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Corporate Restructuring: An Analysis of Spin-offs, Sell-offs and Equity Carve-outs

by

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Abstract

This thesis consists of three essays addressing various issues in corporate restructuring.

The first paper analyzes the pre and post-restructuring operating performance and returns of 115 carve-out firms and their parents. I find that operating performance of carve-outs peaks in the year of issuance at which point carve-outs are significantly outperforming comparable firms. Subsequent declines in performance are significant even after controlling for normal regression toward the mean. Over the ensuing 5 years, carve-outs underperform the CRSP equal weighted index and portfolios of firms matched on the basis of size and market to book. Bootstrapping techniques are utilized to deal with mispecification of common significance tests. Aside from high leverage, parents have unremarkable operating characteristics. Parent returns are comparable to the market for the five years prior to, and the five years after, the carve-out. Evidence is consistent with market timing motives typical of seasoned equity offerings playing an important part in equity carve-out decisions and of potential increases in efficiency playing a less important role than previously believed.

The second paper expands on the first and analyzes three alternative methods (spin-offs, sell-offs or carve-outs) for parent corporations to reduce or eliminate their presence in a particular industry. Previous research documents that announcements of these restructuring transactions result in positive cumulative abnormal returns of similar magnitude. These announcement effects are consistent with the belief that all three transactions generate increases in efficiency, as structural inefficiencies endemic to diversified firms are eliminated. Is it true however, that the three transaction alternatives share similar motivations? In this study, I analyze a sample of 161 spin-offs, 81 sell-offs and 167 carve-outs occurring between 1981 and 1996 in an effort quantify the determinants of the restructuring choice. Motives are broadly classified as either structural (marked by a desire to eliminate structural inefficiencies) or financial (marked by a desire to raise capital).

Univariate comparisons and multinomial logistic regressions indicate that spin-offs are driven primarily by structural motivations while carve-outs are driven primarily by financial motivations. Sell-offs occupy a middle ground between the other two transactions.

The third paper is co-authored with David Scharfstein. In this study we investigate the workings of internal capital markets by analyzing a sample of 161 spin-offs. This sample allows us to examine the capital allocation process when a division is part of a multi-divisional firm, and to see how the process changes once it is spun off as an independent entity. We find that conglomerate divisions in bad (good) industries tend to invest more (less) relative to their stand-alone industry peers if the other divisions in the conglomerate are in good (bad) industries. This pattern does not exist once the division is spun off. This evidence is consistent with Scharfstein and Stein's (1998) theory of socialism in capital allocation whereby bad divisions are subsidized by good divisions and vice versa. Consistent with additional predictions of this theory, we find that socialism is more pronounced in conglomerates with unrelated lines of business and small outside shareholdings.

Thesis Supervisor: David Scharfstein
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0.1 Acknowledgments

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0.2 Dedication

This thesis is dedicated to the memory of my mother-in-law, Carol C. Tatkon, who passed away October 11, 1997. Her quick wit, intelligence, love of life and unequivocal faith in my abilities were an inspiration.

Chapter 1

Introduction

This thesis consists of three related essays addressing various issues in corporate restructuring. Restructuring has recently become a hot academic topic. Changes in corporate goverance, regulation, financial markets and financial institutions have generated a surge in activity as various entities seek to unwind the conglomerates formed in earlier years. Naturally, academic research has followed in the footsteps of the marketplace, analyzing the data of a massive natural experiment.

Prior academic studies have proposed a variety of theories on the nature of the firm and have documented numerous facts about how diversified as well as focused firms operate. The papers presented in this thesis add to those empirical facts. Chapter 1 is an analysis of equity carve-outs. In an equity carve-out, a parent firm legally incorporates a subsidiary then sells a portion of the newly created common shares in an initial public offering. Typically, the parent maintains significant ownership in the carved out entity. The net result is a legally independent new firm that still maintains close ties to the parent. Parents typically experience a positive jump in their stock price when they announce a carve-out. This is generally interpreted as evidence that carve-outs create value, whether by improving incentives for the carve-out managers, improving access to

capital markets or by putting enough distance between parent and carve-out to eliminate inefficiencies inherent in conglomerates.

The intent of the study presented in chapter 1 is to track down sources of this increase in value. Recent studies find evidence of improvements in profitability after spin-offs occur; evidence which might explain the positive announcement effect also experienced by the spin-off parent. Rather than finding increases in profitability following carve-outs, however, I document distinctly different results. Operating performance for carve-out divisions peaks in the year of the carve-out at levels that are significantly above industry levels. Carve-outs experience significant declines in performance back to industry medians over the ensuing years. In addition, there is no evidence of improvements in parent profitability following the carve-out.

Long term returns for the carve-outs are poor. Carve-out equity underperforms generic stock indices and firms matched on the basis of market to book ratios and size. Regression results indicate that these negative long term excess returns are correlated with the percentage of shares sold, relative dollar value of shares sold and leverage of the parent. Carve-outs also generally occur during bull market periods and in industries with positive excess returns. These results, coupled with a variety of related facts indicate an opportunity to time the market and issue an overvalued security may be an important factor in driving decisions to pursue equity carve-outs. Obviously, this result is at odds with the positive announcement effects.

Chapter 2 builds on the results of chapter 1. This section looks jointly at spin-offs, sell-offs and equity carve-outs in an effort to quantify the factors that induce parent firms to choose one restructuring option over another. Spin-offs are similar to carve-outs except that shares in the newly incorporated division are not sold in an initial public offering, but are given to current parent shareholders in a pro-rata distribution. It is important to note that no cash changes hands. In a sell-off, a division is sold directly to another

corporation. The general evidence that I report supports the conclusion of market timing found in chapter 1.

A variety of univariate and logistic regression results indicate that spin-offs are likely to occur when a profitable parent has a poorly performing division in an industry without positive excess returns and without evidence of significant growth opportunities. Furthermore, spin-off are more likely in parents that have moderately low leverage and when the spin-off is in an industry that is unrelated to the core industries of the parent. Sell-offs are more likely to occur with parents that are less profitable and have greater leverage than the median firm in their industry. Like spin-offs, sell-offs generally occur in industries without positive excess returns. Consistent with evidence from chapter 1, carve-outs are more likely to occur when parents have low overall profitability, are highly levered and have a division in an industry related to the core parent industry. They are also more likely to occur during bull market periods and in industries with positive excess returns. These results reinforce the belief that carve-outs occur when an opportunity to sell an overvalued security presents itself. Spin-offs occur when the division in question has become a drag on parent operations. Rather than wait for a good price for the division, parents sever ties via the spin-off and move on.

Chapter 3 takes a different approach from the previous chapters and looks at one of the potential sources of inefficiency in diversified conglomerates. Numerous theories abound as to why many conglomerates seem to be valued at less than the sum of their parts. One theory that has gained recent support is that, due to internal agency conflicts, conglomerates are ineffectual when it comes to allocating capital to its most productive use. In other words, internal capital markets may be less efficient than external market based capital markets. In joint work with David Scharfstein, we assess this theory by analyzing the capital expenditures of a sample of spin-offs, both while they are part of the parent firm and when they are an independent entity. We find evidence that while

part of the parent firm, the spin-off's industry adjusted capital expenditures are sensitive to proxies for the *difference* in investment opportunities between the spin-off and the rest of the parent. Specifically, spin-offs that operate in industries that have high Tobin's Q relative to the other industries of the parent underinvest. Conversely, spin-offs that operate in industries that have low Tobin's Q relative to the other industries of the parent overinvest. These relationships disappear once the spin-off becomes independent.

These results are interpreted as evidence of corporate socialism in capital allocation. Strong divisions inefficiently subsidize weak divisions. The unique contribution of this chapter stems from the data that we use. Spin-offs are able to act as their own control sample between the pre and post-spin-off periods. This nullifies a common criticism of prior research that divisions inside conglomerates are fundamentally different from the typical stand-alone firm used as a comparison. Instead of merely documenting the existence of a conglomerate discount, this chapter provides solid evidence of a potential *source* of the conglomerate discount. Unwinding this inefficiency may, therefore, be a fundamental reason for pursuing a focus increasing restructuring.

Chapter 2

Market Timing and Equity Carve-outs

2.1 Introduction

Prior research documents positive cumulative abnormal returns when restructuring transactions such as spin-offs or asset sell-offs are announced. These results have led to a common belief that restructuring transactions universally generate increases in efficiency. In contrast, announcements of financing transactions such as seasoned equity offerings are associated with negative announcement period excess returns. In addition, firms conducting seasoned equity offerings or initial public offerings display negative long term excess returns when compared to a variety of benchmarks. These results support the belief that financing transactions occur when management is pessimistic about future prospects. Equity carve-outs are unique in that they combine characteristics of both restructuring and financing transactions.[1] If efficiency motives drive pure restructuring transactions and

[1]Spin-offs occur when a parent corporation legally incorporates a subsidiary, creates shares in the subsidiary via a registration with the Securities and Exchange Commision then distributes the shares via a pro-rata distribution to current shareholders of the parent. A sell-off is the direct sale of assets from one corporation to another corporation. A carve-out is similar to a spin-off except that the new shares

market timing motives drive pure financing transactions, then what motives drive equity carve-outs? Finance practitioners generally interpret the positive cumulative abnormal return associated with carve-out announcements as evidence that carve-out decisions are driven by efficiency motives. This paper presents evidence that market timing motives are a significant influence on decisions to undertake equity carve-outs.

