts that the higher the difference in growth opportunities of divisions in the pre-spinoff combined firm, the more severe the capital misallocation. Therefore, the improvement in operating performance will be more pronounced the higher the difference in growth opportunities. It means that the increases in operating performance of the post-spinoff parent firms from the high difference spinoffs are higher than of the post-spinoff parent firms from the low difference spinoffs. Similarly, the increase in the operating performance of the post-spinoff spunoff firms from the high difference spinoffs are higher than of the post-spinoff spunoff firms from the low difference spinoffs. The hypothesis tested is as follows:

$H7.2_A$:) AOP_{hgf} -) $AOP_{lgf,} > 0$

Where) $AOP_{hgf,}$is the change in the adjusted operating performance of the firms from the high difference spinoffs, and) AOP_{lgf} is the change in the adjusted operating performance of the firms from the low difference spinoffs.

CHAPTER 5

RESULTS AND DISCUSSION

Findings and Discussion Involving Hypothesis 1_A

Hypothesis 1_A *The parent firm and the spunoff firm have different growth opportunities.*

The initial sample consists of one hundred and seventy nine spinoffs. Of these spinoffs, there are four spinoffs that are considered non-voluntary spinoffs because they are ordered by the court or are an attempt at controlling damages from lawsuits. Three other spinoffs are dropped from the initial sample because of the involvement of a royalty trust, a Real Estate Investment Trust, or a limited partnership. An additional fifty-five spinoffs are excluded from the initial sample because they do not have the necessary data for testing hypothesis 1. Therefore, the final sample for testing hypothesis 1 consists of one hundred and seventeen spinoffs. These spinoffs are also the basic sample for testing the other hypotheses in this study.

These one hundred and seventeen spinoffs are carried out by one hundred and three companies. Some companies have more than one spinoff over the seventeen-year sample period. Ten companies are involved in two spinoffs, while the other two companies conduct three spinoffs within the sample period. Table 1 presents the sample observations by ex-dividend years.

Table 1. Sample observations by the ex-dividend year		
Year	Number of spinoff	Percent of total
1980	4	3.4
1981	5	4.3
1982	7	6.0
1983	4	3.4
1984	8	6.8
1985	8	6.8
1986	3	2.6
1987	11	9.4
1988	15	12.8
1989	16	13.7
1990	10	8.6
1991	7	6
1992	3	2.6
1993	6	5.1
1994	1	.8
1995	7	6
1996	2	1.7
Total	117	100.0

In general, the number of spinoffs increases from the early 1980s to the late 1980s. The largest number of spinoffs in one year is 16 in 1989, followed by 15 in 1988. In the 1990s however, the number of spinoffs decreases. The smallest number of spinoffs in one year is 1 in 1994, followed by 2 in 1996. It seems that the popularity of spinoffs as a means of corporate reorganization peaks in the late 1980s and diminishes in the 1990s.

Table 2. The size of the parent and the spunoff firms in millions of dollars at the end of the ex-dividend year		
Size	Number of parent firms	Number of spunoff firms
< 250	53	89
250 – 499	10	12
500 – 749	8	2
750 – 999	4	3
1000 – 1249	6	2
> 1250	36	9
Total	117	117
Equity values are computed as the product of common shares outstanding and closing price of common stock at the end of the ex-dividend fiscal year.		

Table 2 shows the sizes of the parent and the spunoff firms at the end of ex-dividend years. The sizes of the firms are represented by the market value of equity. The majority of the parent firms are larger than 250 million dollars, and more than 30% of them are larger than 1.25 billion dollars. In contrast, more than 75% of the spunoff firms are smaller than 250 million dollars, and less than 8% of them are larger than 1.25 billion dollars.

The difference in size between parent firms and spunoff firms can also be represented by their means and medians. The mean and median of the parent firms are 1.6 billion and 417 million dollars respectively, while the mean and median of the spunoff firms are 532 million and 98 million dollars respectively.

As discussed in Chapter 3, the question under consideration is whether or not the misallocation of internal capital is a major reason for a diversified firm to spin off its division. One way of addressing this question is to see if the parent firm has different growth opportunities than the spunoff firm. However, it is not important whether the parent firm has higher or lower growth opportunities than the spunoff firm. What important is that whether or not the difference exists. Table 3 provides the mean differences in growth opportunities between the parent firms and the spunoff firms.

Table 3. Result from testing Hypothesis 1: The difference in growth opportunities between the parent and the spunoff firms is not zero.

N	Proxy for growth opportunities	Mean differences	P-value of T-test
117	MA/BA	.81	.001
117	Q	.86	.001
117	UCF	.15	.001
117	RACF	3.66	.001

MA/BA is the market/book ratio. Q is Tobin's Q. UCF is the unadjusted cash flow measure of growth opportunities. RACF is the risk-adjusted cash flow measure of growth opportunities.

Table 3 above shows strong evidence that the parent and the spunoff firms have different growth opportunities. The highest difference in growth opportunities is 3.66 when the risk-adjusted cash flow (RACF) is used as a proxy for growth opportunities. The lowest difference in growth opportunities is 0.15 using the unadjusted cash flow (UCF) as a proxy for growth opportunities. Regardless of which proxy for growth opportunities is used the results are always significantly different from zero at less than the 1% level.

Findings and Discussion Involving Hypothesis 2_A

Hypothesis 2_A *Firms that subsequently spin off their divisions have lower managerial ownership than firms that do not spin off their divisions.*

Of the one hundred and seventeen spinoffs used for testing hypothesis 1 above, only eighty-three spinoffs are used for testing hypothesis 2. Twelve spinoffs are excluded because their announcement dates are not available. An additional fifteen spinoffs are dropped because the managerial ownership data for the parent firms is not available. Seven additional spinoffs are excluded because in each of five cases, the spinoff resulted

in two spunoff firms. Although each of these five cases is recorded as two spinoff events, the spinoffs are carried out at the same time by the same parent firm. Therefore, I only have only five parent firms from these ten spinoff events. In another case, the spinoff results in three spunoff firms. Again, although this multiple spinoff is recorded as three spinoff events, there is only one parent firm. Because of this multiple spinoff, I drop two additional spinoffs. Table 4 presents the difference in managerial ownership between spinoff firms and non-spinoff firms.

Table 4. Results from testing Hypothesis 2: Managerial ownership of spinoff firms is less than managerial ownership of non-spinoff firms.

Panel A. Comparison is made by using managerial ownership of a firm in the same industry and with the closest total asset value.

N	Managerial ownership	Mean differences (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks Test
83	MO1	-5.56	.005	.001
83	MO2	-6.82	.003	.001
83	MO3	-9.13	.002	.001

Panel B. Comparison is made by using the mean of managerial ownership of firms in the same industry and with comparable total asset value.

N	Managerial ownership	Mean differences (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks Test
83	MO1	-5.1	.001	.001
83	MO2	-6.41	.001	.001
83	MO3	-6.28	.003	.001

MO1 is the managerial ownership of the highest ranked officers. MO2 is the managerial ownership of the Two highest ranked officers. MO3 is the managerial ownership of all officers and directors.

In Table 4 Panel A, the managerial ownership in the spinoff firms is considerably less than the managerial ownership of the non-spinoff firms in the same industries that have the closest total asset value with the spinoff firms. For the highest ranked officers, the mean difference is –5.56%. For the top two managers, the mean difference is –6.82%. For all officers and directors, the mean difference is –9.13%. All the differences are

statistically significant at less than the 1% level, using both the paired T-test and the Wilcoxon Signed Ranks test.

Similarly, in Table 4 Panel B above, the managerial ownership in the spinoff firms is much less than the mean managerial ownership of the non-spinoff firms in the same industries and with comparable total asset values with the spinoff firms. For the highest ranked officers, the mean difference is –5.51%. For the two highest ranked managers, the mean difference is –6.41%. For all officers and directors, the mean difference is –6.28%. Again, all the differences are statistically significant at less than the 1% level using both tests.

Overall, the evidence supports the notion that the misallocation of internal capital is an agency problem. A low management ownership stake, coupled with the existence of a differential in growth opportunities between parent and spunoff firms, leads to misallocation of internal capital, thus creating incentives to conduct spinoffs.

Findings and Discussion Involving Hypothesis 3_A

Hypothesis 3_A *Pre-spinoff combined firms from highly different growth opportunity spinoffs have less debt than do pre-spinoff combined firms from less different growth opportunity spinoffs.*

The sample used in testing hypothesis 3 consists of eighty-six spinoffs. Of the original one hundred and seventeen spinoffs, twelve spinoffs are excluded because their announcement dates are not available. An additional fifteen spinoffs are dropped because thirteen cases are multiple spinoffs. Two other spinoffs are excluded because their parent firms are involved in two separate spinoffs in one year.

The reason for excluding the fifteen spinoffs above is that it is necessary to find the difference in growth opportunities between a parent and a spunoff firm for testing hypothesis 3. When a parent firm conducts multiple spinoffs or two separate spinoffs in the same year, There is no basis for determining which spunoff firm to use in measuring the difference in growth opportunities. Finally, four spinoffs are not included in the sample because they have incomplete financial data for testing the hypothesis.

Based on each of the four proxies for growth opportunities, the total sample of eighty-six spinoffs is grouped into two sub-samples. Each sub-sample consists of forty-three spinoffs. The sample obtained from the consistent classification of all four proxies contains only 24 firms. The results for the sample are included in the table, under the proxy name COMB. This procedure is discussed in Chapter 4. Table 5 shows the results of the T-tests and the Mann-Whitney U tests on the level of debt in high difference spinoffs and in low difference spinoffs.

Table 5. Results from testing Hypothesis 3.1: Pre-spinoff combined firms from highly different growth opportunity spinoffs have less debt than pre-spinoff combined firms from low different growth opportunity spinoffs.

N	Growth proxy	Mean of D_{phg}	Mean of D_{plg}	P-value for T-test	P-value for Mann-Whitney U test
86	MA/BA	.48	.62	.14	.07
86	Q	.53	.56	.43	.29
86	UCF	.43	.66	.04	.07
86	RACF	.59	.50	.75	.87
24	COMB	.56	.72	.33	.40

MA/BA is market/book ratio. Q is Tobin's Q. UCF is the unadjusted cash flow measure of growth opportunities. RACF is the risk-adjusted cash flow measure of growth opportunities. COMB represents a consistent sample; all measures of growth opportunities give the same classifications. D_{phg} is the debt of the pre-spinoff combined firms from the high-difference spinoffs, and D_{plg} is the debt of the pre-spinoff combined firms from the low-difference spinoffs. The level of debt of each pre-spinoff combined firm is represented by the ratio of the book value of long-term debt to the market value of equity.

An investigation of Table 5 reveals some evidence that the debt level of the pre-spinoff combined firms from the high difference spinoff sub-sample is less than the debt level of the pre-spinoff combined firms from the low difference spinoff sub-sample. The evidence, however, is not strong, and does not occur uniformly across the measures of growth opportunities.

The evidence appears strongest when using the unadjusted cash flow (UCF) as a measure of growth opportunities. The debt level of pre-spinoff combined firms from high-difference spinoffs and low-difference spinoffs is 0.43 and 0.66 respectively. The T-test and the Mann-Whitney U test reveal that the difference is significant at the 4% and 7% levels. The use of the Market/Book ratio (MA/BA) for the measurement of growth opportunities gives similar results. The debt level of pre-spinoff combined firms from high difference spinoffs and low difference spinoffs is 0.48 and 0.62 respectively. The

Mann-Whitney U test confirms that the difference is significant at the 7% level, while the T-test reveals that the difference is not significant at conventional levels. The uses of the other measures of growth opportunities, however, do not result in significant differences between the debt level of the pre-spinoff combined firms of the high difference spinoff sub-sample and the debt level of the pre-spinoff combined firms of the low difference spinoff sub-sample.