I analyze the operating and market performance of a sample of 115 carve-outs which occurred between 1981 and 1993. Carve-out operating performance peaks in the year of the carve-out where levels are significantly higher than levels seen in comparable firms. Over the subsequent five years, operating performance declines back to industry norms. As an example, return on assets (ROA), measured as operating income normalized by total assets, increases from a median of 12.90% two years prior to the carve-out to 17.14% in the year of the carve-out. Over the next two years median ROA declines back to 12.98%. Declines in performance are significant even after controlling for normal regression to the mean by matching carve-out firms to firms with similar operating performance. Sales and earnings growth show similar peaked patterns.

At issue, carve-outs have significantly higher market to book ratios than firms in the same industry indicating that continued strong performance is expected. Over the next five years, however, carve-outs underperform the CRSP equal weighted index by 28.8% and portfolios matched on the basis of size and market to book ratios by 33.1%. Underperformance is significant at the 1% and 10% levels respectively when compared to boot-strapping distributions.

Aside from high leverage, parents fail to exhibit similarly distinctive characteristics. Their operating performance and growth rates are consistent and do not differ appreciably

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are sold via an initial public offering to an entirely new set of shareholders. Parents generally only sell a portion of the new shares. The rest are retained by the parent as a majority shareholder. See appendix 2 for information on details which depend on the percentage sold by the parent. Confusion sometimes occurs because many people refer to carve-outs as "a partial spin-off via an initial public offering".

from industry levels. In contrast to firms conducting seasoned equity offerings, parent long term equity returns do not differ appreciably from returns on the CRSP equal weighted index. Analysis of segment data shows that the median Tobin's Q, sales growth and asset growth for the carve-out's industry are greater than corresponding values for industries of the other segments of the parents.

The picture that emerges is one of a parent firm potentially in need of funds due to its high leverage. Rather than conduct a seasoned offering, these parents opt for the carve-out of a particularly noteworthy division. Evidence that carve-out excess returns are negatively correlated with the percentage of ownership sold and the relative amount of funds raised indicate that parents know when the offering price is good relative to intrinsic value. Results are consistent with parents exploiting a window of opportunity in which they can issue potentially overvalued carve-out equity.

2.2 Carve-outs in the Context of Other Events

A wealth of event studies in the 1980s analyze announcement effects for a variety of transactions. Miles and Rosenfeld (1983) are among the first to investigate the informational impact of what I will term restructuring events. They find that parents register significant cumulative abnormal returns (CAR's) of 3.34% during the two days surrounding a spin-off announcement. Similar results are found by Schipper and Smith (1983) and Hite and Owers (1983). Alexander, Benson and Kampmeyer (1984) find CAR's of 2.1% for parents divesting assets via direct sale to other firms. Later studies by Jain (1985) and Hite, Owers and Rogers (1987) document comparable results. Schipper and Smith (1986) find that parents conducting carve-outs have a CAR of 1.8% over the five days surrounding announcement. Similar carve-out announcement effects are found in the course of other studies such as Klein, Rosenfeld and Beranek (1991), Lang, Poulsen

and Stulz (1995) and Michaely and Shaw (1995).

Later studies of carve-outs have discovered additional details about announcement effects. Byers, Lee and Opler (1996) find that parent announcement period returns are greater if: the parent retains a significant stake, there was a change in parent management in the prior year, there has not been a significant run up in the price of the parent in the prior year and the proceeds from the carve-out are to be paid out as opposed to being kept inside the firm. Byers et.al. believe the first three characteristics distinguish parents who have shifted management policies and are trying to light a fire under the executives of the carve-out division. The payout characteristic is believed to identify carve-outs driven by a desire to exploit potential gains in efficiency. Managers of parents that pay out proceeds are less likely to be motivated by the private benefits associated with investable cash. Allen and McConnell find similar announcement period results where the decision to disperse funds and the size of the carve-out relative to the parent are significant positive determinants in the announcement period returns. Rather than look at parent CAR's, Slovin, Shuska and Ferraro (1995) find that firms which are in the same industry as the carve-out show announcement period CAR's of -1.11%.[2]

In contrast to restructuring events, seasoned equity offerings (SEO's) show roughly opposite results. Asquith and Mullins (1986), Masulis and Korwar (1986) and Mikkelson and Partch (1986) find that SEO announcements generate CARs of approximately -3.0% during the surrounding days. Schipper and Smith (1986) also look at subsequent SEO's by parent firms which previously conducted carve-outs. Consistent with other studies, they find SEO CAR's of -3.5%.

The positive CAR associated with spin-off, divestiture and carve-out announcements

[2]One of the latest additions to the carve-out announcement effect literature questions the very basis of previous results. Hand and Skantz (1997b) find that announcement date increases in parent company stock price are accompanied by a decrease of similar magnitude at the carve-out issue date.

is often informally presented as evidence of increased efficiency resulting from the restructuring. Extensive work documents that conglomerate firms are inefficient. For example, Lang and Stulz (1994) find that Tobin's Q for multi-segment firms is .43 less than the sales weighted average of segment median industry Q, indicating that a conglomerate's value is less than the sum of its parts. Potential sources of inefficiency and reduced value include poorly functioning internal capital markets,[3] an inability to optimize stock based incentive plans for all but the most senior executives,[4] limited coverage by industry specific analysts[5] and reluctance by empire building managers to cut ties from poorly performing divisions.

· Spin-off efficiency stories are supported by two recent empirical studies. Wruck and Wruck (1996) analyze long term operating performance and returns for a sample of spin-offs and their parents. They find that both spin-offs and their parents show improvements in ROA (measured as $\frac{operating\ income}{assets}$) and sales growth over the ensuing four years. Capital expenditures are also found to increase during the same period. Average three year spin-off and parent returns of 72.5% and 76.1% are larger than corresponding market returns by 28.2% and 26.7% respectively.[6] Daley, Mehrotra and Sivakumar (1997) analyze parent and spin-offs as a combined unit. Their focus is on comparing spin-offs in the same industry as the parent versus spin-offs in unrelated industries. For unrelated spin-offs

[3]Shin and Stulz (1995) find that investment of small divisions in conglomerates is dependent on the free cash flow of their larger brethren. When the firm's cash flow is high, these small divisions invest more than their stand alone counterparts. When the firm's cash flow is low, the opposite relationship is observed. Lamont (1996) finds that investment in the non-oil divisions of energy company conglomerates was strongly affected by energy shocks in the 70's and 80's while investment by comparable stand alone firms was relatively unaffected.

[4]Thermoelectron, a company that has over a dozen carve-out children or grandchildren reports incentive motives as one of the prime reasons for doing carve-outs.

[5]Bhushan (1989) finds evidence that analyst coverage is negatively related to the degree of firm diversification. Gilson, Healy, Noe and Palepu (1997) analyze a sample of spin-offs, carve-outs and targeted stock deals where inadequate analyst coverage is cited as a reason for the restructuring. They document significant turnover and increase in analyst coverage. Moreover, these changes are correlated with subsequent improvements in earnings forecasts.

[6]Similar long term returns are found by Cusatis, Miles and Woolridge (1993).

they find increases in ROA of 3.0% between the year before and the year after the spin-off.[7]

Spin-offs produce two totally separate companies and should therefore eliminate the conglomerate discount vis-à-vis the spun-off division. In comparison, carve-outs result in a partial separation which may eliminate some of the bad characteristics of conglomerates while retaining potential coordination benefits. Fund transfers into and out of the carve-out division are no longer as easy to implement.[8] If these transfers previously reflected inefficient capital investment decisions then a fiduciary responsibility to minority investors should reduce this inefficiency. Carve-outs also provide an equity security reflecting the performance of a specific division rather than of an entire conglomerate. This new security can now be used in the incentive contracts of carve-out managers in place of less informative accounting measures or parent company equity. Finally, the new publicly traded security is accompanied by audited financial information and market returns that are useful to prospective and current debt holders for evaluating the financial health of the carve-out firm.

An alternative explanation for the positive CAR seen in equity carve-outs is provided by Nanda (1991). He generalizes the model of Myers and Majluf (1984) to describe a firm that can fund a positive NPV investment project via an SEO or an equity carve-out. As in Myers and Majluf there is asymmetric information, this time concerning the value of assets in place of both the parent and the potential carve-out division. Firms that resort

[7]In contrast to the Wruck and Wruck and Daley et.al. results, Michaely and Shaw (1995) find very poor operating performance and long term returns for a sample of carve-outs and spin-offs of Master Limited Partnerships (MLP's). They find ROA declines of 5.09% for carve-outs and 7.56% for spin-offs in the 2 years after the event. Parents show similar declines in performance. Master Limited Partnerships are a specialized organization form with significant differences from normally incorporated firms with respect to tax treatment, type of firms which can become an MLP and ownership/control structure. Because of these differences, much of Michaely and Shaw's sample comes from the oil and gas industry. The differences in sample population make it difficult to generalize their results to other studies.

[8]Legally, money can flow from the carve-out to the parent only via dividends or debt repayments. All economic transactions between the two entities are supposed to be accomplished "at arms length".

to carve-out equity will generally be those with high value parent assets and low value carve-out assets. A characteristic of five of the six possible Perfect Bayesian Equilibria in Nanda's model is that a decision to issue carve-out equity results in an increase in price for the parent company, despite the release of negative information about carve-out assets.

The negative CAR associated with SEO's is usually rationalized as evidence of the Myers and Majluf model. Firms with low value assets in place are more willing to raise financing via an SEO than are firms with high value assets in place. Announcement of an SEO therefore results in a release of negative information. Evidence on post-issue operating performance of SEO's is consistent with this story. Loughran and Ritter (1995a) find that median ROA for SEO firms declines from 15.8% in the year of the issue to 12.0% four years later. Teoh, Welch and Wong (1997) document similar declines and trace the source to aggressive accrual accounting prior to the SEO in an apparent attempt to artificially improve earnings. In addition to negative CAR's, researchers have observed that SEO's have poor long term returns. Spiess and Affleck-Graves (1995) find that five year SEO returns are 32% less than returns of firms of similar size from the same industry. An opportunity to sell shares at more than their intrinsic value provides additional incentives for low value firms to pursue an SEO.