Although there is some evidence that pre-spinoff combined firms of highly different growth opportunity spinoffs have less debt than do pre-spinoff combined firms of less different growth opportunity spinoffs, the findings may be influenced by other factors. These factors affect a firm's choice of capital structure. Table 6 below presents the results of the regression analyses on the debt level of pre-spinoff combined firms.

The regression analysis reveals that only when the unadjusted cash flow (UCF) is used to measure growth opportunities, the coefficient for the dummy for difference in growth opportunities is significantly negative at the 4% level. The uses of the other proxies for growth opportunities provide coefficients that are not significant at conventional levels.

Table 6. Results from testing Hypothesis 3.2: Estimated coefficients from regression analysis on the debt level of pre-spinoff comb ined firms. The dependent variable is the ratio of the book value of long-term debt to the market value of equity. (P-value for one tailed test is in parentheses)

Independent variable	MA/BA	Q	UCF	RACF	COMB
Intercept	1.17 (.001)	1.09 (.001)	1.24 (.001)	.99 (.001)	1.76 (.001)
○GROWTH	-.22 (.15)	-.05 (.40)	-.37 (.04)	.15 (.25)	-.23 (.33)
SIZE	.17 (.26)	.14 (.30)	.073 (.39)	.15 (.28)	2.68 (.14)
PROFIT	-.11 (.15)	-.12 (.13)	-.12 (.14)	-.13 (.13)	-.27 (.12)
RISK	-.19 (.23)	-.17 (.25)	-.13 (.31)	-.17 (.26)	-1.88 (.18)

○GROWTH is the difference in growth opportunities between the parent and the spunoff firms and it is a dummy that takes the value of one if the parent firm is from the high-difference spinoffs, and zero otherwise. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications. SIZE is the natural log of parent's total assets. PROFIT is the ratio of earnings before interest and taxes to sales of the parent firm. RISK is the natural log of standard deviation of the parent's earnings before interests and taxes over year t-1 to t-5 relative to the announcement year.

Table 6 shows that all the signs of the coefficients of the control variables conform to expectations. However, none of them is statistically significant. These control variables are derived from well-established determinants of leverage in firms. These determinants may explain the choice of capital structure only of firms under normal circumstances. The sample firms in this study, on the other hand, are on the brink of major corporate reorganizations. These determinants may not apply to such firms.

Findings and Discussion Involving Hypothesis 4_A

Hypothesis 4_A *Stock price reaction to the spinoff announcement is more positive if the parent firm and the spunoff firm have a high difference in growth opportunities.*

Ninety-one spinoffs are used to test the market reactions around the spinoff announcement dates. Of the original one hundred and seventeen spinoffs, twelve spinoffs are dropped because their announcement dates are not available. Thirteen spinoffs are also lost because for each event, the spinoffs result in more than one spunoff firm. Finally, one more spinoff is excluded from the sample due to unavailability of data on the *CRSP* files, for estimating the announcement period returns.

The mean cumulative abnormal return in the two-day interval (-1,0) using the equally weighted market index is 3.7%. This cumulative abnormal return is statistically significant at the 1% level. This cumulative abnormal return is not very different from the cumulative abnormal returns reported in earlier studies. Hite and Owers (1983) find a two-day announcement return of 3.3% and Daley et al. (1997) have a 3.4% announcement return.

Table 7 shows the cumulative abnormal return of the two sub-samples. Based on the four proxies for growth opportunities, the high difference sub-sample consists of forty-six spinoffs, while the low-difference sub-sample consists of forty-five spinoffs. The sample obtained from the consistent classification of all four proxies contains only 24 firms (the high difference sub-sample consists of fourteen spinoffs, while the low-difference sub-sample consists of ten spinoffs). The results for the sample are included in the table, under the proxy name COMB. This procedure is discussed in Chapter 4.

Table 7. Results from testing Hypothesis 4.1: The cumulative abnormal return of the high difference spinoffs is higher than the cumulative abnormal return of the low difference spinoffs. The high difference sub-sample consists of 46 spinoffs while the low-difference sub-sample consists of 45 spinoffs (the high difference sub-sample consists of 14 spinoffs while the low-difference sub-sample consists of 10 spinoffs for COMB).

Growth proxy	CAR_{hdg}	CAR_{ldg}	P-value for T-test	P-value for Mann-Whitney U test
MA/BA	3.3	4.11	.76	.70
Q	3.51	3.9	.63	.46
UCF	3.67	3.73	.52	.66
RACF	4.84	2.54	.02	.03
COMB	4.79	3.16	.21	.35

MA/BA is the market/book ratio. Q is Tobin's Q. UCF is the unadjusted cash flow measure of growth opportunities. RACF is the risk-adjusted cash flow measure of growth opportunities. COMB represents a consistent sample; all measures of growth opportunities give the same classifications. CAR_{hdg} is the cumulative abnormal return of the high-difference spinoffs. CAR_{ldg} is the cumulative abnormal return of the low-difference spinoffs.

Table 7 above shows that only the risk adjusted cash flow measure (RACF) produces results that are consistent with my predictions. The mean cumulative abnormal returns around the announcement dates of the high-difference spinoff sub-sample are around twice as much as the returns of the low-difference spinoff sub-sample. The mean cumulative abnormal returns in the high-difference spinoff sub-sample are 4.84%, while they are 2.54% for the low-difference spinoff sub-sample. The T-test and the Mann-Whitney U test reject the equality of the cumulative abnormal returns across the two sub-samples at the 2% and 3% levels respectively. The uses of the other measures of growth opportunities, however, do not produce results that conform to my predictions.

To complement the univariate tests, a regression analysis is also conducted on the cumulative abnormal return. Fearing that heteroscedasticity hampers the validity of the test of the hypothesis when the cumulative abnormal return is used as the dependent

variable in the model, I run the White tests on my data. The null hypothesis for the White test is that the data is homocedastic. The P-values of the White tests using the Market/Book ratio, Tobin's Q, the unadjusted cash flow, the risk-adjusted cash flow, and the combined measure for estimating the difference in growth opportunities are 0.21, 0.19, 0.20, 0.32, and 0.35 respectively. Therefore, there is no evidence of heteroscedasticity.

To check the presence of multicollinearity on the data, I estimate the variance inflation factors (VIFs) for all independent variables in the models. The results are shown on Table 8 below.

Table 8. The variance inflation factors of all independent variables used in the regression analyses.

Independent variable	MA/BA	Q	UCF	RACF	COMB
DGO	1.01	1.07	1.07	1.06	1.22
IND	1.10	1.13	1.12	1.11	1.33
CS	1.19	1.20	1.21	1.25	1.42
FCF	1.08	1.08	1.09	1.11	1.31
SIZE	1.07	1.10	1.10	1.07	1.21

DGO is a dummy that takes the value of one if the parent firm is from the high-difference spinoffs, and zero otherwise. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q (Q), the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications. IND is a variable that takes a value of one if the parent and the spunoff firms have different two-digit SIC codes, and zero otherwise. CS is a dummy variable (CS_j) that takes the value of one if the would-be spunoff firm suffers losses in the year the spinoff decision is made, and zero otherwise. FCF is a measure of free cash flow as proposed by Lehn and Poulsen (1989). SIZE is the size of the spunoff firm relatives to the size of the parent firm. The size of the spunoff firm is computed by multiplying the number of its outstanding shares with the closing price of its stock on the ex-dividend date. The size of the parent firm is calculated by multiplying the number of its outstanding shares with the closing price of its stock on the announcement date.

Table 8 shows that none of the VIFs is greater than 2. Therefore, there is no indication of a multicollinearity problem in the model. Table 9 below presents the results from the regression analysis on the cumulative abnormal returns of the two sub-samples.

Table 9. Results from testing Hypothesis 4.2. Estimated coefficients from regression analysis on the cumulative abnormal returns around the spinoff announcement date (-1,0). The sample consists of 91 spinoffs (24 for COMB). The dependent variable is the cumulative abnormal returns. (P-value for one tailed test is in parentheses).

Independent variable	MA/BA	Q	UCF	RACF	COMB
Intercept	2.11 (.07)	1.98 (.07)	1.27 (.20)	.64 (.31)	-1.19 (.30)
DGO	-1.06 (.18)	-.99 (.20)	.53 (.33)	2.42 (.04)	2.00 (.14)
IND	.59 (.33)	.69 (.30)	.70 (.30)	.74 (.29)	4.55 (.03)
CS	.92 (.26)	1.01 (.24)	.79 (.29)	.24 (.43)	.31 (.45)
FCF	.85 (.44)	.39 (.47)	.78 (.44)	-1.5 (.39)	-18.51 (.13)
SIZE	3.98 (.009)	4.09 (.008)	3.95 (.01)	3.88 (.001)	5.48 (.01)

DGO is a dummy that takes the value of one if the parent firm is from the high-difference spinoffs, and zero otherwise. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q (Q), the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications. IND is a variable that takes a value of one if the parent and the spunoff firms have different two-digit SIC codes, and zero otherwise. CS is a dummy variable (CS_j) that takes the value of one if the would-be spunoff firm suffers losses in the year the spinoff decision is made, and zero otherwise**.** FCF is a measure of free cash flow as proposed by Lehn and Poulsen (1989). SIZE is the size of the spunoff firm relatives to the size of the parent firm. The size of the spunoff firm is computed by multiplying the number of its outstanding shares with the closing price of its stock on the ex-dividend date. The size of the parent firm is calculated by multiplying the number of its outstanding shares with the closing price of its stock on the announcement date.

The regression results in Table 9 also provide mixed evidence. The only result consistent with the predictions of the capital misallocation hypothesis is obtained when growth opportunities of the parent and the spunoff firms are proxied by the risk adjusted cash flow (RACF). The sign of the dummy for the difference in growth opportunities (DGO) is positive as expected, and significant at the 4% level. This result conforms to the notion that the difference in growth opportunities is a significant contributor to excess returns accruing to shareholders in spinoffs.

The coefficient of DGO, however, is not the only one that is statistically significant. The coefficient of SIZE is positive as expected and statistically significant at less than the 1% level. This finding conforms to the findings in earlier studies by Miles and Rosenfeld (1983), and Kudla and McInish (1988) that there is a positive relationship between the market reaction and the size of the spunoff firm relative to that of its parent firm.

What is remarkable about the results from the regression analysis on the cumulative abnormal return is that the dummy that represents the industry differential between the parent and the spunoff firms (IND) is mostly not significant in explaining the market reaction to the spinoff announcements. The importance of IND in explaining excess returns accruing to shareholders in spinoffs only appears in the smaller consistent sample, under the proxy name COMB. Because of the smaller sample size, the importance of IND in explaining excess returns accruing to shareholders in spinoffs may only apply to those specific spinoffs.

Table 9 also shows that the other two control variables are not significant in explaining excess returns accruing to shareholders in spinoffs. The coefficients of the dummy variable that represents the cross-subsidy in the pre-spinoff combined firms (CS) have positive signs as expected but are not significant at conventional levels. Finally, the coefficients of the free cash flow (FCF) are also not significant and some of them have the wrong signs. There is no evidence, therefore, that the pre-spinoff combined firms use spinoffs to solve their cross-subsidy and free cash flow problems.