Carve-outs share characteristics with both restructuring and financing transactions. Like spin-offs, carve-outs reduce the influence of the parent corporation over the carved-out division. In addition a new security is created. Arguments can be made that carve-outs should share all of the hypothesized spin-off efficiency gains. Like SEO's and IPO's, however, carve-outs entail the sale of ownership for cash. This introduces potential market timing complications into the efficiency story. The remaining sections of the paper provide an in-depth investigation of carve-outs, their parents and their industries in an attempt to assess the relative importance of the competing motivations.

2.3 The Data

Carve-outs are identified via the Securities Data Company (SDC) New Issues database for 1980-1990 and via the annual summary of deals in *Mergers and Acquisitions* for 1991-1993. The years 1994-1996 are not included since my analysis requires several years of post-carve-out operating and market data for each firm. The sample is restricted to carve-outs which generate more than $20 million in proceeds, have Standard Industrial Classification (SIC) codes between 1000 and 5999, are not Limited Partnerships (LP's), and are not American Depository Receipts (ADR's). SDC identifies one hundred-five carve-outs while *Mergers and Acquisitions* identifies twenty-five carve-outs. The SIC code restriction excludes non-industrial firms (0-999 constitutes agricultural firms, 5000-5999: financial firms, 6000-10000: service firms and government agencies). LP's are excluded since tax regulations and control issues for LP's are significantly different from normal firms. ADR's are excluded since international parent firm operating data is more difficult to obtain and to interpret. The size restriction was chosen due to cost constraints as a way to limit the number of firms provided in SDC's list. Throughout this study, the fiscal year during which the carve-out occurs will be referred to as year 0. Prior and post-event fiscal years are referred to as year -1, year 1 etc.[9]

Pre-carve-out operating data comes from the prospectus for each issue. A prospectus generally provides balance sheet data for two years prior to the carve-out, income statement data for four years prior to the carve-out and cash flow statement data for three years prior to the carve-out. Summary data on the carve-out division such as total assets, revenues and net income are generally given for five years prior to the carve-out. Prospectuses also contain data on the actual deal such as offering price, number

[9]Unless otherwise specified, all dollar amounts are quoted in millions except for per-share values which are in units.

of shares sold, total shares sold, over-allotment provisions, and deal expenses. Finally, prospectuses include a brief one paragraph statement on the proposed use of the proceeds. Prospectuses are available for eighty-nine of the one hundred-five carve-outs identified by SDC and for twenty-four of the twenty-five identified by the *Mergers and Acquisitions* articles. Operating data for three additional carve-outs are obtained from prospectuses of debt issues which occurred close to the date of the carve-out. Note that these issues lack data on the actual deal. This provides a sample of one hundred-sixteen carve-outs with pre-carve-out operating data.

COMPUSTAT is used for parent operating data and for carve-out data after the carve-out becomes a public company. CRSP is used for all security return data. CRSP and COMPUSTAT data are available for eighty-four of the parents and all but one of the carve-outs. The missing parent observations are because the parent is not publicly traded (fourteen firms), or because the parent is traded on a foreign exchange not covered by CRSP or COMPUSTAT (seventeen firms). Table 1 lists the number of carve-outs and funds raised per year. Table 2 provides summary information on industry affiliations of parents and carve-outs.

Matching firm samples are selected for each carve-out and parent by searching the COMPUSTAT segment data base for firms that generated at least 75% of their sales in the appropriate four, three or two digit SIC. Once identified, the full-firm annual data for that particular match is gathered for each year in which the match had the requisite 75% concentration. If there are five or more four digit SIC matches available in all of the years needed to match carve-out or parent firm data, then the matching sample is composed of four digit SIC matches. Otherwise, matches are made at the three or two digit SIC level. Sixty-eight of the one hundred-fifteen carve-out firms and forty-one of the eighty-four parent firms are paired with four digit SIC matching groups. Three digit SIC matches are used for forty-four carve-outs and forty parents. The remaining three

observations in both groups are paired with three digit SIC matches.

This procedure of identifying matches via segment sales data is used for two reasons. The first reason is to circumvent the fact that the annual COMPUSTAT record for each firm contains only one SIC. This SIC is the most recent primary SIC of a corporation. Thus, a firm like Chris Craft Inc. might be listed as a television broadcasting firm today, while twenty years ago it was a boat manufacturer. It would be inappropriate to compare a broadcasting firm in 1980 to a boat manufacturer just because the current SIC's match. The second reason is to ensure that the matching samples are composed of pure-play companies. A firm like General Electric lists a primary SIC of 3800, however, that SIC accounts for only 20% of GE's revenue. Matching via segment data alleviates both of these problems.

2.4 Characteristics of the Deal

Parents sell an average (median) of 37.5% (27.3%) of their ownership in the carve-out. The minimum percentage ownership sold is 4.8% while the maximum percentage sold is 100%.[10] Gross proceeds average $122.3 ($79.9) million. As expected, underwriters take a significant share of the funds raised. After deducting fees and expenses, the average deal raises $104.2 ($61.8) million. Fees and expenses on average consume 8.8% of gross proceeds with a maximum of 16.7% and a minimum of 3.8%.

In contrast to IPO's, this sample does not show significant underpricing. The closing price on the first day of carve-out trading is on average only 54 cents more than the offering price. This works out to an average price change of 2.9%. The maximum percentage price increase is 70% and the maximum percentage price decrease is 71%.

[10]Six of the deals in this sample are full divestiture IPO's. While the classic carveout is usually characterized as a deal where the parent maintains more than 50% ownership, there was no a-priori reason to exclude deals where parents sell more than 50% ownership.

The 95^{th} and 5^{th} percentiles are 25% and -23%.[11]

The average carve-out comprises a noticeable portion of the parent. As of the date of the carve-out, the mean (median) values for carve-out total book assets is \$545.1 (\$230.1) million. Initial sales are \$655.1 (\$291.5) million. The largest carve-out in the sample has total assets of \$5.589 billion and sales of \$7.681 billion. Corresponding values for parents are: total book assets \$6.516 (\$2.360) billion, sales \$3.726 (\$2.024) billion. As expected, parents are significantly larger than carve-outs.

Gross proceeds as a percentage of parent market value are 14.4% (4.9%). There are four primary uses of the proceeds: 1) remit to the parent, 2) carve-out expansion either as CAPX, R&D or acquisitions, 3) general corporate purposes of the carve-out, 4) pay down debt of the carve-out. The breakdown is summarized in table 3. Giving the money back to the parent is by far the most common choice. 76.8% of all proceeds raised in this sample are remitted to the parent. 50% of firms report this as the sole use of proceeds. Paying off carve-out debt is the next largest use of funds, accounting for 8.8% of total proceeds. Carve-out expansion and general corporate purposes account for the remaining known uses with 4.8% and 3.3% respectively. Many prospectuses indicate that proceeds will be used to pay down debt that was recently borrowed for the express purpose of paying a dividend to the parent. In these situations the use of funds is altered to indicate that proceeds are going to the parent.

Five of the one hundred-fifteen deals are for dual class stock. In one deal, the class held by the parent has a subordinated dividend claim. In the other four deals, the class being sold to the public has less voting power than the class retained by the parent. One of the four has a 1:3 vote ratio. Two of the four have 1:5 vote ratios. In the final deal, the public shares have no voting rights at all. In two of the one hundred-fifteen deals, the

[11] Ibbottson, Sindelar and Ritter (1988) report average first day returns of 16.4% for a sample of 8,668 IPO's between 1960 and 1987.

prospectus indicate that the parent firm intends to spin off its remaining shares within the next year.

2.5 Operating Performance

2.5.1 Carve-out Operating Characteristics

The most striking characteristic of equity carve-outs is the trend in their profitability as shown in table 4 panel A. Mean ROA peaks in the year prior to the issue at 19.45% while median ROA peaks in the year of the issue at 17.14%.[12] The average difference in ROA relative to the matching sample in year 0 of 9.29% is strongly significant with a t statistic of 7.784. Skewness is a problem for most ratios in this study, however, a sign test and a Wilcoxon signed rank (WSR) test are both significant at the .0001 level. T statistics for the average difference are significant at the 5% level or better for years -3, -1, 0,+1,+2 and +3. The two sign statistics are significant at the 5% level or better for all years between -2 and +4.

Klein, Rosenfeld and Beranek (1991) find that by 1988, forty-four of fifty-two carve-outs implemented between 1966 and 1983 were either reacquired by the parent, or were sold off to another firm. They describe carve-outs as a temporary stopping point enroute to a more permanent capital structure. This sample also show signs of impermanence. It is therefore possible that patterns in operating performance are due to new observations filtering into the sample in the five years prior to the carve-out, and to firms leaving the sample during the five years after the carve-out due to reacquisition or sell off. Analysis

[12] ROA is calculated in three different ways for this study. $ROA_1 = \frac{operating\ income}{total\ assets}$. $ROA_2 = \frac{net\ income + interest + taxes + depreciation}{total\ assets}$. $ROA_3 = \frac{net\ income}{total\ assets}$. Unless otherwise specified, all references to ROA from here on will relate to ROA_1 unless a subscript is explicitly included. Results for all three definitions are provided in the tables in order to provide comparability to other studies. A summary of data definitions is provided in appendix 1.

of year to year changes within each carve-out (table 4 panel B), however, shows that this is not the primary source of results. Within firm differences are calculated by subtracting a firm's ROA in year i from the firm's ROA in year 0. The mean and median differences within firms are of roughly the same level as the corresponding differences across the entire sample. Both t-statistics and sign tests are significant at the 5% level or better for all difference except for the difference between year 0 and year -1.[13]

As noted by Barber and Lyons (1996), there is normally a regression towards the mean in accounting data that can be misconstrued as a significant change.[14] To account for this effect, further analysis of the change in ROA between year 0 and year +2 makes use of control portfolios. ROA is calculated for all firms listed on COMPUSTAT between 1977 and 1996. Outliers are moderated by winsorizing the data at the 1^{st} and 99^{th} percentiles.[15] Changes in ROA over the prior two years and the ensuing two years are then calculated for each firm-year observation. Change in ROA for carve-out firms is then adjusted by subtracting the average(median) change in ROA for the matching sample from the appropriate year. A variety of comparisons based on the various combinations of size, two digit SIC,[16] current ROA and prior ROA trend are presented in table 4 panel

[13]An analysis of CRSP delisting codes shows that, over the five year window of this study, twenty-eight carve-outs are acquired by another firm and four are delisted due to financial difficulties. A cursory analysis (not reported) of change in ROA from year 0 to +2 shows that the decline for acquired firms is roughly 65% of the decline for non-acquired firms. At this time, the identity of the acquiring firms has not been determined.

[14]They conclude that many previous analyses of operating performance are based on misspecified tests when the sample under consideration has prior performance that is either extremely good or extremely bad. In random draws of securities with good or bad prior performance, they reject the null hypothesis of no subsequent significant changes in performance too often. In essence, what is often construed as subsequent significant changes in performance is really nothing more than a normal regression to the mean. In order to control for this effect, they recommend comparing post-event changes in operating performance to changes seen in portfolios of firms that are matched based on three criteria: size, two digit SIC and current ROA.

[15]If an observations has an ROA less than the 1st percentile value or greater than the 99th percentile value then the applicable percentile value is substituted in its place. This is done with all firm years combined into one large group.

[16]It is difficult to find sufficient matching firms at the three digit SIC level while also requiring similar size or operating performance, thus, two digit SIC matching is used.

C. When size (book value of assets) is included as a matching requirement, control firms must be within ± 50% of the carve-out firm size. When ROA or ROA trend is included as a matching requirement, control firms must be within ± 20% of the corresponding carve-out value.

Normal regression to the mean is found to explain some of the decline in ROA seen in table 4 panels A and B, but not all of it. As an example, when matches are made on the basis of size and ROA, adjusted change in ROA (ΔROA) remains significant. Mean (median) ΔROA is 5.8% (1.89%) for ROA_1 , 5.0% (1.75%) for ROA_2 and 6.0% (1.84%) for ROA_3. Corresponding t-statistics are 3.122, 2.451 and 3.114: all significant at better than the 5% level. Both non-parametric statistics are significant at the 1% level for all three ROA formulations. The only comparison group with poor results occurs when matches are based on ROA trend and current ROA. Mean (median) ΔROA values for the three ROA measures after this comparison are 3.41% (1.48%), 2.97% (2.30%) and 2.33% (.007%). Only the t-statistic for ΔROA_1 is significant and then only at the 10% level. The non-parametric statistics, however, are generally significant. Weak significance in this comparison can be partly attributed to the difficulty in finding enough matching firms. Over thirty firms are not matched in this comparison. In addition, small numbers of matching firms in each matching sample lead to greater problems with outlying observations. In general, however, the evidence rejects a null hypothesis that carve-out firms do not experience significant declines in operating performance.

Analysis of the source of the superior prior performance shows that carve-out firms have slightly greater asset utilization rates as shown by the $\frac{sales}{total\ assets}$ ratio, and significantly better sales margins. Table 5 summarizes these relationships. The patterns of both ratios mirror the pattern of ROA with results peaking either in year 0 or -1. The difference in margins at year 0 of 4.1% has a significant t-statistic of 4.35 and sign test significance of .0001. Similar significance is evident in years -2, -1, +1 and +2. Asset

utilization is less significant but consistently points in the same direction of superior carve-out performance around year 0.

Previous studies find similar results for related transactions. Jain and Kini (1994) analyze a subset of IPO's that have COMPUSTAT data available for the year prior to the IPO and report decreases in ROA from fiscal year -1.[17] The median decrease is 3.58% in year 0, 7.6% in year +1, 10.53% in year +2 and 9.09% in year +3. With respect to matching firms, they find higher median ROA of 10% in year -1, 5% in year 0, 2% in year +1, and 0% thereafter. Differences in year -1 are statistically significant. Loughran and Ritter (1995a) find that SEO firm ROA decreases from 6.3% to 3.1% over the four years following the SEO. Michaely and Shaw in their analysis of Limited Partnerships find that the carve-outs in their sample experience a decline in ROA from 7.8% to 2.6% between the year prior to the carve-out and the year following the carve-out.[18]

It is possible that the carve-out ROA pattern is a result of accounting or transfer pricing chicanery engineered by the parent firm in order to improve the appearance of the carve-out. Teoh, Welch and Wong (1997, 1997a) find that prior to IPO's and SEO's, firms become increasingly aggressive in their use of discretionary accruals in an apparent effort to pump up earnings.[19] Sample split comparisons and cross sectional regressions show that firms with the most aggressive accounting policies have the worst returns over the ensuing five years. The detail of Teoh et. al.'s analysis is beyond the scope of this study, however, a cursory analysis of Sales General and Administrative expenses (SGA)

[17] Approximately 40% of the carveouts in this study's sample have COMPUSTAT data available for the fiscal year prior to the actual carveout. None of the firms in this sample have COMPUSTAT data available more than one year prior.

[18] Loughran and Ritter and Michaely and Shaw compute ROA in its more typical form of $\frac{income\ before\ extraordinary\ items}{total\ assets}$. Table 4 panel A shows similar results in this study for this particular definition of ROA.

[19] Teoh, Welch and Wong estimate discretionary accruals as the residual from cross sectional regressions which estimate what the normal level of accruals (as a function of sales growth) would be for comparable firms.

(not reported) does not reveal serious manipulation.

If parents are trying to improve the observed profitability of a carve-out division then one simple alternative would be to reduce the overhead expenses charged to the carve-out division. If this were the case then we would expect to see a decline in the ratio of $\frac{SGA}{sales}$ in the years prior to the carve-out, with a corresponding increase in the years after the carve-out. While $\frac{SGA}{sales}$ (not reported) does decline from a median level of .151 in year -3 to .135 in year 0, the difference is not significant. $\frac{SGA}{sales}$ increases in the years following the carve-out. Again however, the differences are not significant. It is puzzling why the ratio continues to increase in the later years. If parents undercharged the carve-out division prior to the carve-out then most of the readjustment should occur in year +1. It is possible that the best run firms are the ones that exit the sample early. It is also possible that the carve-out divisions just do not run as efficiently on their own.

Teoh et. al. (1997a) also find that the peaked pattern seen in SEO ROA (measured as $\frac{net\,income}{assets}$) is driven predominantly by changes in the rate of accrual recognition, not in changes in operational performance. Cash flow from operations normalized by assets actually shows a declining trend prior to the SEO while remaining essentially unchanged after the SEO. Analysis of ROA_1 shows that their accrual result is not seen in this carve-out sample. This difference is surprising since it seems likely that creative accounting across divisions of a firm would be easier to conceal than across an entire firm. A possible explanation is that carve-outs are a spur of the moment decision rather than a long planned for adjustment in capital structure. If this is true then we would not expect to see many prior changes in accounting policies.

2.5.2 Carve-out Growth and Investment Policy

Consistent with higher profitability, carve-outs expend more on capital expenditures (CAPX) as a percentage of total assets than do matching firms. The mean (median) capital expenditures normalized by assets ratio (CAPXA) for carve-outs in year 0 are 9.1% (7.7%) as compared to 6.8% (5.9%) for matching samples. The difference has a t-statistic of 3.30. Similar significant differences occur in years -2, -1, +1 and +2. By year +3 the two sign statistics are weak enough to begin questioning the value of the marginally significant t-statistics. The same patterns occur when CAPX is normalized by sales or net property plant and equipment, however, the significance tests are not quite as strong.

Sales grow significantly in the period prior to the carve-out. Sales growth peaks two years before the carve-out at 190.7% (18.1%) and gradually declines thereafter. In the year after the carve-out, sales growth drops to 14.8% (0.7%). Differences in sales growth rates are significant. In table 6 panel A, the difference in growth rates between years -2..-1 and +1..+2 of 28.2% has a t-statistic of 2.242 and sign test statistics that are significant at the .01 level. Results are comparable across other pre-event and post-event years. The pattern of growth in EBITD mirrors that of sales growth. T-tests for significant differences in EBITD growth across pre-event and post-event years are not significant at conventional levels, however, sign tests are significant at the .01 level or better. In opposition to sales growth, CAPXA remains at its year 0 level of approximately 7.5% for the next two years. It is not until year +3 that CAPXA begins to decline to the level of comparison firms.

There is no clean way to say whether the difference in capital expenditures from year 0 through year +2 is a sign of efficiency or waste. Given the greater initial profitability of the carve-outs, it is likely that they have better investment opportunities. However,

it is possible that the greater profitably is a temporary product of chance that has been exploited (identified) by a carve-out. If this is true, then the above average capital expenditures during profitability's inevitable regression to the mean are unwarranted. The possibility of excessive investment would be consistent with the "free cash flow" hypothesis articulated in Jensen and Meckling (1986).