Findings and Discussion Involving Hypothesis 5_A and Hypothesis 6_A

Hypothesis 5_A *Relatively high growth firms increase their capital expenditure after the spinoffs.*

Hypothesis 6_A *Relatively low growth firms decrease their capital expenditure after the spinoffs.*

The sample for testing hypothesis 5 and hypothesis 6 consists of fifty-eight spinoffs. Of the original one hundred and seventeen spinoffs, thirteen are excluded because these spinoffs result in multiple spunoff firms. Eight other spinoffs are dropped because the parent firms or the spunoff firms are involved in another spinoff within three years. An additional twenty-three spinoffs are not included in the sample because either the parent, the spunoff firms or both are taken over by other firms within three years following the spinoffs. Finally, fifteen other spinoffs are excluded because their complete data for testing the hypotheses is not available on *The Research Insight.*

As mentioned above, the sample for testing hypothesis 5 and hypothesis 6 consists of fifty-eight spinoffs. Besides that sample, I also have another sample that consists of seventy-three spinoffs. These additional fifteen spinoffs are those for which data is not available on *The Research Insight.* The *SEC* file is used to manually collect data for these firms.

Initially, the *SEC* file is the only source of data being used, however, the data in the *SEC* file is not complete; it has data for some years but not for others. For the firms that do not have the data in ex-dividend years, therefore, the *SEC* file is used. For the other years, *The Research Insight* is used. The problem with combining data from these

two sources is that they may not be compatible with each other. For the sake of completeness, I also report the results of the tests on the sample that consists of these seventy-three spinoffs, in the Appendix. The table numbers in the Appendix are the same as those reported here. In summary, the results using the larger sample are about the same as the results using the smaller sample.

As mentioned in Chapter 4, the fifty-eight firms used for testing hypothesis 5 are either the parent firms with higher growth opportunities than their spunoff firms or the spunoff firms with higher growth opportunities than their parent firms. In contrast, the firms used for testing hypothesis 6 are either the parent firms with lower growth opportunities than their spunoff firms or the spunoff firms with lower growth opportunities than their parent firms.

Based on the market/book ratio, there are thirty-three relatively high growth parent firms and twenty-five relatively high growth spunoff firms for testing hypothesis 5. This separation also means that there are twenty-five relatively low growth parent firms and thirty-three relatively low growth spunoff firms for testing hypothesis 6. The sample procedure is repeated for the other three proxies of growth opportunities.

The use of Tobin's Q results in thirty-five relatively high growth parent firms and twenty-three relatively high growth spunoff firms. Based on the unadjusted cash flow measure of growth opportunities, there are thirty relatively high growth parent firms and twenty-eight relatively high growth spunoff firms. Finally, the use of the risk-adjusted cash flow measure of growth opportunities results in twenty-four relatively high growth parent firms and thirty-four relatively high growth spunoff firms.

The use of the four proxies above results in some inconsistency regarding which firm (parent or spunoff firm) has higher growth opportunities than the other. Therefore, I drop thirty-one firms when I use the smaller, consistent sample (COMB). The smaller, consistent sample contains fourteen relatively high growth parent firms and thirteen relatively high growth spunoff firms.

In summary, the results from testing hypothesis 5 show that there is mixed evidence that relatively high growth firms increase their capital expenditure after the spinoffs. Only relatively high growth spunoff firms, not relatively high growth parent firms, increase their capital expenditure. However, the increases do not occur uniformly across the measures of the capital expenditure or the proxies for growth opportunities.

Similarly, the results from testing hypothesis 6 show that there is mixed evidence that relatively low growth firms decrease their capital expenditure following the spinoffs. The decrease in the capital expenditure of the relatively low growth firms is apparent within two years after the spinoffs. However, the decreases do not occur uniformly across the measures of the capital expenditure or the proxies for growth opportunities.

The mixed results may be due, in part, to using the capital expenditures of the firms in ex-dividend years as the basis for comparisons. The capital expenditures of the firms in ex-dividend years already contain the capital expenditures of the firms as separate, independent firms. It is possible that all the changes in the capital expenditures occur in ex-dividend years. Therefore, the ex-dividend year cannot be used as the basis year for comparisons. Using another year before the ex-dividend year for a basis year,

however, is impossible because both parent and spunoff firms are not independent firms prior to ex-dividend years.

Tables 10, 11, and 12 present the results of testing hypothesis 5 for one year, two years, and three years after the spinoffs respectively.

Table 10. Results from testing Hypothesis 5: Changes in capital expenditure of relatively high growth spinoff firms between year 0 and year 1 are positive.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test
MA/BA	Full	58	.38	.35	.58	.72	.17	.68
	Parent	33	-.11	.80	.89	-.33	.63	.97
	Spunoff	25	2.33	.07	.14	2.1	.04	.08
Q	Full	58	.22	.41	.60	.79	.15	.54
	Parent	35	-.98	.79	.84	-.15	.56	.92
	Spunoff	23	2.04	.11	.18	2.21	.04	.08
UCF	Full	58	1.07	.14	.32	.66	.20	.66
	Parent	30	.37	.39	.40	.31	.39	.64
	Spunoff	28	1.83	.12	.29	1.02	.18	.49
RACF	Full	58	.34	.38	.47	.91	.12	.53
	Parent	24	-.31	.57	.32	.47	.37	.65
	Spunoff	34	.80	.31	.45	1.22	.11	.32
COMB	Full	27	1.94	.15	.20	1.71	.13	.35
	Parent	14	1.29	.31	.19	.98	.34	.52
	Spunoff	13	2.64	.18	.33	2.49	.11	.20

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and having the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and having comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

Based on the misallocation of capital hypothesis, the changes in the capital expenditure of the relatively high growth firms after the spinoffs are expected to be positive. As can be seen from Table 10 above, there is no evidence that the relatively higher growth firms increase their capital expenditure one-year after the spinoffs. For the full sample, all the results using the proxies for growth opportunities for both the closest adjusted and the mean adjusted capital expenditure are positive. Although all the firms increased their capital expenditure one year after the spinoffs, none of the increases is statistically significant at conventional levels.

Next, the sample is broken down into two sub-samples based on whether the firm is a parent firm or a spunoff firm. After a spinoff, a parent firm is not necessarily a single-division firm, while the spunoff firm is mostly a single-division firm. Therefore, the increase in the capital expenditure is expected to be more pronounced when the firm is a spunoff firm.

Table 10 shows that all the changes in the capital expenditure of the spunoff firms following the spinoffs are positive. The changes in the mean capital expenditure of the spunoff firms are 2.1% and 2.21% (both significant at the 4% level by the T-tests and at the 8% level by the Wilcoxon Signed Ranks tests), when the market/book ratio and Tobin's Q are used as measures of growth opportunities respectively. In contrast, the changes in the capital expenditure of the parent firms are not always positive. Although, some of the changes in the capital expenditure are positive, none of them is significant at conventional levels.

Table 11. Results from testing Hypothesis 5: Changes in capital expenditure of relatively high growth spinoff firms between year 0 and year 2 are positive.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	58	.48	.33	.39	.46	.29	.59
	Parent	33	.36	.35	.48	0	.51	.56
	Spunoff	25	.65	.39	.45	1.07	.27	.17
Q	Full	58	.85	.21	.29	.90	.12	.16
	Parent	35	.34	.35	.49	.07	.45	.49
	Spunoff	23	1.62	.24	.24	2.17	.10	.08
UCF	Full	58	-.61	.69	.74	-.22	.61	.77
	Parent	30	-.28	.67	.74	-.34	.70	.63
	Spunoff	28	-.96	.65	.65	-.09	.52	.70
RACF	Full	58	-.11	.53	.59	.03	.48	.54
	Parent	24	.99	.16	.35	-.21	.63	.39
	Spunoff	34	-.89	.66	.72	.19	.44	.55
COMB	Full	27	1.10	.29	.32	1.06	.23	.16
	Parent	14	.28	.40	.40	-.24	.59	.27
	Spunoff	13	1.98	.31	.34	2.46	.20	.20

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and having the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and having comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

An investigation of Table 11 also reveals that all relatively higher growth firms do not increase their capital expenditure within two years after the spinoffs. Some of the results using the proxies for growth opportunities for both the closest adjusted and the mean adjusted capital expenditure of the full sample are positive, but they are not statistically significant at conventional levels. It also can be seen that both parent and

spunoff firms do not always have positive changes in their capital expenditures following the spinoffs. All of the changes in the closest adjusted capital expenditure are not significant.

Similarly, only one of the changes in the mean adjusted capital expenditure is statistically significant. The only significant increase in the mean adjusted capital expenditure belongs to the spunoff firms when Tobin's Q is used to measure growth opportunities. The change is 2.17% and significant at the 10% level by the T-test and at the 8% level by the Wilcoxon Signed Ranks test.

Table 12. Results from testing Hypothesis 5: Changes in capital expenditure of relatively high growth spinoff firms between year 0 and year 3 are positive.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	58	-.36	.60	.75	.80	.18	.11
	Parent	33	-.07	.54	.78	.74	.15	.24
	Spunoff	25	-.74	.59	.61	.88	.32	.16
Q	Full	58	.10	.47	.59	1.21	.07	.05
	Parent	35	.31	.34	.57	.98	.09	.12
	Spunoff	23	-.23	.52	.57	1.55	.19	.10
UCF	Full	58	-1.88	.88	.98	-.73	.82	.96
	Parent	30	-2.1	.88	.93	-.44	.75	.72
	Spunoff	28	-1.65	.73	.95	-1.03	.76	.95
RACF	Full	58	-.78	.71	.93	-.11	.55	.75
	Parent	24	.13	.43	.61	.04	.48	.47
	Spunoff	34	-1.42	.73	.93	-.21	.57	.78
COMB	Full	27	-.4	.56	.67	.17	.45	.54
	Parent	14	.26	.40	.55	-.24	.59	.62
	Spunoff	13	-1.11	.57	.64	.62	.42	.44

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and having the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and having comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

Finally, the test results of capital expenditure changes in relatively higher growth firms between year 0 and year 3 after the spinoff are shown on Table 12 above. For the full sample, using the proxies for growth opportunities for both the closest adjusted and the mean adjusted capital expenditure, there is only one significant positive change in the mean adjusted capital expenditure. It is when Tobin's Q is used to measure growth opportunities. The firms increase their capital expenditure by 1.21%. This positive

change is significant at the 7% level by the T-test and at the 5% level by the Wilcoxon Signed Ranks test.

The results for the changes in the capital expenditure of the parent and the spunoff firms are as before; not all of them are positive. The changes are positive and marginally significant when Tobin's Q is used as measures of growth opportunities. The mean adjusted capital expenditure changes of the parent firms and the spunoff firms are positive (0.98% and 1.55%) and significant either by the T-tests or by the Wilcoxon Signed Ranks tests.

Tables 13, 14, and 15 show the results of testing hypothesis 6 for one year, two years, and three years after the spinoffs. The misallocation of capital hypothesis implies that the relatively low growth spinoffs firms reduce their capital expenditure following the spinoffs. Therefore, the changes in the capital expenditure of the relatively low growth firms after the spinoffs are expected to be negative.