2.5.3 Parent Operating Characteristics

Parents do not show the distinctive operating patterns that carve-outs show. Results are shown in table 7. In year 0, ROA for the parent sample is 11.59% (12.66%). Prior and later years display similar values. In no year is the ROA of the parent significantly different from the median ROA of the matching sample. This result is true no matter which formulation of ROA is analyzed. Within firm comparisons of parent firm operating characteristics (not shown) show insignificant improvements prior to the carve-out and insignificant declines after the carve-out. Variations in parent ROA are correlated with movements in match ROA. The maximum difference occurs in year 0 with parent ROA being 1.7% (.34%) greater than the corresponding match. The significance tests show a inconsequential t-statistic of 1.11, sign test p values of .640 and WSR p value of .241.[20] Subtracting carve-out data from parent data to give us information on the remaining businesses of the parent does not change the conclusion that parent are unremarkable.

The most distinguishing characteristic of parents is their significantly higher leverage. Debt as a percentage of total market value for parents in year 0 is 35.0% (35.1%) versus 21.0% (20.4%) for matching samples. The difference in leverage is highly significant with

[20] Caution should be exercised when looking at parent profitability in year 0. Parents have the option of recording the difference between the book value of shares sold and their actual market value as a "gain on sale" on their income statement. Given that the vast majority of carve-outs have high market to book ratios, this means that parent net income in year 0 will be unnaturally high. Hand and Skantz (1997c) find that 81% of the parent firms in their sample of carve-outs book the gain on their income statement.

a t-statistic of 5.93 and WSR p values of .0001. This pattern is evident and statistically significant in all data years. The peak difference occurs in year -1 when market leverage for parents is 38.7% (34.3%) versus 22.1% (20.9%) for matching samples. The difference in year -1 has a t-statistic of 6.73 and WSR p values of .0001. Debt as a percentage of book value shows an identical pattern. A within firm analysis (not reported) shows that book leverage increases significantly between years -2 and -1; increasing from 53.1% (49.2%) to 58.6% (53.9%). The difference produces a t-statistic of 2.67 with WSR p values of .0104.[21] As expected interest coverage ratios for parents are less than the corresponding ratio for matching samples. In year 0, median values are 3.71 for parents versus 4.44 for matching samples. (Means are not reported for interest coverage due to significant skewness).

The high level of leverage is a likely impetus for an equity issue as a means to adjust the parent capital structure. It is difficult, however, to detect that leverage decreases significantly on average after the carve-out. The difference between book leverage in year -1 and 0 is only 2.5% (3.2%) with a t statistic of 1.24 and sign test p values of .1147 and .0743. As noted earlier, the mean (median) gross proceeds as a percentage of parent total assets is 13.3% (6.7%). On average, parents receive about 75% of net proceeds. If all proceeds were applied to debt reduction then we would expect to observe book leverage decreases of at least 10%.[22] It is likely that a significant number of parents retain the proceeds rather than dispersing them to outside claimants such as debt-holders.[23]

Market valuation ratios for the parent are shown in table 8. Parents have low values for Tobin's Q when compared to their matching samples. In year 0, median parent Q

[21] Similar high leverage of carve-out parents is documented by Allen and McConnell.

[22] Assuming net proceeds are 92% of gross proceeds, 75% of funds are remitted to parent and applied to debt reduction, 50% of parent book liabilities are debt: 13.3%*92%*75%*(1/50%)=18.4%

[23] Allen and McConnel find that parents who announce an intention to pay out proceeds experience announcement period increases of 6.63%, while parents who retain the proceeds experience announcement period returns of -.01%.

is 1.102 versus 1.364 for the median of all matching sample medians. The differences in Q are significant for years -3 through +3 with t-statistics as high as 3.706 and WSR p values of .0001. In all years, parents have higher Price/Earnings ratios than their match sample median. Differences in P/E ratios are not as significant as differences in Q due to greater skewness. Low Q and high P/E ratios are generally not synonymous. The high leverage of parents is probably what drives this juxtaposition. High leverage generates high interest costs which decrease the earnings per share denominator in the P/E ratio. There is no corresponding change in the numerator or denominator of Q. Finally, parents have consistent dividend payout ratios that are much greater than payout ratios for the matching samples. Parent median payout ratios at year -1 and 0 are .314 and .240 while median matches have payout ratios of 0. The difference needs to be interpreted with caution since parents tend to be larger than equivalent matching sample firms who often do not pay dividends.

2.5.4 Intra-firm Industry Comparison

COMPUSTAT segment data provides an opportunity to compare the industry of the carve-out to the industries of the other divisions of the parent. Segment data is available for 64 of the 84 parent firms. Year 0 industry median Tobin's Q, ROA, sales growth and asset growth are computed for all of the SIC codes listed in the various firms segment data. As before, matches are made at either the four, three, or two digit level whenever there are five or more firms with more than 75% of their sales at the applicable SIC classification level. Results are shown in table 9. Comparisons show that the industry of the carve-out has higher median Tobin's Q, sales growth and total asset growth than the industries of the other segments of the parent. Median industry ROA's do not differ significantly. These results hold when comparisons are made to sales weighted averages

(not reported) of the parent's other segments. When compared to the carve-outs that they are generating, parents appear remarkably mundane. It is likely that parents and their investment bankers are able to spin a more appealing story for the future prospects of the carve-out than for the future prospects of the parent.

2.6 Long Term Stock Market Performance

2.6.1 Carve-out Returns

A pervasive feature of IPO's and SEO's seems to be long term underperformance.[24] Spin-offs on the other hand generate superior long term returns.[25] Returns for this carve-out sample are more comparable to those associated with IPO's and SEO's. Pre-event returns are calculated for the five year period ending on the day before the carve-out. Post-event returns are calculated from the first reported trading day on or after the date of the carve-out. A significant portion of both the carve-out and parent samples do not trade during the entire analysis period. In these cases, the return on the appropriate matching sample is substituted for the missing time periods in order to fill them out.

Over the five years following the carve-out, buy and hold returns for carve-outs are 45.7% (23.1%) versus 74.5% (70.4%) for the equal weighted index and 82.7% (78.9%) for the value weighted index. Excess returns versus the CRSP equal weighted index are -28.8% (-51.43%) and -33.1% (-58.7%) versus the value weighted index. Year by year performance is summarized in table 10.[26] In order to test the significance of these results,

[24] Spiess and Affleck-Graves (1995) find median five year post-SEO performance of 10% versus 42.3% for a sample of matching firms. Loughran and Ritter (1995) find long-run performance of IPO's of 15.7% versus 66.4% for matching firms.

[25] Cusatis, Miles and Woolridge (1993) find mean three year buy and hold returns of 76.0% for a sample of pure spinoffs. This return is 33.6% greater than returns for matching firms and is significant at the 5% level.

[26] Canina, Michaely, Thaler and Womack find that compounding daily returns for an equally weighted index can generate a large positive bias in the calculated long term return of the index. A primary

I utilize a variant of the boot-strapping method of Ikenberry, Lakonishok and Vermaelen (1995).[27]

Firm size and market to book ratio are computed for all firms on COMPUSTAT between 1980 and 1993.[28] Only firms with a stock code of 0 and non-missing observations for size and market to book are retained.[29] This list of COMPUSTAT firms is then matched to CRSP using the methodology of Guenther and Rosman (1994). The remaining firms are then sorted into 10 size deciles each year. These size deciles are further sorted into 5 market to book quintiles. Each of the 50 yearly size/market to book portfolios contains between 59 and 73 firms depending on the year, later years having more firms. Monthly returns are gathered for the next 72 months for each security in each of the 700 portfolios. If a security ceases to trade, then the monthly CRSP equal weighted return is substituted in its place for the remaining portion of the 72 month time period.[30] Finally an equal weighted return is calculated for each month for each of the 700 portfolios.

After calculating portfolio returns, 115 securities are randomly selected from among

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source of this bias seem to be the interaction between implicit daily rebalancing and the bid-ask spread. In order to minimize this bias, daily returns are used only to calculate the return from a security's start date to the end of the start month, and from the beginning of the end month until the end date.Monthly returns are used for all intermediate time periods.

[27]Barber and Lyon (1997) and Kothari and Warner (1997) raises serious objections to the validity of previous event studies which conclude the existence of significant long term excess returns. Both find that common test statistics such as the Student's t, sign and Wilcox signed rank test are poorly specified when excess returns are calculated relative to a variety of reference portfolios. The potential reasons for this misspecification are too numerous to be addressed here.

[28]Firm size = *End of year stock price * shares outstanding.*
Market to book = $\frac{Market\ value\ of\ equity + book\ value\ of\ debt\ and\ preferred}{total\ book\ assets}$
This formulation eliminates the possibility of negative mb ratios that can occur when the market value of equity is divided by the book value of equity.

[29]A stock code of 0 identifies publicly traded firms on COMPUSTAT. Firms with non zero stock codes generally will not match to CRSP.

[30]This process was also done without filling in returns for dead securities. What is left in each portfolio tends to be winner stocks and leads to an upward bias in the returns reported for each portfolio. This is the mirror image of the new issues problem noted by Barber and Lyon where the regular CRSP indexes are regularly injected with IPO's that seem to have low long term returns.

the 700 portfolios. Each security is assigned a random start month between April of the year following the portfolio construction and the next March. This 4 month offset prevents any front running with respect to the COMPUSTAT data used to sort the 700 portfolios.[31] Buy and hold returns for the next 60 months are calculated for each of the 115 random security/month combination. If a security ceases to trade during the 60 month period then the return on the equal weighted index or matching portfolio is used to fill out the remaining months. Excess returns with respect to the equal weighted index and year/size/market to book portfolios are then calculated. This process is repeated 5000 times to generate an empirical distributions that can be used to assess the significance of the excess returns seen in the carve-out sample.[32]

Figures 1 through 5 provide pictorial illustrations of the boot-strapping distributions while table 11 reports breakpoints for standard significance levels. The distribution of returns for the randomly selected portfolios is skewed to the right. The average equal weighted 5 year return across the random portfolios is 99.7%, while the median is 95.2%. 5th and 95th percentile values are 65.2% and 141.9%. The distributions for the matching portfolio and equal weighted index returns that correspond to each of the randomly selected portfolios are generally symmetric. The mean (median) of the 5000 matching portfolio equal weighted returns is 105.9% (105.4%). The corresponding mean (median) of equal weighted index returns is 79.1% (78.8%).