Table 13. Results from testing Hypothesis 6: The changes in capital expenditure of relatively low growth spinoff firms between year 0 and year 1 are negative.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	58	-.60	.26	.35	-.20	.36	.30
	Parent	25	-.06	.47	.52	-.01	.44	.53
	Spunoff	33	-1.01	.24	.31	-.28	.38	.24
Q	Full	58	-.47	.31	.32	-.30	.32	.19
	Parent	23	-.23	.41	.32	-.44	.27	.29
	Spunoff	35	-.63	.33	.39	-.21	.40	.26
UCF	Full	58	-1.39	.06	.12	-.11	.42	.34
	Parent	28	-2.11	.01	.03	-.84	.08	.09
	Spunoff	30	-.72	.32	.55	.57	.73	.70
RACF	Full	58	-.57	.21	.21	-.47	.19	.15
	Parent	34	-.88	.12	.09	-.73	.08	.11
	Spunoff	24	-.12	.46	.64	-.11	.46	.38
COMB	Full	27	-1.33	.11	.20	-.8	.18	.25
	Parent	13	-.52	.34	.36	-1.13	.14	.15
	Spunoff	14	-2.08	.13	.31	-.53	.36	.55

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and having the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and having comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

Table 13 shows that for the full sample, all of the mean changes between year 0 and year 1 in the closest and mean adjusted capital expenditures using the proxies for growth opportunities are negative. Most of them, however, are not statistically significant. The unadjusted cash flow measure of growth opportunities is the only one that results in a statistically significant decrease of the closest adjusted capital

expenditure. The change in the closest adjusted capital expenditure is -1.39%, and significant at the 6% level by the T-test, but not significant at conventional levels by the Wilcoxon Signed Ranks test.

As before, the changes in capital expenditure of the relatively low growth parent firms and spunoff firms are analyzed separately. Significance is indicated only when growth opportunities of the parent and the spunoff firms are proxied by the unadjusted cash flow (UCF) and by the risk adjusted cash flow (RACF).

The parent firms' changes in closest adjusted capital expenditure and in the mean adjusted capital expenditure using the unadjusted cash flow (UCF) as a measure of growth opportunities are -2.11% (significant at the 1% level by the T-test and at the 3% level by the Wilcoxon Signed Ranks test) and -0.84% (significant at the 8% level by the T-test and at the 9% level by the Wilcoxon Signed Ranks test.) The use of the risk adjusted cash flow (RACF) as a measure of growth opportunities results in marginally significant decrease in the capital expenditures of the parent firms. The other measurements, on the other hand, do not provide evidence that either the parent or the spunoff firms decrease their capital expenditure within one year after the spinoffs.

Table 14. Results from testing Hypothesis 6: The changes in capital expenditure of relatively low growth spinoff firms between year 0 and year 2 are negative.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	58	-1.62	.05	.07	-.67	.15	.25
	Parent	25	-.88	.18	.19	-.31	.35	.50
	Spunoff	33	-2.17	.09	.14	-.96	.17	.22
Q	Full	58	-1.96	.03	.04	-1.18	.05	.12
	Parent	23	-.90	.18	.15	-.59	.25	.32
	Spunoff	35	-2.65	.05	.08	-1.56	.07	.15
UCF	Full	58	-.62	.24	.32	.05	.53	.81
	Parent	28	-.40	.37	.30	.13	.56	.59
	Spunoff	30	-.83	.27	.50	-.02	.49	.84
RACF	Full	58	-1.01	.10	.17	-.32	.33	.54
	Parent	34	-1.00	.13	.14	-.01	.45	.33
	Spunoff	24	-1.04	.25	.49	-.64	.33	.59
COMB	Full	27	-2.23	.03	.09	-.78	.23	.46
	Parent	13	-1.85	.14	.13	-1.12	.19	.31
	Spunoff	14	-2.59	.07	.33	-.47	.39	.69

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and having the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and having comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

An investigation of Table 14 reveals stronger evidence that, for the full sample, firms decrease their capital expenditures within two years after the spinoffs. The most significant result is when Tobin's Q is used as a measure of growth opportunities. The change in the closest adjusted capital expenditure is –1.96%, and significant at the 3% and the 4% levels by the T-test and by the Wilcoxon Signed Ranks test respectively.

The change in the mean adjusted capital expenditure is -1.18%. However, the decrease is only significant by the T-test at the 5% level, and is not significant by the Wilcoxon Signed Ranks test.

It also can be seen on Table 14 that all parent and spunoff firms have negative changes in their capital expenditures following the spinoffs. However, none of the decreases in the closest adjusted capital expenditures of the parent firms is significant at conventional levels.

For the spunoff firms, the most significant evidence of a decrease in the closest adjusted capital expenditure is when Tobin's Q is used as a measure of growth opportunities. The change is –2.65% (significant at the 5% level by the T-test and at the 8% level by the Wilcoxon Signed Ranks test).

The decrease in the mean adjusted change in capital expenditure is only significant when the firms are the spunoff firms and the measure of growth opportunities is Tobin's Q. The change is -1.56% (significant at the 7% level by the T-test but not significant by the Wilcoxon Signed Ranks Test).

Table 15. Results from testing Hypothesis 6: The changes in capital expenditure of relatively low growth spinoff firms between year 0 and year 3 are negative.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	58	-2.09	.03	.02	-.71	.13	.18
	Parent	25	-2.57	.12	.14	-.53	.27	.31
	Spunoff	33	-1.73	.05	.04	-.85	.18	.19
Q	Full	58	-2.61	.01	.005	-1.10	.06	.09
	Parent	23	-3.52	.06	.02	-.96	.13	.18
	Spunoff	35	-2.01	.04	.03	-1.20	.13	.14
UCF	Full	58	-.63	.25	.30	.76	.84	.97
	Parent	28	-.51	.29	.22	.81	.82	.78
	Spunoff	30	-.74	.32	.41	.32	.63	.97
RACF	Full	58	-1.62	.09	.14	.10	.55	.82
	Parent	34	-2.05	.11	.09	.30	.64	.45
	Spunoff	24	-1.00	.28	.40	-.17	.45	.84
COMB	Full	27	-1.94	.07	.15	-.91	.20	.41
	Parent	13	-1.31	.21	.18	-1.31	.15	.15
	Spunoff	14	-2.53	.12	.35	-.54	.38	.77

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and having the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and having comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

Table 15 contains some evidence that, for the full sample, firms decrease their capital expenditures three years after the spinoffs. The most significant result for the closest adjusted change in capital expenditure is when Tobin's Q is used as a measure of growth opportunities. The decrease in the closest adjusted capital expenditure is –2.61%, and significant at the 1% level by the T-test and at less than the 1% level by the Wilcoxon Signed Ranks test.

Similarly, the most significant decrease in the mean adjusted capital expenditure for the full sample appears when Tobin's Q is used as a measure of growth opportunities. The decrease in the mean adjusted capital expenditures is -1.10% (significant at the 6% level by the T-test and at the 9% level by the Wilcoxon Signed Ranks test).

Table 15 also shows that, in general, both parent and spunoff firms have negative changes in their capital expenditures following the spinoffs. The negative changes in the closest adjusted capital expenditures of the parent firms is the most significant, when Tobin's Q is used as a measure of growth opportunities. The decrease in the closest adjusted capital expenditure using Tobin's Q is –3.52%. The decrease is significant at the 6% level by the T-test and at the 2% level by the Wilcoxon Signed Ranks test.

For the spunoff firms, the most significant evidence of the decrease in the closest adjusted capital expenditure also appears when Tobin's Q is used as a measure of growth opportunities. The change is –2.01% (significant at the 4% level by the T-test and at the 3% level by the Wilcoxon Signed Ranks test). Some of the mean adjusted changes in capital expenditure are also negative, but none of them is statistically significant.

Next, I look at the changes in the capital expenditures of post-spinoff firms, without matched firms. Before a spinoff, a parent firm and a spunoff firm are pooled into a single firm, a pre-spinoff combined firm. One of these is an excess cash low-growth firm, while the other is a cash-hungry high growth firm. Therefore, following the spinoff, the change in the capital expenditure of the post-spinoff firms with higher growth opportunities is, at least, more positive (less negative) than the change in the capital

expenditure of the post-spinoff firms with lower growth opportunities. This evidence may be obtained even without the use of the matched firms.

When testing without matched firms, I find mixed evidence that the change in the capital expenditure of the post-spinoff firms with higher growth opportunities is more positive (less negative) than the change in the capital expenditure of the post-spinoff firms with lower growth opportunities. The evidence does not occur uniformly across the firms, and the proxies for growth opportunities. Only when the firms are the spunoff firms, and the proxy is the risk adjusted cash flow (RACF), that the results consistently support the hypothesis.

These findings are to be expected because unlike a spunoff firm, a parent firm does not necessarily become a single-division firm after the spinoff. The incident of capital misallocation is reduced but does not entirely disappear in the parent firm. With regard to the proxies for growth opportunities, only the use of the risk adjusted cash flow (RACF) as a measure of growth opportunities provides results that support the capital misallocation hypothesis. Therefore, there are some consistencies regarding the findings in this study.

Tables 16, 17, and 18 show the results of testing the hypothesis for one year, two years, and three years after the spinoffs.

Table 16. Results from testing Hypothesis 5 & 6, without matched firms: The change in the capital expenditure of the post-spinoff firms with higher growth opportunities is more positive (less negative) than the change in the capital expenditure of the post-spinoff firms with lower growth opportunities. The change in the capital expenditure is evaluated between year 0 and year 1. The total sample consists of 116 firms (54 for COMB).

Growth Measure	Firm	N	Sub-sample	The capital expenditure		
				Mean changes (%)	P-value for T-test	P-value for Mann Whitney U test
MA/BA	Full	58	Higher	-.2	.43	.36
		58	Lower	-.39		
	Parent	33	Higher	-.25	.27	.30
		25	Lower	-.93		
	Spun-off	25	Higher	-.14	.54	.39
		33	Lower	.03		
Q	Full	58	Higher	-.08	.33	.28
		58	Lower	-.51		
	Parent	35	Higher	-.13	.16	.14
		23	Lower	-1.18		
	Spun-off	23	Higher	-.01	.49	.56
		35	Lower	-.06		
UCF	Full	58	Higher	-.42	.33	.52
		58	Lower	-.80		
	Parent	30	Higher	-1.42	.80	.65
		28	Lower	-.78		
	Spun-off	28	Higher	.64	.17	.42
		30	Lower	-.83		
RACF	Full	58	Higher	.17	.12	.06
		58	Lower	-.92		
	Parent	24	Higher	-.1.09	.65	.60
		34	Lower	-.8		
	Spun-off	34	Higher	1.06	.08	.04
		24	Lower	-1.10		
COMB	Full	27	Higher	.78	.08	.10
		27	Lower	-1.35		
	Parent	14	Higher	.89	.17	.05
		13	Lower	-1.20		
	Spun-off	13	Higher	.65	.16	.41
		14	Lower	-1.48		

The capital expenditure is represented by the ratio of capital expenditures to total assets. The change in the capital expenditure of the post-spinoff firm is calculated by comparing its capital expenditure in year 0 with year 1. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

Table 16 shows mixed results regarding the prediction that changes in the capital expenditures of all relatively high growth spinoff firms are more positive (less negative)

than of all relatively low growth spinoff firms. Only the risk adjusted cash flow measure (RACF) and the smaller, consistent sample (COMB) produce results that are consistent with my predictions. The changes in the capital expenditure of all relatively high growth firms are 0.17% and 0.78%, while they are -0.92% and –1.35% for all relatively low growth firms using RACF and COMB respectively. The difference is significant at the 6% level by the Mann-Whitney U test, but not significant by the T-test for RACF. For COMB, on the other hand, the difference is significant at the 10% level by the Mann-Whitney U test, and at the 8% level by the T-test

Table 16 above also shows only the smaller, consistent sample (COMB) produces results that are consistent with the prediction that the changes in the capital expenditure of relatively high growth parent firms are more positive (less negative) than of relatively low growth parent firms. The changes are 0.89% and –1.20% (significant at the 5% level by the Mann-Whitney U test, but not significant by the T-test).

There is also evidence that changes in the capital expenditure of relatively high growth spunoff firms are more positive (less negative) than of relatively low growth spunoff firms. The most significant results are from the use of the risk adjusted cash flow (RACF) as a proxy for growth opportunities. The changes are 1.06% and –1.10% (significant at the 4% level by the Mann Whitney U test, and at the 8% level by the T-test).

The results of the tests on the differences between the changes in the capital expenditure of relatively high growth spinoff firms and of relatively low growth spinoff firms between year 0 and year 2 are presented in Table 17 below.

Table 17. Results from testing Hypothesis 5 & 6, without matched firms: The change in the capital expenditure of the post-spinoff firms with higher growth opportunities is more positive (less negative) than the change in the capital expenditure of the post-spinoff firms with lower growth opportunities. The change in the capital expenditure is evaluated between year 0 and year 2. The total sample consists of 116 firms (54 for COMB).

Growth Measure	Firm	N	Sub-sample	The capital expenditure		
				Mean changes (%)	P-value for T-test	P-value for Mann Whitney U test
MA/BA	Full	58	Higher	-.47	.36	.44
		58	Lower	-.9		
	Parent	33	Higher	-1.02	.67	.71
		25	Lower	-.56		
	Spun-off	25	Higher	.25	.26	.18
		33	Lower	-1.13		
Q	Full	58	Higher	.23	.05	.19
		58	Lower	-1.59		
	Parent	35	Higher	-.82	.49	.47
		23	Lower	-.83		
	Spun-off	23	Higher	1.83	.03	.06
		35	Lower	-2.08		
UCF	Full	58	Higher	-.29	.36	.65
		58	Lower	-.7		
	Parent	30	Higher	-1.28	.72	.55
		28	Lower	-.64		
	Spun-off	28	Higher	.77	.24	.54
		30	Lower	-.75		
RACF	Full	58	Higher	.75	.06	.16
		58	Lower	-1.13		
	Parent	24	Higher	-1.56	.80	.82
		34	Lower	-.22		
	Spun-off	34	Higher	2.37	.02	.03
		24	Lower	-2.41		
COMB	Full	27	Higher	-.53	.31	.40
		27	Lower	-1.38		
	Parent	14	Higher	-1.49	.61	.45
		13	Lower	-1.07		
	Spun-off	13	Higher	.50	.24	.32
		14	Lower	-1.48		

The capital expenditure is represented by the ratio of capital expenditures to total assets. The change in the capital expenditure of the post-spinoff firm is calculated by comparing its capital expenditure in year 0 with year 2. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

As with Table 16, Table 17 reveals mixed results regarding the prediction that changes in the capital expenditures of all relatively high growth spinoff firms are more

positive (less negative) than of all relatively low growth spinoff firms. Only the risk adjusted cash flow measure (RACF) and Tobin's Q (Q) produce results that are consistent with my predictions. The changes in the capital expenditure of all relatively high growth firms are 0.75% and 0.23%, while they are -1.13% and –1.59% for all relatively low growth firms using RACF and Q respectively. For RACF, the difference is significant at the 6% level by the T-test, but not significant by the Mann-Whitney U test. For Q, the difference is significant at the 5% level by the T-test, but not significant by the Mann-Whitney U test.

Table 17 above also reveals that there is no evidence that the changes in the capital expenditure of relatively high growth parent firms are more positive (less negative) than of relatively low growth parent firms.

For spunoff firms, however, there is some evidence that is consistent with my predictions. The most significant results are from the use of the risk adjusted cash flow (RACF) and Tobin's Q (Q) as proxies for growth opportunities. The changes in the capital expenditure of all relatively high growth spunoff firms are 2.37% and 1.83%, while they are –2.41% and –2.08% for all relatively low growth firms using RACF and Q respectively. For RACF, the difference is significant at the 2% level by the T-test, and at the 3% level by the Mann-Whitney U test. For Q, the difference is significant at the 3% level by the T-test, and at the 6% level by the Mann-Whitney U test.

The results of the tests on the differences between the changes in the capital expenditure of relatively high growth spinoff firms and of relatively low growth spinoff firms between year 0 and year 3 are presented in Table 18 below.

Table 18. Results from testing Hypothesis 5 & 6, without matched firms: The change in the capital expenditure of the post-spinoff firms with higher growth opportunities is more positive (less negative) than the change in the capital expenditure of the post-spinoff firms with lower growth opportunities. The change in the capital expenditure is evaluated between year 0 and year 3. The total sample consists of 116 firms (54 for COMB).

Growth Measure	Firm	N	Sub-sample	The capital expenditure		
				Mean changes (%)	P-value for T-test	P-value for Mann Whitney U test
MA/BA	Full	58	Higher	-.67	.27	.44
		58	Lower	-1.39		
	Parent	33	Higher	-.65	.47	.28
		25	Lower	-.74		
	Spun-off	25	Higher	-.7	.30	.27
		33	Lower	-1.88		
Q	Full	58	Higher	.02	.04	.19
		58	Lower	-2.08		
	Parent	35	Higher	-.25	.15	.42
		23	Lower	-1.36		
	Spun-off	23	Higher	.43	.09	.20
		35	Lower	-2.55		
UCF	Full	58	Higher	-.72	.52	.91
		58	Lower	-.64		
	Parent	30	Higher	-.99	.66	.73
		28	Lower	-.52		
	Spun-off	28	Higher	-.42	.44	.88
		30	Lower	-.76		
RACF	Full	58	Higher	-.27	.17	.57
		58	Lower	-1.49		
	Parent	24	Higher	-.84	.44	.75
		34	Lower	-.98		
	Spun-off	34	Higher	.13	.16	.40
		24	Lower	-2.22		
COMB	Full	27	Higher	-2.78	.73	.87
		27	Lower	-1.80		
	Parent	14	Higher	-1.28	.47	.74
		13	Lower	-1.43		
	Spun-off	13	Higher	-4.40	.79	.79
		14	Lower	-2.15		

The capital expenditure is represented by the ratio of capital expenditures to total assets. The change in the capital expenditure of the post-spinoff firm is calculated by comparing its capital expenditure in year 0 with year 3. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF). COMB represents a consistent sample; all measures of growth opportunities give the same classifications.

Table 18 shows little empirical evidence that the changes in the capital expenditures of all relatively high growth spinoff firms are more positive (less negative)

than of all relatively low growth spinoff firms. Only Tobin's Q (Q) produces results that are consistent with my predictions. The changes in the capital expenditure of all relatively high growth firms and of relatively low growth firms are 0.02% and –2.08 (significant at the 4% level by the T-test, but not significant by the Mann-Whitney U test).

Table 18 above also shows that there is no evidence that the changes in the capital expenditure of relatively high growth parent firms are more positive (less negative) than of relatively low growth parent firms.

For spunoff firms, also, there is little empirical evidence that is consistent with my predictions. Again, the only significant results are from the use of Tobin's Q (Q) as a proxy for growth opportunities. The changes in the capital expenditure of all relatively high growth spunoff firms and of all relatively low growth firms are 0.43% and -2.55% (significant at the 9% level by the T-test, but not significant at conventional levels by the Mann-Whitney U test).

Findings and Discussion Involving Hypothesis 7_A

Hypothesis 7_A *The higher the difference in growth opportunities between the parent firm and the spunoff firm, the higher the operating performance of both the parent firm and the spunoff firm following the spinoff.*

The sample used for testing hypothesis 7 consists of fifty-eight pairs of spinoff firms. These spinoff firms are identical to those used for testing hypothesis 5 and hypothesis 6. I also report the results of the tests on the sample that consists of the seventy-three spinoffs, in the Appendix. The table numbers in the Appendix are the same

as those being reported here. In summary, the results using the larger sample are about the same as the results using the smaller sample.

Despite the possible shortcomings of using the ex-dividend year as a basis year, some of the results from testing hypothesis 7 support the misallocation of capital hypothesis. Both the spunoff firms and the parent firms increase their operating performance following the spinoffs. The positive changes in the operating performance of the spunoff firms, however, come earlier and are bigger than the positive changes in the operating performance of the parent firms. Again, these differences are to be expected because unlike a spunoff firm, a parent firm does not necessarily become a single-division firm after the spinoff. The incident of capital misallocation is reduced but does not entirely disappear in the parent firm.

I find little empirical evidence that the operating performances of parent and spunoff firms of the high difference spinoff sub-samples are higher than the changes in the operating performances of parent and spunoff firms of the low difference spinoff sub-samples. The majority of the changes in the operating performance of the firms of the high difference sub-sample are higher than of the firms of the low difference sub-sample. However, the differences are only significant, if at all, when the firms are the spunoff firms.

Table 19 shows the changes in operating performance of all spinoffs firms over the different periods.

Table 19. Results from testing Hypothesis 7.1: Changes in operating performance of all spinoff firms following the spinoffs are positive.

Period	N	The closest adjusted operating performance.			The mean adjusted operating performance.		
		Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
Year 0 to year 1	116	1.38	.19	.18	.87	.27	.15
Year 0 to year 2	116	2.33	.10	.15	1.59	.14	.26
Year 0 to year 3	116	.36	.43	.64	-.12	.53	.59

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in one period with the other period. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and having the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and having comparable total assets.

Table 19 shows that when the parent firms and spunoff firms are grouped and analyzed together, they have positive changes in their operating performance. The largest changes in the operating performance appear within two years following the spinoffs. The change in the closest adjusted operating performance two years after the spinoffs is 2.33% (significant at the 10% level by the T-test, but not significant by the Wilcoxon Signed Ranks test). Similarly, the change in the mean adjusted operating performance in that period is 1.59% (not significant both by the T-test and by the Wilcoxon Signed Ranks test). Table 20 below presents the changes in operating performance of the parent firms and the spunoff firms over the different periods.

Table 20. Results from testing Hypothesis 7.1: Changes in operating performance of the parent firms and the spunoff firms following the spinoffs are positive.

Period	N	Firm	The closest adjusted operating performance.			The mean adjusted operating performance.		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
Year 0 to year 1	58	Parent	-1.37	.79	.25	-2.21	.92	.50
	58	Spunoff	4.13	.05	.10	3.95	.05	.09
Year 0 to year 2	58	Parent	1.56	.06	.07	.66	.23	.31
	58	Spunoff	3.10	.19	.42	2.52	.18	.33
Year 0 to year 3	58	Parent	1.06	.21	.35	-.03	.51	.76
	58	Spunoff	-.33	.53	.76	-.22	.53	.40

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in one period with the other period. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and having the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and having comparable total assets.

Table 20 reveals, that between year 0 and year 1, the only positive change in the operating performance belongs to the spunoff firms. The changes in the closest adjusted performance and the mean adjusted performance of the spunoff firms from year 0 to year 1 are 4.13% (significant at the 5% level by the T-test and at the 10% level by the Wilcoxon Signed Ranks test) and 3.95% (significant at the 5% level by the T-test and at the 9% by the Wilcoxon Signed Ranks tests) respectively.