This difference in symmetry is even more apparent when we look within each of the

[31] Some firms have fiscal years ending in January, February or March. As an example, suppose a firm has a fiscal year ending on February 28. Data submitted for the period March 01 1990 through February 28 1991 is listed in COMPUSTAT as fiscal year 1990, despite the fact that there is some 1991 data mixed in.

[32] An alternative methodology would be to calculate only 12 months of returns for each portfolio and then splice the returns of matching size/market to book portfolios together year by year. Each of the 5 yearly returns on the randomly selected securities would then be compared to the size/market to book portfolio in which they resided at the start of each year. Since the objective of this study is to determine whether carve-outs are mispriced *at the date of issue* relative to comparable securities, this yearly reclassifying procedure was deemed inappropriate.

5000 randomly selected portfolios and analyze the mean and median difference in returns between each of the 115 randomly selected securities and the corresponding matching portfolio or equal weighted index return. The mean (median) of the 5000 *average* differences is -6.02% (-9.62%) relative to matching portfolios, and 20.7% (16.35%) relative to the equal weighted index.[33] The mean (median) of the 5000 *median* differences is -37.7% (-38.0%) relative to the matching portfolios and -22.8% (-22.8%) relative to the equal weighted index. The negative median differences are accompanied by sign test and Wilcoxon signed rank statistics that are quite negative. As an example, the average sign test statistic across the 5000 random portfolios for excess returns relative to the equal weighted average is -8.4. Under the null hypothesis that the median difference is zero, the corresponding p value for a 115 element sample would be approximately .14.

Table 10 shows the significance of the carve-out sample excess returns with respect to the equal weighted index and portfolios matched on the basis of size and market to book. Mean excess returns relative to the equal weighted index are significant. Excess return in year +5 is in the 1^{st} percentile of bootstrap results, while excess returns in year +4 and +3 are in the 2^{nd} and 8^{th} percentiles respectively. Sign test statistics of -11 and -12 in years year +4 and +5, however, are not significant, registering in the 27^{th} and 24^{th} percentiles. Wilcoxon signed rank statistics in year +4 and +5, however, are significant, registering at the 5^{th} and 1^{st} percentiles. Results relative to size/market to book matched portfolios are not as significant as those relative to the equal weighted

[33]Note that the average equal weighted index return is less than the average randomly selected portfolio return and the average matching portfolio return. This is consistent with the "new issues" bias in index returns discussed by Barber and Lyon (1997). Neither the randomly selected portfolios nor the matching portfolios pick up any new securities through time. If new securities have poor returns then we should expect that portfolios, such as the equal weighted index, which are periodically infused with new issues will perform relatively worse. This bias is not a problem in the bootstrapping process since the carve-out portfolio and the 5000 random portfolios will be equally exposed. Also note that the average random portfolio performs worse than its set of matching portfolios. The source of this bias is not fully understood. Detailed analysis, however, shows that it is not a function of the size or market to book sorting process. As long as this bias affects all portfolios equally there should be no ill effects.

index. While the excess performance at year +5 of -31.86% versus matching portfolios is larger in absolute terms than the -28.80% versus the equal weighted index, the significance is lower, registering at the 10^{th} percentile. Sign test and Wilcoxon signed rank statistics in year +5 are significant registering at the 5^{th} and 4^{th} percentiles.

Splitting the sample depending on whether the carve-out occurred prior to or after January 1^{st} 1988 shows the unexpected result that returns relative to the equal weighted index are much worse for the later sample. This split leaves 50 observations in the early sample and 65 observations in the later sample. As shown in table 12, excess returns relative to the equal weighted average are actually positive for the carve-outs occurring prior to 1988, and significantly negative for carve-outs occurring during or after 1988. The scale of the difference is surprising particularly when you consider that the later subsample contains observations from 1992-1993 for which there is less than five years of returns. These observations have less time in which to rack up the very poor returns seen in the later subsample. A possible explanation is that the investment community has been able to publicize the success of earlier carve-outs and convince investors to participate in later less worthy deals.

2.6.2 Parent Returns

Parents returns, shown in table 13, do not show underperformance comparable to that shown by the carve-out. The mean (median) post-issue five year returns for parents is 76.5% (42.8%). The equivalent returns for the equal weighted and value weighted indices are 72.7% (71.2%) and 80.5% (76.7%).[34] Average excess returns relative to the two indices are 3.7% and -3.2%. Excess returns at year +5 relative to size and market to book matched portfolios (not reported) average -12.9%. While excess returns are worse

[34]Index returns differ slightly between the parent sample and the carve-out sample since we are matching stock return data for only 84 parents as opposed to 115 total carve-outs.

than the average bootstrap returns, they do not attain significance at the 10% level.

Parent equity market performance in the year prior to the carve-out is generally quite good with mean (median) returns of 35.5% (20.9%) versus 24.0% (20.6%) for the equal weighted index and 21.1% (18.9%) for the value weighted index. Longer term pre-issue returns are also listed in table 13. Parents appear to have performed well over the long term, however, this observation should be interpreted with caution. There are biases inherent in looking back at returns for firms that are known to survive. Any random sample of firms that were alive at the date of the carve-out would also be likely to show good prior returns.

2.6.3 Industry Returns

Returns of other firms in the carve-out's industry, shown in table 14, are quite good prior to the carve-out and are moderately poor after the carve-out. Mean returns are calculated for each industry using the same matching firms used in the initial operating performance comparisons. As an example of the results, the average (median) of industry mean returns from year -1 to year 0 is 36.8% (27.9%) while the corresponding value from year 0 to year +1 is only 8.9% (3.2%). Five year post-issue average (median) industry mean return is 53.9% (23.8%). Differences between the carve-out firm and its respective industry indicate that the poor performance of carve-outs reflects a significant industry effect. Average industry returns at year +5 are an insignificant 8.7% greater than carve-out returns. This is consistent with the Slovin, Shuska and Ferraro (1995) observation that firms in the same industry as a carve-out experience a -1.11% excess return around the announcement of the carve-out.

In related work, Hand and Skantz (1997a) find that equity carve-outs are clustered in the late stages of bull markets. Using a similar sample, they find a mean pre-issue value

weighted index return of 17.2% in the year prior to the average carve-out. In contrast, they find the mean post-issue value weighted index return is 10.2%. Their t-statistic on the difference in means is a significant -3.6. Their result is seen in this study as well. The mean pre-issue value weighted return is 21.1% versus a mean post-issue return of 8.0%. It is possible that parents conducting carve-outs are adept at picking times when their carve-out division is overvalued relative to the market and when the market is at a peak. Caution, however, should be exercised with this conclusion. It may be the case that it is the periods prior to the carve-out that are exceptionally good and not that the periods after the carve-out are exceptionally bad. This is plausible given that the investment banking community is hesitant to float new issues when there has been recent turmoil in the markets.[35]

2.6.4 Analysis of the Source of Relative Performance

Prior sections of the paper document that carve-outs experience significant declines in operating performance after the issue date and that their long term returns are poor. Not surprisingly, these effects are highly correlated. Regressions (not reported) of long term excess returns on the adjusted changes in operating performance from table 4 panel C show a highly significant positive relationship. It should come as no surprise that firms with poor operating performance are punished by the market. Validation of a market timing hypothesis, however, requires more than this simple relationship. Is there evidence that parents know about future declines in performance before they happen, or does it appear that parents are no more knowledgeable than the market?

One way to answer this question is to look at factors influencing the parent's willingness to undertake a carve-out. If parent managers dislike justifying their actions to

[35]The author thanks John Affleck-Graves for pointing out this subtle, but important distinction.

shareholders, then they should be averse to relinquishing control of the carve-out. The larger is the percentage ownership sold, the less effective is parent control. If, however, assets are overvalued then the displeasure of reduced control will be countered by receipt of cash which can be redeployed to other pet projects. Therefore, the larger the percentage of shares sold, the greater should be subsequent carve-out underperformance.[36] If managers enjoy private benefits from running large empires then aversion to relinquishing control should also be a function of the relative size of the carve-out. The larger a carve-out is relative to the parent, the less willing parents should be to accept a given price. Larger carve-outs, therefore, would be expected to have worse returns than smaller carve-outs. Finally, parent willingness to do a carve-out should be a function of financial stress. Financially stressed parents may be forced to do a carve-out at inopportune times in order to generate cash.

Multivariate regressions indicate that these relationships are generally true. Table 15 panels A through E present selected results of regressions of carve-out excess returns on a variety of factors. The first item to note is the year dummy variable included in all of the regressions. Table 12 noted that carve-outs occurring after 1988 performed much worse than carve-outs occurring earlier. This effect is seen in the multivariate results. The year dummy, coded 1 if the observation came after 1 Jan 1988 and 0 otherwise, is consistently negative and significant. Of greater interest are the other explanatory variables. As predicted, the larger is the carve-out relative to the parent, the worse is the long term performance. As seen in table 15, the coefficient for relative proceeds ranges between -.54 and -1.47 depending on the year analyzed. The coefficient is significant at

[36]This may be tempered, however, by the existence of important breakpoints for the percentage of ownership sold. As noted earlier, parents selling less than 20% ownership are able to continue consolidating the financial data of the carve-out on both their financial statements and their tax returns. Parents selling 20% to 50% ownership can only consolidate the carve-out on the parent's financial statement. Most importantly, parent selling more than 50% ownership no longer maintain majority control of the carve-out.

the 10% level for all regression and at the 5% level or better for all regressions using year +2 and year +3 returns.