Between year 0 and year 2, all the changes in the operating performance of both parent and spunoff firms are positive. The change, however, is only significant for the closest adjusted operating performance of the parent firms. The change in the closest adjusted operating performance of the parent firms from year 0 to year 2 is 1.56%

(significant at the 6% level by the T-test and at the 7% level by the Wilcoxon Signed Ranks test).

The magnitudes of the changes in the closest adjusted operating performance and the mean adjusted operating performance of the spunoff firms from year 0 to year 2 are bigger than of the parent firms. Although the magnitudes are bigger, they are less significant than those of the parent firms. Finally, none of the changes in the operating performance of both the parent and the spunoff firms between year 0 and year 3 is significant at conventional levels.

Table 21 below presents the changes in operating performance of the spinoffs firms of high difference sub-sample and of low difference sub-sample between year 0 and year1.

Table 21. Results from testing Hypothesis 7.2: The changes in operating performance of spinoff firms from high-difference sub-sample between year 0 and year 1 are higher than the changes in operating performance of spinoff firms from low-difference sub-sample.

Growth Measure	Firm	N	Sub-sample	The closest adjusted operating performance.			The mean adjusted operating performance.		
				Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test	Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test
MA/BA	All	58	High.	2.5	.23	.15	2.7	.10	.06
		58	Low	.21			-.93		
	Parent	29	High.	-2.2	.68	.53	-1.9	.43	.11
		29	Low	-.57			-2.50		
	Spun-off	29	High.	7.3	.11	.08	7.3	.08	.19
		29	Low	1.0			.64		
Q	All	58	High.	3.0	.14	.08	2.8	.09	.15
		58	Low	-.3			-1.02		
	Parent	29	High.	-1.7	.57	.26	-2.0	.45	.17
		29	Low	-1.07			-2.39		
	Spun-off	29	High.	7.8	.08	.10	7.5	.07	.28
		29	Low	.5			.35		
UCF	All	58	High.	2.7	.21	.28	1.8	.25	.25
		58	Low	.1			-.09		
	Parent	29	High.	-3.0	.82	.49	-4.0	.87	.47
		29	Low	.21			-.39		
	Spun-off	29	High.	8.3	.05	.26	7.7	.06	.16
		29	Low	-.01			.21		
RACF	All	58	High.	.7	.67	.31	0	.72	.37
		58	Low	2.1			1.7		
	Parent	29	High.	-3.0	.83	.69	-3.9	.86	.49
		29	Low	.26			-.5		
	Spun-off	29	High.	4.3	.47	.19	3.9	.50	.37
		29	Low	3.9			3.9		
COMB	All	16	High	-1.4	.60	.36	.5	.51	.39
		16	Low	.02			.65		
	Parent	8	High	-9.6	.79	.66	-8.8	.79	.28
		8	Low	.23			-.42		
	Spun-off	8	High	6.8	.28	.43	9.8	.26	.50
		8	Low	-.2			1.7		

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in year 0 with year 1. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and having the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and having comparable total assets.

Table 21 shows mixed results regarding the changes in the operating performance of all spinoff firms of the high difference sub-sample and of low difference sub-sample. For the changes in the closest adjusted operating performances, there is only one significant difference in the changes in the operating performance of all spinoff firms of high difference sub-sample and of the low difference sub-sample. The changes in the closest adjusted operating performance of all spinoff firms of the two sub-samples, when Tobin's Q is used as a measure of growth opportunities are 3% and -0.3%. The difference is significant at the 8% level by the Mann-Whitney U test, but not significant by the T-test.

For the mean adjusted operating performance, the results are also not as strong as expected. The most significant result appears when the market/book ratio is used as a measure of growth opportunities. The changes in the mean adjusted operating performance of all spinoff firms of the high difference sub-sample and of the low difference sub-sample are 2.7% and –0.93% respectively. The difference is significant at the 10% level by the T-test and at the 6% level by the Mann-Whitney U test.

Table 21 above also shows no evidence that the parent firms of the high difference sub-sample have more positive changes in operating performance than the parent firms of the low difference sub-sample. All of the differences in the changes in the closest adjusted operating performance and in the mean adjusted operating performance of the parents from the high difference sub-sample, using all the proxies for growth opportunities, are not statistically significant.

There is some evidence, however, that the spunoff firms of the high difference sub-sample have more positive changes in operating performance than the spunoff firms of the low difference sub-sample. The most significant results are from using Tobin's Q as a measure of growth opportunities. The changes in the closest adjusted operating performance of the spunoff firms of the high difference and of the low difference sub-samples are 7.8% and .5% respectively (significant at the 8% level by the T-test and at the 10% level by the Mann-Whitney U test). Similarly, the changes in the mean adjusted operating performance of the spunoff firms of the high difference and of low difference sub-samples are 7.5% and -1.08% respectively (significant at the 7% level by the T-tests but not significant by the Mann-Whitney U tests).

The results of the tests on the differences between the changes in the operating performance of the firms of the high difference spinoff sub-sample and of the low difference spinoff sub-sample between year 0 and year 2 are presented in Table 22 below.

Table 22. Results from testing Hypothesis 7.2: The changes in operating performance of spinoff firms from high-difference sub-sample between year 0 and year 2 are higher than the changes in operating performance of spinoff firms from low-difference sub-sample.

Growth Measure	Firm	N	Sub-sample	The closest adjusted operating performance.			The mean adjusted operating performance.		
				Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test	Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test
MA/BA	All	58	High.	3.4	.28	.18	3.5	.10	.20
		58	Low	1.3			-.3		
	Parent	29	High.	1.78	.42	.53	1.44	.19	.51
		29	Low	1.35			-.22		
	Spun-off	29	High.	5.0	.30	.19	5.5	.15	.15
		29	Low	1.2			-.4		
Q	All	58	High.	4.2	.15	.15	3.9	.05	.19
		58	Low	.5			-.7		
	Parent	29	High.	1.25	.62	.41	.65	.50	.39
		29	Low	1.88			.67		
	Spun-off	29	High.	7.2	.13	.15	7.1	.05	.15
		29	Low	-.9			-2.1		
UCF	All	58	High.	5.5	.04	.07	4.8	.01	.02
		58	Low	-.86			-1.61		
	Parent	29	High.	1.33	.59	.56	1.46	.19	.22
		29	Low	1.80			-0.13		
	Spun-off	29	High.	9.7	.03	.02	8.1	.02	.02
		29	Low	-3.5			-3.1		
RACF	All	58	High.	4.2	.15	.09	3.3	.11	.03
		58	Low	.5			-.2		
	Parent	29	High.	2.55	.17	.26	1.75	.12	.15
		29	Low	.58			-.42		
	Spun-off	29	High.	5.9	.22	.14	4.9	.19	.05
		29	Low	.3			.1		
COMB	All	16	High.	7.8	.03	.12	8.1	.02	.06
		16	Low	-3.30			-3.1		
	Parent	8	High.	1.14	.49	.44	3.74	.12	.24
		8	Low	1.12			.65		
	Spun-off	8	High.	14.4	.03	.06	12.4	.04	.07
		8	Low	-7.6			-6.9		

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in year 0 with year 2. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and having the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and having comparable total assets.

Table 22 reveals some evidence that the changes in the operating performance of all spinoff firms of the high difference sub-sample are higher than the changes in the operating performance of all spinoff firms of the low difference sub-sample. The most significant results appear when the unadjusted cash flow (UCF) is used to measure growth opportunities. The changes in the closest adjusted operating performance of all spinoff firms of the high difference and of the low difference sub-samples are 5.5% and -0.86% respectively (significant at the 4% level by the T-test, and at the 7% level by the Mann-Whitney U test). Similarly, the changes in the mean adjusted operating performance of all spinoff firms of the high difference and of the low difference sub-samples are 4.8% and -1.61% respectively (significant at the 1% level by the T-tests and at the 2% level by the Mann-Whitney U tests).

Table 22 also shows that most of the changes in the mean adjusted performance of the parent firms of the high difference sub-sample are higher than of the low-difference sub-sample, but the differences are not significant at conventional levels. For the closest adjusted operating performance, the changes in the operating performance of the parent firms of the high difference sub-sample are higher than the changes in the operating performance of the low difference sub-sample, only when the market/book ratio (MA/BA), and the risk-adjusted cash flow (RACF) are used as measures of growth opportunities. Again, the differences are not significant at conventional levels.

For spunoff firms, the evidence is slightly stronger. In every instance, the change in the operating performance of the spunoff firms of the high difference sub-sample is higher than of the low difference sub-sample. The most significant results appear when

the unadjusted cash flow (UCF) is used as a measure of growth opportunities. The changes in the mean adjusted operating performance of the spunoff firms of the high difference sub-sample and of the low difference sub-sample are 8.1% and –3.1% respectively. The difference is significant at the 2% levels by both the T-test and the Mann-Whitney U test. Similarly, the changes in the closest adjusted operating performance of the spunoff firms of the high difference sub-sample and of the low-difference sub-sample are 9.7% and –3.5% respectively. The difference is significant at the 3% level by the T-test and at the 2% level by the Mann-Whitney U test.

It is important to note, however, that the consistent sample (COMB) shows a significantly higher change for the high growth difference sub-sample than for the low growth difference sub-sample. The differences are significant for the combined sample of parent and spunoff firms, and for the spunoff firms. The results, however, are not significant for the parent firms

Table 23 below shows the test results on the differences between the changes in the operating performance of the firms from the high difference spinoff sub-sample and from the low difference spinoff sub-sample between year 0 and year 3.

Table 23. Results from testing Hypothesis 7.2: The changes in operating performance of spinoff firms from high-difference sub-sample between year 0 and year 3 are higher than the changes in operating performance of spinoff firms from low-difference sub-sample.

Growth Measure	Firm	N	Sub-sample	The closest adjusted operating performance.			The mean adjusted operating performance.		
				Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test	Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test
MA/BA	All	58	High.	3.7	.06	.17	1.9	.10	.24
		58	Low	-2.9			-2.1		
	Parent	29	High.	2.4	.15	.49	.69	.24	.30
		29	Low	-.3			-.75		
	Spun-off	29	High.	4.9	.10	.15	3.1	.14	.25
		29	Low	-5.6			-3.5		
Q	All	58	High.	4.4	.03	.28	2.9	.03	.14
		58	Low	-3.7			-3.2		
	Parent	29	High.	1.55	.35	.46	.12	.44	.14
		29	Low	.6			-.17		
	Spun-off	29	High.	7.2	.03	.19	5.7	.02	.24
		29	Low	-7.9			-6.2		
UCF	All	58	High.	4.1	.04	.08	2.6	.04	.18
		58	Low	-3.4			-2.9		
	Parent	29	High.	2.0	.24	.43	.23	.40	.31
		29	Low	.14			-.29		
	Spun-off	29	High.	6.2	.06	.05	5.1	.04	.04
		29	Low	-6.9			-5.5		
RACF	All	58	High.	3.0	.11	.28	2.1	.08	.15
		58	Low	-2.3			-2.3		
	Parent	29	High.	2.8	.09	.40	.71	.24	.40
		29	Low	-.70			-.76		
	Spun-off	29	High.	3.1	.20	.29	3.4	.11	.07
		29	Low	-3.8			-3.9		
COMB	All	16	High.	15.5	.01	.07	9.1	.03	.07
		16	Low	-8.4			-7.3		
	Parent	8	High.	4.8	.16	.43	2.16	.22	.24
		8	Low	-2.16			-.61		
	Spun-off	8	High.	26.2	.02	.03	16.1	.04	.15
		8	Low	-14.6			-14.0		

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in year 0 with year 3. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and having the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and having comparable total assets.