In order to capture effects of percentage sold independent of the carve-out's size, two additional dummy variables, Pct_2 and Pct_5, are included to indicate when the percentage sold is greater than 20% and greater than 50% respectively. Results in table 16 show that deals where the parent sold less than 20% performed the best. Deals involving a sale of 20% to 50% of ownership perform worse. Above 50%, the relationship levels off. As an example, coefficients (t-statistics) for the intercept, Pct_2 and Pct_5 from the year +3 regression including relative proceeds and the year dummy are .6677 (4.422), -.6631 (3.655), and .3959 (1.944) respectively. The dummy variables are cumulative so that the net effect when the percentage sold is between 20% and 50% is the sum of the first two coefficients. The net effect when the percentage sold is greater than 50% is the sum of all three coefficients. It is likely that the percentage sold results reflect differing motives for doing the carve-out, where parents selling less than 20% or more than 50% are influenced by efficiency motives while parents selling between 20% and 50% are influenced by market timing motives.

Variables indicating the financial stress of the parent are generally not significant predictors of future excess returns. Surprisingly, the sign of the parent leverage coefficient is negative while the free-cash flow coefficient is positive. While insignificant, these values are not consistent with financially stressed parents being forced to do carve-outs at inopportune times.

Loughran and Ritter (1995a) find that SEO's conducted by firms with high pre-issue sales growth and CAPX increases perform worse over the ensuing four years than their lower growth counterparts. Firms with large pre-issue increases in Earnings per Share (EPS) perform weakly worse than firms with smaller increases. They interpret these findings as evidence of a cognitive bias on the part of investors who are over-estimating

the future performance of good firms. Evidence of myopia on the part of investors in this study's carve-out sample is weak. Regressions using items such as growth in pre-carve-out sales, CAPX, ROA and EBITD have signs consistent with investors over-predicting future performance, but significance statistics are low.

Evidence of an investor myopia story would be interesting support for a market timing story. It is likely that the informational advantage of managers is in predicting future operating performance. In order for this informational advantage to be exploitable, investors must not correctly update beliefs conditional on the announcement of a carve-out. If this were true, then there should be a negative correlation between pre-issue improvements in operating performance and post-issue market underperformance. Evidence that relative proceeds and the percentage sold are negatively correlated with excess returns imply that the parents are aware of when they are able to receive a particularly good price for the stake that they sell. Lack of evidence, however, for why investors would overvalue the carve-out does not allow us to decisively conclude that market timing "explains" the link between carve-out operating performance and long term returns. At best, results are consistent with market timing being a significant factor in decisions to pursue an equity carve-out.

2.7 Conclusion

Equity carve-outs seem to have more in common with financing transactions such as seasoned equity offerings and initial public offerings and less in common with pure restructuring transactions than previously believed. Operating performance as measured by return on assets, profit margin, sales growth and earnings growth peaks in the year of the carve-out. Differences relative to firms in the same industry are highly significant. Subsequent declines in return on assets are significant even after subtracting declines

seen in firms matched on the basis of similar size and prior performance. The decline in carve-out performance, coupled with the fact that parents show no countervailing improvements in performance, is seen as evidence against the hypothesis that carve-outs are done in order to generate increases in efficiency. Additional evidence that carve-out capital expenditures appear less responsive after the carve-out to proxies for investment quality such as Tobin's Q, and more responsive to free cash flow also support the view that efficiency is not improved by the carve-out. These results are in sharp contrast to recent findings that efficiency gains seem to be an integral part of spin-off transactions.

If efficiency gains are not material then why bother with the effort involved in an equity carve-out? Poor long term carve-out returns relative to the CRSP equal weighted index and relative to portfolios matched on the basis of size and market to book indicate that the opportunity to sell equity at a price greater than its intrinsic value may provide the motivation. This hypothesis is supported by the fact that long term excess returns are negatively related to the relative proceeds raised and the percentage of ownership sold. It is also interesting to note that carve-out divisions have characteristics which imply greater growth potential than other divisions of the parent. Median values for the carve-out's industry Tobin's Q, sales growth, asset growth and capital expenditures are larger than the corresponding values for the other divisions of the parent. Carve-outs also generally have individual values which are high for their industry. Parents on the other hand tend to have values which are low for their primary industry. It is likely that stories of strong future growth necessary to launch a new issue are easier to spin for the carve-out division than for the parent as a whole.

All of these characteristics make carve-outs appear like a seasoned equity offerings or initial public offering embedded in a larger parent firm. It is likely that high parent leverage is part of the impetus for undertaking the carve-out. For many other firms, the action taken under similar circumstances is to do a seasoned equity offering. Prior

research shows that seasoned offerings tend to occur after a run-up in the firm's price and improvements in the operating performance. Parents doing carve-outs do not have comparable company-wide improvements that can be exploited in a seasoned equity offering. What parents do have, however, is an individual division with outstanding performance that will be eagerly greeted by the market.

Table 1
Number of Carve-outs Per Year and Dollars Raised Per Year.

	Number	Gross Funds Raised (in millions)
1981	3	45.4
1982	0	0.0
1983	13	692.9
1984	5	282.6
1985	5	243.0
1986	10	2564.2
1987	15	2765.7
1988	9	1245.1
1989	8	2321.4
1990	12	900.2
1991	8	971.8
1992	13	1894.9
1993	14	1349.2

Table 2
Breakdown of Sample By 2 Digit SIC Code.

SIC	Carve-outs	Parents	Industry
1000	4	1	Metal Mining
1300	12	4	Oil and Gas Extraction
1500	1	2	Construction, General
1700	1		Construction, Special Trade
2000	4	1	Food and Kindred Products
2100	1	1	Tobacco Products
2200	1	1	Textile Mill Products
2300	2		Apparel and Other Finished Products
2600	3	2	Paper and Allied Products
2700	1	1	Printing, Publishing and Allied Products
2800	11	10	Chemicals and Allied Products
2900	2	5	Petroleum Refining and Related Industries
3000	2	2	Rubber and Miscellaneous Plastic Products
3200	1	2	Stone, Clay, Glass and Concrete Products
3300	8	4	Primary Metal Industries
3400	2	1	Fabricated Metal, except Machinery and Transportation
3500	4	3	Commercial Machinery, Computer Equipment
3600	3	4	Electrical Equipment, except Computers
3700	4	3	Transportation Equipment
3800	4	5	Measuring Instruments, Photo Equipment, Watches
3900	1		Miscellaneous Manufacturing
4000		1	Railroad Transportation
4200	1	1	Motor Freight Transportation, Warehousing
4500	1		Water Transportation
4800	8	1	Communications
4900	11	7	Electric, Gas, Sanitary Services
5000	2	1	Durable Goods Wholesale
5100	1	4	Non-durable Goods Wholesale
5300	3		General Merchandise Stores
5400	2	1	Food Stores
5500	1	1	Auto Dealers, Gas Stations
5600	2	1	Apparel and Accessory Stores
5700	1		Home Furniture and Equipment Stores
5800	1		Eating and Drinking Places
5900	5	2	Miscellaneous Retail
6000		1	Depository Institutions
7300		1	Business Services
7900		1	Amusements, Recreation
8200		2	Educational Services

Table 3
Prospective Use of Carve-out Proceeds.

Average Percentage Allocated is an equally weighted average across firms of the reported prospective use of the carve-out proceeds. Percentage of Total Funds is a proceeds weighted average measuring what percentage of total funds raised by all carve-outs in the sample were allocated for each purpose. Reported prospective use comes from carve-out prospectuses.

	Average Percentage Allocated	Percentage of Total Funds
Remitted to Parent	66.3%	76.8%
Carve-out Debt Reduction	7.6%	8.8%
Carve-out General Corporate Purposes	6.3%	3.3%
Carve-out Capital Expenditures	11.1%	4.8%
Unknown	8.7%	6.9%

Table 4, Panel A
Operating Performance

Return on assets for carve-out firms versus industry matching sample means. Matching samples are composed of firms with more than 75% of their sales in the same SIC code as the carve-out. If fewer than five firms match at the 4 digit SIC level then matching is done at the 3 or 2 digit level. All observations have been winsorized at the 1st and 99th percentiles. Mean and Median Difference rows report the average and median match by match difference. Difference observations significant at the 10%, 5% or 1% levels are annotated with *, ** or *** in the superscript. Significance for mean difference is determined by a Student's t test under the null hypothesis of mean difference=0. Significance for median difference is determined by a standard sign test under the null hypothesis of median difference= 0. Data is aligned so that year 0 is the year of the carve-out. Data definitions: ROA_1 = Operating income/ total assets, ROA_2 = (Net income + taxes + interest)/total assets, ROA_3 = Net income/total assets.