As with Table 22, Table 23 reveals some evidence that the changes in the operating performance of all spinoff firms of the low difference sub-sample are lower than the changes in the operating performance of all spinoff firms of the high difference sub-sample. Almost all of the changes in the closest adjusted operating performance and the mean adjusted operating performance of all spinoff firms of the high difference sub-sample are significantly higher than of all spinoff firms of the low difference sub-sample.

Table 23 above also shows that for both parents and spunoffs, and for all measures of growth opportunities, the changes in the closest adjusted operating performance and the mean adjusted operating performance of the parent and the spunoff firms of the high difference sub-samples are always higher than of the low difference sub-sample. The differences, however, are not consistently significant.

CHAPTER 6

CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

This chapter summarizes the results of the research, discusses its limitations, and includes suggestions for further work.

Summary and Conclusions

The main objective of this study is to investigate the importance of reduced capital misallocation in explaining the gains in corporate spinoffs. Higher differences in growth opportunities imply that more capital is misallocated. When capital is grossly misallocated within diversified firms, the firms should conduct spinoffs to maintain the objective of maximizing shareholder wealth. Evidence gathered from comparing the growth opportunities of parent firms and spunoff firms is consistent with the capital misallocation hypothesis. This study finds that the higher the difference in growth opportunities of a diversified firm's businesses, the more likely is the firm to conduct a spinoff. Therefore, this study supports the argument that the incidence of capital misallocation in pre-spinoff combined firms is a reason for diversified firms to conduct spinoffs.

The results from testing the difference in managerial ownership between spinoff firms and non-spinoff firms support the argument that the misallocation of internal capital is an agency problem. A low management ownership stake, coupled with the existing

differential in growth opportunities between parent and spunoff firms, leads to misallocation of internal capital, thus creating incentives to conduct spinoffs.

The capital misallocation hypothesis asserts that the higher the difference in growth opportunities among the firm's businesses, the higher the costs of joint operations as the incidence of the misallocation of capital increases. Some of the spunoff firms, however, may have small differences in growth opportunities with their parent firms, but still, their parents spin them off. This can happen if debt levels are high. This study finds little evidence that the debt level of the pre-spinoff combined firms of the sub-sample with high differences in growth opportunity is less than the debt level of the pre-spinoff combined firms of the sub-sample with low differences in growth opportunity. My findings do not support the notion that debt is an agent for change, in this case.

The capital misallocation hypothesis asserts that spinning off a division that has different growth opportunities than the parent, reduces the differential in growth opportunities within the firms. The higher the difference in growth opportunities, the less the capital misallocation in the future. Accordingly, the market will react more positively to spinoff announcements that involve high differences in growth opportunities between the spunoff firms and the parent firms. I find some support for this, particularly in the use of the risk adjusted cash flow (RACF) as a proxy for growth opportunities between the parent and the spunoff firms. It appears that the market reacts more favorably when parent and spunoff firms have high differences in growth opportunities.

According to the capital misallocation hypothesis, the main source of value reduction in the diversified firm is the inefficiency of its investment policy. If a spinoff is

carried out to solve this problem, then following the spinoff, the post-spinoff firms will adjust their investment policy on a basis consistent with the industries in which they compete. Thus, the investment level in the post-spinoff firms with relatively low growth opportunities is lower than before the spinoffs, whereas the investment level in the post-spinoff firms with relatively high growth opportunities is higher than before the spinoffs.

The results of these tests show mixed evidence that relatively high growth firms increase their capital expenditure after the spinoffs. Specifically, only relatively high growth spunoff firms, not relatively high growth parent firms, increase their capital expenditure. However, the increase does not happen uniformly across the measures of the capital expenditure or the proxies of growth opportunities.

Similarly, there is mixed evidence that relatively low growth firms decrease their capital expenditure following the spinoffs. The decrease in the capital expenditure of the relatively low growth firms is apparent within two years after the spinoffs. However, the decrease does not happen uniformly across the measures of the capital expenditure or the proxies of growth opportunities. In addition, there is some evidence that the change in the capital expenditure of the post-spinoff firms with higher growth opportunities is more positive (less negative) than the change in the capital expenditure of the post-spinoff firms with lower growth opportunities. Especially, when the firms are the spunoff firms, and the proxy for growth opportunities is the risk adjusted cash flow (RACF).

The capital misallocation hypothesis predicts that the parent and the spunoff firms of highly different growth opportunity spinoffs will experience an improvement in operating performance. The results show mixed support for this prediction. The results

show that both the spunoff firms and the parent firms increase their operating performance following the spinoffs. The increases in the operating performance of the spunoff firms appear earlier and are bigger. More importantly, the increase in operating performance for firms of the high difference sub-sample is only significantly higher than of the low difference sub-samples if the firms are the spunoff firms. This is not surprising, because a parent firm is not necessarily a single-division firm after the spinoff. Thus, capital misallocation may still be a problem in the parent firm, even after a spinoff.

The summary of the findings in this study is on Table 24 below:

Table 24. Summary of the findings.

Hypothesis	Description	Evidence
H1	The parent firm and the spunoff firm have different growth opportunities.	Strong
H2	Firms that subsequently spin off their divisions have lower managerial ownership than firms that do not spin off their divisions.	Strong
H3	Pre-spinoff combined firms from highly different growth opportunity spinoffs have less debt than do pre-spinoff combined firms from less different growth opportunity spinoffs.	Weak
H4	Stock price reaction to the spinoff announcement is more positive if the parent firm and the spunoff firm have a high difference in growth opportunities.	Mixed
H5	Relatively high growth firms increase their capital expenditure after the spinoffs.	Mixed
H6	Relatively low growth firms decrease their capital expenditure after the spinoffs.	Mixed
H7.1	Both the spunoff firms and the parent firms increased their operating performance following the spinoffs.	Weak
H7.2	The higher the difference in growth opportunities between the parent firm and the spunoff firm, the higher the operating performance of both the parent firm and the spunoff firm following the spinoff.	Mixed

Limitations of the Research

This study has the following limitations:

1. Ideally, the difference in growth opportunities between parent and spunoff firms should be measured while they are still parts of the pre-spinoff combined firms. Unfortunately, this data is not available. At best, data sources only publish business segment data. Business segments are not divisions, and it is not clear which segment would be the parent firm and which would be the spunoff firm. More importantly, business segment data is inadequate for estimation of growth opportunities. This lack of data forces me to measure growth opportunities after the firms become independent. There is a possibility, though, that their growth opportunities changes immediately after they become independent firms.
2. As mentioned in Chapter 4 and Chapter 5, the ex-dividend year is used as the basis year for testing hypothesis 5 through hypothesis 7. It is possible that all the changes occur in the ex-dividend year, and, therefore, the ex-dividend year cannot be used as the basis year for comparisons. Using another year before the ex-dividend year for a basis year, however, is impossible because both parent and spunoff firms are essentially new firms. Both parent and spunoff firms become independent firms for the first time in the ex-dividend year.
3. Finally, one of the objectives of research is to find characteristics in a sample that can be applied to the whole population in general. One way to achieve it is by obtaining a sample as large as possible. Conducting spinoff is not a routine activity for firms. Furthermore, many spinoff firms do not survive as independent firms long enough to

allow measuring the benefits from the spinoffs. This study has a limited sample. It is possible that the findings in the study only apply to these sample firms not to the entire population.

Suggestions for Further Research

Future research may compare the market reaction to the issuance of new securities by a parent firm before and after a spinoff. Capital misallocation is a waste of corporate resources. If the spinoff is used as a means to reduce the misallocation of capital, then the market reaction to the issuance of new securities will be at least less negative than before the spinoff. Future research may find this topic promising.

Growth opportunities of firms are unobservable; they can only be proxied. The most popular proxy for growth opportunities in the literature is Tobin's Q. This proxy, however, is not used only for estimating growth opportunities of firms. Researchers also use Tobin's Q to measure managerial performance, firm value, and free cash flow. In this study, a new proxy for growth opportunities is introduced. This is the risk adjusted cash flow measure of growth opportunities.

It would be interesting to test the power of the risk adjusted cash flow in differentiating the growth opportunities among firms. These firms should be divided in two groups. The first group should consist of firms from high growth industries such as, pharmaceutical and computer industries. The second group should consist of firms from low growth industries, such as food and oil industries. If the risk adjusted cash flow is a powerful proxy, it should be able to reveal that, on average, firms from pharmaceutical and computer industries have higher growth opportunities than firms from food and oil

industries. Finally, future research that uses another proxy for growth opportunities may also use this proxy to check the robustness of the findings.

APPENDIX

Results From Testing Hypothesis 5 through Hypothesis 7 Using Larger Sample

Table 10. Results from testing Hypothesis 5: Changes in capital expenditure of relatively high growth spinoff firms between year 0 and year 1 are positive. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	73	-.64	.72	.68	-.14	.56	.61
	Parent	40	-.93	.80	.83	-.17	.58	.91
	Spunoff	33	-.3	.56	.37	-.09	.52	.20
Q	Full	73	-.68	.73	.58	-.25	.60	.63
	Parent	42	-.86	.80	.78	-.17	.58	.89
	Spunoff	31	-.44	.58	.29	-.36	.57	.24
UCF	Full	73	-.2	.56	.23	-.16	.56	.66
	Parent	40	.44	.33	.22	.23	.39	.56
	Spunoff	33	-.98	.65	.33	-.64	.63	.54
RACF	Full	73	-1.1	.79	.50	-.12	.55	.65
	Parent	26	-.2	.55	.22	.45	.36	.66
	Spunoff	47	-1.56	.79	.59	-.44	.62	.52

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and has the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and have comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF).

Table 11. Results from testing Hypothesis 5: Changes in capital expenditure of relatively high growth spinoff firms between year 0 and year 2 are positive. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test
MA/BA	Full	73	-.68	.71	.60	-.52	.69	.30
	Parent	40	.28	.36	.51	-.04	.53	.53
	Spunoff	33	-1.8	.77	.65	-1.1	.69	.27
Q	Full	73	-.36	.62	.49	-.36	.64	.35
	Parent	42	.31	.34	.45	-.08	.56	.59
	Spunoff	31	-1.26	.69	.53	-.74	.63	.27
UCF	Full	73	-1.04	.79	.85	-.32	.60	.78
	Parent	40	-.20	.65	.71	-.34	.75	.64
	Spunoff	33	-20	.77	.78	-.3	.54	.72
RACF	Full	73	-.89	.745	.77	-.26	.58	.57
	Parent	26	.96	.14	.31	-.18	.62	.38
	Spunoff	47	-1.91	.83	.86	-.31	.56	.60

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 2. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and has the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and have comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF).

Table 12. Results from testing Hypothesis 5: Changes in capital expenditure of relatively high growth spinoff firms between year 0 and year 3 are positive. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test
MA/BA	Full	73	-.93	.75	.73	-.1	.54	.13
	Parent	40	.08	.45	.63	.8	.10	.13
	Spunoff	33	-2.16	.76	.71	-1.2	.71	.35
Q	Full	73	-.39	.61	.51	.09	.46	.13
	Parent	42	.46	.23	.35	.92	.07	.12
	Spunoff	31	-1.5	.69	.63	-1.03	.67	.37
UCF	Full	73	-2.26	.94	.98	-1.49	.93	.98
	Parent	40	-1.35	.84	.79	-.23	.67	.63
	Spunoff	33	-3.37	.87	.97	-3.02	.92	.98
RACF	Full	73	-1.13	.79	.86	-1.08	.86	.86
	Parent	26	.28	.35	.48	.01	.49	.51
	Spunoff	47	-1.9	.82	.89	-1.68	.86	.89

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively high growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 3. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and has the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and have comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF).

Table 13. Results from testing Hypothesis 6: The changes in capital expenditure of relatively low growth spinoff firms between year 0 and year 1 are negative. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
MA/BA	Full	73	-.82	.19	.53	-.12	.41	.34
	Parent	33	.22	.62	.73	.32	.71	.77
	Spunoff	40	-1.68	.15	.37	-.49	.28	.15
Q	Full	73	-.81	.20	.37	-.05	.46	.34
	Parent	31	.12	.56	.55	.25	.65	.66
	Spunoff	42	-1.5	.17	.30	-.27	.37	.20
UCF	Full	73	-1.34	.03	.11	-.07	.45	.43
	Parent	33	-1.75	.02	.05	-.18	.38	.35
	Spunoff	40	-1.00	.20	.39	.03	.51	.52
RACF	Full	73	-.4	.24	.30	-.20	.34	.32
	Parent	47	-.52	.18	.21	-.17	.36	.43
	Spunoff	26	-.18	.44	.61	-.25	.40	.31

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively low growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 1. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and has the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and have comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF).

Table 14. Results from testing Hypothesis 6: The changes in capital expenditure of relatively low growth spinoff firms between year 0 and year 2 are negative. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test
MA/BA	Full	73	-1.4	.06	.03	-.32	.36	.10
	Parent	33	-1.18	.07	.11	-.8	.12	.27
	Spunoff	40	-1.61	.15	.08	.1	.53	.16
Q	Full	73	-1.7	.03	.01	-.57	.27	.08
	Parent	31	-1.4	.04	.03	-.95	.10	.20
	Spunoff	42	-2.04	.09	.06	-.23	.44	.16
UCF	Full	73	-1.14	.08	.13	-.48	.24	.56
	Parent	33	-.9	.20	.16	-.42	.30	.39
	Spunoff	40	-1.33	.13	.31	-.53	.31	.72
RACF	Full	73	-1.21	.04	.06	-.63	.15	.30
	Parent	47	-1.13	.06	.07	-.52	.20	.26
	Spunoff	26	-1.34	.17	.33	-.85	.26	.48

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively low growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 2. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and has the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and have comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF).

Table 15. Results from testing Hypothesis 6: The changes in capital expenditure of relatively low growth spinoff firms between year 0 and year 3 are negative. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Sample	N	The closest-adjusted capital expenditure			The mean-adjusted capital expenditure		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcox-on Signed Ranks test
MA/BA	Full	73	-1.67	.03	.03	-1.03	.03	.05
	Parent	33	-1.83	.14	.21	-.82	.12	.13
	Spunoff	40	-1.55	.06	.06	-1.20	.08	.09
Q	Full	73	-2.33	.008	.004	-1.25	.02	.03
	Parent	31	-2.73	.06	.02	-1.14	.05	.07
	Spunoff	42	-2.04	.03	.04	-1.33	.08	.11
UCF	Full	73	-.39	.31	.33	.32	.69	.89
	Parent	33	-.4	.31	.23	.38	.68	.60
	Spunoff	40	-.37	.39	.48	.26	.60	.91
RACF	Full	73	-1.43	.07	.11	-.12	.42	.66
	Parent	47	-1.38	.13	.14	.11	.57	.55
	Spunoff	26	-1.53	.18	.25	-.54	.35	.69

The capital expenditure is represented by the ratio of capital expenditures to total assets. The capital expenditure of control firms is subtracted from the capital expenditure of relatively high growth firms to find the adjusted capital expenditure. The change in the capital expenditure of the relatively low growth firm is calculated by comparing its adjusted capital expenditure in year 0 with year 3. The closest-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the capital expenditure of a firm in the same industry and has the closest total assets. The mean-adjusted capital expenditure is the capital expenditure of the spinoff firms adjusted by the mean capital expenditures of firms in the same industry and have comparable total assets. The growth opportunities are estimated using market/book ratio (MA/BA), Tobin's Q, the unadjusted cash flow measure of growth opportunities (UCF), or the risk-adjusted cash flow measure of growth opportunities (RACF).

Table 19. Results from testing Hypothesis 7.1: Changes in operating performance of all spinoff firms following the spinoffs are positive. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Period	N	The closest adjusted operating performance.			The mean adjusted operating performance.		
		Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
Year 0 to year 1	146	2.38	.08	.15	1.77	.15	.05
Year 0 to year 2	146	3.04	.04	.05	2.09	.09	.08
Year 0 to year 3	146	.83	.32	.37	.32	.41	.24

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in one period with the other period. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and has the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and have comparable total assets.

Table 20. Results from testing Hypothesis 7.1: Changes in operating performance of the parent firms and the spunoff firms following the spinoffs are positive. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Period	N	Firm	The closest adjusted operating performance.			The mean adjusted operating performance.		
			Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test	Mean changes (%)	P-value for Paired T-test	P-value for Wilcoxon Signed Ranks test
Year 0 to year 1	73	Parent	-1.18	.80	.26	-1.41	.86	.29
	73	Spunoff	5.93	.02	.15	4.94	.05	.04
Year 0 to year 2	73	Parent	1.48	.04	.07	.89	.13	.17
	73	Spunoff	4.59	.09	.16	3.29	.14	.14
Year 0 to year 3	73	Parent	.97	.19	.35	.47.	.30	.57
	73	Spunoff	.7	.42	.44	.18	.47	.18

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in one period with the other period. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and has the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and have comparable total assets.

Table 21. Results from testing Hypothesis 7.2: The changes in operating performance of spinoff firms from high-difference sub-sample between year 0 and year 1 are higher than the changes in operating performance of spinoff firms from low-difference sub-sample. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Firm	N	Sub-sample	The closest adjusted operating performance.			The mean adjusted operating performance.		
				Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test	Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test
MA/BA	All	74	High.	4.25	.13	.23	4.8	.03	.04
		72	Low	.45			-1.33		
	Parent	37	High.	-2.15	.75	.71	-1.24	.44	.14
		36	Low	-.19			-1.58		
	Spun-off	37	High.	10.65	.05	.10	10.81	.02	.06
		36	Low	1.09			-1.08		
Q	All	74	High.	4.7	.08	.12	4.1	.08	.08
		72	Low	0			-.6		
	Parent	37	High.	-1.48	.58	.24	-1.31	.47	.18
		36	Low	-.88			-1.51		
	Spun-off	37	High.	10.83	.04	.18	9.42	.06	.13
		36	Low	.9			.35		
UCF	All	74	High.	1.51	.70	.59	.91	.69	.33
		72	Low	3.26			2.64		
	Parent	37	High.	-2.5	.83	.35	-3.0	.88	.41
		36	Low	.19			.18		
	Spun-off	37	High.	5.5	.55	.71	4.8	.52	.21
		36	Low	6.3			5.1		
RACF	All	74	High.	2.2	.53	.70	1.7	.52	.47
		72	Low	2.51			1.8		
	Parent	37	High.	-2.9	.88	.71	-3.0	.89	.13
		36	Low	.56			.26		
	Spun-off	37	High.	7.4	.31	.46	3.4	.31	.27
		36	Low	4.5			6.4		

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in year 0 with year 1. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and has the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and have comparable total assets.

Table 22. Results from testing Hypothesis 7.2: The changes in operating performance of spinoff firms from high-difference sub-sample between year 0 and year 2 are higher than the changes in operating performance of spinoff firms from low-difference sub-sample. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Firm	N	Sub-sample	The closest adjusted operating performance.			The mean adjusted operating performance.		
				Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test	Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test
MA/BA	All	74	High.	4.16	.26	.25	4.5	.06	.15
		72	Low	1.88			-.4		
	Parent	37	High.	1.28	.59	.71	1.41	.24	.48
		36	Low	1.69			.35		
	Spun-off	37	High.	7.05	.23	.15	7.57	.07	.10
		36	Low	2.07			-.1.11		
Q	All	74	High.	5.0	.12	.18	4.3	.08	.14
		72	Low	1.0			-.2		
	Parent	37	High.	1.14	.65	.39	.95	.47	.32
		36	Low	1.83			.82		
	Spun-off	37	High.	1.14	.66	.47	.95	.47	.32
		36	Low	1.83			.82		
UCF	All	74	High.	4.01	.29	.27	3.0	.29	.18
		72	Low	2.05			1.2		
	Parent	37	High.	1.15	.65	.61	1.13	.37	.48
		36	Low	1.82			.63		
	Spun-off	37	High.	6.9	.25	.15	4.8	.31	.12
		36	Low	2.3			1.8		
RACF	All	74	High.	4.82	.15	.16	3.6	.16	.08
		72	Low	1.2			.5		
	Parent	37	High.	1.92	.30	.43	1.51	.20	.28
		36	Low	1.03			.24		
	Spun-off	37	High.	7.7	.17	.16	5.8	.20	.08
		36	Low	1.4			.7		

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in year 0 with year 2. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and has the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and have comparable total assets.

Table 23. Results from testing Hypothesis 7.2: The changes in operating performance of spinoff firms from high-difference sub-sample between year 0 and year 3 are higher than the changes in operating performance of spinoff firms from low-difference sub-sample. Data from *The Research Insight* and the *SEC* file were combined to get larger sample.

Growth Measure	Firm	N	Sub-sample	The closest adjusted operating performance.			The mean adjusted operating performance.		
				Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test	Mean changes (%)	P-value for T-test	P-value for Mann Whit-ney U test
MA/BA	All	74	High.	2.94	.12	.41	2.1	.11	.19
		72	Low	-1.33			-1.5		
	Parent	37	High.	1.71	.25	.67	1.13	.23	.28
		36	Low	.2			-.21		
	Spun-off	37	High.	4.16	.15	.27	3.1	.14	.15
		36	Low	-2.86			-2.79		
Q	All	74	High.	4	.04	.25	2.5	.06	.14
		72	Low	-2.45			-1.9		
	Parent	37	High.	1.25	.40	.63	.69	.40	.12
		36	Low	.68			.24		
	Spun-off	37	High.	1.25	.40	.59	1.25	.40	.12
		36	Low	.68			.68		
UCF	All	74	High.	2.4	.19	.21	1.4	.23	.25
		72	Low	-.8			-.8		
	Parent	37	High.	1.3	.38	.50	.21	.61	.80
		36	Low	.63			.73		
	Spun-off	37	High.	3.6	.20	.15	2.6	.19	.24
		36	Low	-2.2			-2.3		
RACF	All	74	High.	2.3	.21	.38	1.67	.17	.26
		72	Low	0.7			-1.1		
	Parent	37	High.	1.9	.19	.61	.81	.35	.34
		36	Low	0.00			.11		
	Spun-off	37	High.	2.7	.29	.28	2.5	.19	.13
		36	Low	-1.3			-2.2		

The operating performance is represented by the return on assets. The adjusted operating performance is found by subtracting the operating performance of control firms from the operating performance of each spinoff firm. The change in the operating performance of the spinoff firm is calculated by comparing its adjusted operating performance in year 0 with year 3. The closest-adjusted operating performance is the operating performance of the spinoff firms adjusted by the operating performance of a firm in the same industry and has the closest total assets. The mean-adjusted operating performance is the operating performance of the spinoff firms adjusted by the mean operating performance of firms in the same industry and have comparable total assets.

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