	-3	-2	-1	Year 0	+1	+2	+3
Observations	105	113	115	115	110	103	96
ROA_1: Mean	.1666	.1460	.1945	.1797	.1628	.1340	.1223
Median	.1259	.1290	.1563	.1714	.1386	.1298	.1181
Match Mean	.0659	.0757	.0768	.0866	.0899	.0777	.0799
Match Median	.0803	.0752	.0825	.0884	.0781	.0727	.0799
Mean Difference	.0915**	.0598	.1142***	.0929***	.0722***	.0557***	.0429***
Median Difference	.0288*	.0528***	.0777***	.0852***	.0693***	.0474***	.0392***
ROA_2: Mean	.1863	.1956	.2416	.2138	.1921	.1407	.1547
Median	.1253	.1466	.1664	.1795	.1657	.1365	.1337
Match Mean	.0840	.0906	.0914	.1009	.1004	.0862	.0892
Match Median	.0965	.0912	.0911	.0969	.0954	.0887	.0886
Mean Difference	.0993***	.1032***	.1502***	.1128***	.1068***	.0541***	.0664***
Median Difference	.0585***	.0583***	.0780***	.0851***	.0790***	.0532***	.0661***
ROA_3: Mean	.0392	.0010	.0549	.0711	.0560	.0190	.0323
Median	.0454	.0419	.0530	.0654	.0510	.0377	.0347
Match Mean	-.0256	-.0192	-.0135	-.0033	-.0072	-.0073	-.0123
Match Median	-.0099	-.0150	-.0033	-.0018	-.0058	-.0044	-.0129
Mean Difference	.0612***	.0194	.0684***	.0745***	.0649***	.0248	.0459***
Median Difference	.0408***	.0429***	.0651***	.0712***	.0624***	.0375***	.0418***

Table 4, Panel B

Within Firm Difference in ROA_2 Between Year 0 and All Other Years

ΔROA_2 is ROA_2 in year 0 minus ROA_2 in year j where j is -3..-1, +1..+4. T-statistics are based on the null hypothesis that the mean of ΔROA_2 is zero. WSR stands for the non-parametric Wilcoxon Signed Rank test. Observations where both the t-statistic and the WSR p value are significant at the 5% level or better are displayed in bold. ROA_2 = (Net income + taxes + interest)/total assets.

	0..-3	0..-2	0..-1	0..+1	0..+2	0..+3	0..+4
Observations	92	108	114	108	100	93	75
ΔROA_2							
Mean	.036	.051	.017	.034	.077	.070	.105
Median	.024	.026	.004	.008	.051	.044	.059
t-statistic	**1.973**	**2.577**	.917	**2.251**	**3.714**	**3.415**	**3.252**
WSR p value	**.0151**	**.0013**	.8037	**.0095**	**.0001**	**.0001**	**.0001**

Table 4, Panel C

Comparative Changes in Operating Performance.

ΔROA_i is the change in ROA_i between year 0 and +2 for carve-out firms minus the change in ROA_i seen in a sample of control firms. Control samples are matched on the basis of combinations of size, 2 digit SIC (SIC_2) and current ROA. This matching is done to control for normal regression to the mean seen in outlying observations of accounting ratios (Barber and Lyons (1996)). Size matches must have total assets within ± 50%. ROA matches must be within ± 20%. The mean and t-statistic columns summarize the average Δ relative to the mean change in the matching sample. The median, sign test and Wilcoxon signed rank (WSR) columns summarize the median Δ relative to the median change in the matching sample. Variable definitions: Size = book value of total assets, ROA_1 = (Operating Income before depreciation)/size, ROA_2 = (Net income + tax + interest)/size, ROA_3 = Net income/size.

Matched By:	Obs.	Mean	Median	t-statistic	Sign test p value	WSR p value
Size and SIC_2	110					
ΔROA_1		.0788	.0281	4.156	.0002	.0001
ΔROA_2		.0898	.0358	4.147	.0001	.0001
ΔROA_3		.0749	.0199	3.904	.0001	.0001
Current ROA and SIC_2	101					
ΔROA_1		.0399	.0184	2.296	.0281	.0038
ΔROA_2		.0425	.0199	2.104	.0154	.0021
ΔROA_3		.0509	.0160	2.546	.0006	.0016
Current ROA and Size	110					
ΔROA_1		.0580	.0189	3.122	.0002	.0001
ΔROA_2		.0508	.0175	2.451	.0001	.0001
ΔROA_3		.0606	.0184	3.114	.0022	.0001

Table 5

Median Operating Statistics of Carve-out Firms Versus Matching Samples

Data is aligned so that t is the fiscal year during which the carve-out occurred. Medians are reported since they provide a better indication of the overall trend in this sample. Data in Match rows is the median value drawn from the set of matching sample median values (matches come from firms with > 75% of sales in the same SIC as the carve-out). Data in Mean (Median) Difference rows is the mean (median) of the match by match difference between carve-out and matching sample median. Observations significant at the 10%, 5% or 1% level are denoted by a superscript of *,** or ***. Significance for the mean (median) difference is determined by a Student's t-test (Wilcoxon signed rank test) based on the null hypothesis that the mean (median) of the match by match difference is zero. Data definitions: Sales Margin = (sales - cost of goods sold - sales general and administrative expense)/sales. Sales/Assets, CAPX/Assets and CAPX/Sales are self-explanatory. Free cash flow = (Net income + depreciation - CAPX)/Assets.

	-3	-2	-1	Year 0	+1	+2	+3
Sales Margin:							
Carve-out	.086	.104	.130	.152	.133	.115	.108
Match	.087	.081	.094	.109	.098	.096	.093
Mean Difference	.008	-.330	.088**	.093**	.076**	.070**	.054**
Median Difference	.003	.025**	.032**	.041**	.033**	.026**	.013**
Sales/Assets:							
Carve-out	1.196	1.222	1.242	1.224	1.096	1.019	1.102
Match	1.111	1.100	1.112	1.062	1.086	1.049	1.025
Mean Difference	.204**	.218**	.276**	.234**	.134**	.123*	.183*
Median Difference	.061*	.094**	.119**	.041**	.040*	.011	-.002
CAPX/Assets:							
Carve-out	.059	.052	.069	.073	.077	.072	.058
Match	.070	.065	.057	.059	.058	.061	.059
Mean Difference	.012	.084	.028**	.031**	.021**	.059**	.015**
Median Difference	-.002	-.002	.005**	.005**	.012**	.008**	0.0
CAPX/Sales:							
Carve-out	.044	.051	.051	.048	.060	.072	.054
Match	.058	.051	.050	.052	.053	.056	.055
Mean Difference	.026	.199	.035	.064	.004	.045**	.020
Median Difference	-.005	-.004	0.0	-.001	.001**	.008**	0.0
Free Cash Flow							
Carve-out	.020	.022	.044	.049	.020	.004	.006
Match	-.014	-.001	-.004	-.006	.005	.004	.001
Mean Difference	-.100	-.196	.016	.049**	.036**	-.004	.037**
Median Difference	.034**	.025**	.047**	.052**	.029**	.001	.005**

Table 6, Panel A
Carve-out Growth

Net Growth in Carve-out Total Assets, Sales and Earnings Before Interest and Taxes. Values have not been adjusted for inflation. Growth rates are calculated as ($value_{j+1}$ - $value_j$)/$value_j$. Column headings of year j..j+1 indicates growth between year j and j+1. EBITD stands for earnings before interest, taxes and depreciation.

	Year 4..3	Year 3..2	Year 2..1	Year 1..0	Year 0..1	Year 1..2	Year 2..3
Growth in Assets:							
Mean	.403	.475	.476	.323	.302	.163	.242
Median	.110	.116	.168	.119	.120	.086	.039
Growth in Sales:							
Mean	.323	1.907	.318	.238	.148	.174	.141
Median	.158	.181	.153	.133	.007	.110	.059
Growth in EBITD:							
Mean	.433	1.316	.988	1.307	-.091	.046	.057
Median	.158	.234	.172	.102	.034	.071	.031

Table 6, Panel B
Significance of Changes in Carve-out Growth.

Values give the difference in growth rates between year +1..+2 and year -2..-1 for Assets, Sales and EBITD. T-statistics are based on the null hypothesis that the mean $\Delta = 0$. Sign test and Wilcoxon signed rank (WSR) test p values are based on the null hypothesis that the median $\Delta = 0$.

	ΔAsset Growth	ΔSales Growth	ΔEBITD Growth
Mean	.020	-.282	-1.564
Median	.020	-.064	-.328
t-statistic	.191	2.242	1.008
Sign test p value	.5426	.0032	.0029
WSR p value	.7116	.0032	.0007

Table 7

Median Operating Statistics of Parent Firms Versus Matching Samples

Data is aligned so that year 0 is the fiscal year during which the carve-outs occurred. Medians are reported rather than means due to skewness generated by outliers. Data in Match rows is the median value drawn from the set of matching sample median values. Data in Difference rows is the median of the match by match difference between parent and matching samples. T- statistics for the Difference variables are based on the null hypothesis that the mean difference is zero. WSR stands for the non-parametric Wilcoxon Signed Rank test. Observations that are significant at the 10%, 5% or 1% levels are denoted by *, **or ***. Data Definitions: ROA_2 = (net income + taxes + interest)/total assets, Market Leverage = (long term debt + short term debt)/(market value of equity + long term debt + short term debt), Book Leverage = (long term debt + short term debt)/(book value of equity + long term debt + short term debt), Interest Coverage = (interest expense)/(net income + taxes + interest expense), Free Cash Flow = (net income + depreciation - capx)/total assets.

	-3	-2	-1	Year 0	+1	+2	+3
ROA_2:							
Parent	.126	.133	.119	.127	.119	.109	.119
Match	.130	.125	.119	.122	.118	.114	.117
Mean Difference	.017*	.010	.004	.017	-.004	.013	.016
Median Difference	.002	0.0	0.0	.003	0.0	.003	0.0
Market Leverage:							
Parent	.314	.321	.343	.351	.352	.339	.334
Match	.203	.193	.209	.203	.204	.201	.184
Mean Difference	.114***	.128***	.162***	.135***	.144***	.180***	.164***
Median Difference	.086***	.096***	.118***	.094***	.087***	.112***	.105***
Book Leverage:							
Parent	.433	.492	.539	.542	.531	.591	.562
Match	.286	.297	.308	.285	.308	.323	.309
Mean Difference	.204***	.250***	.297***	.284***	.230***	.648***	.410***
Median Difference	.149***	.199***	.241***	.240***	.193***	.228***	.179***
Interest Coverage:							
Parent	4.624	4.714	3.415	3.709	3.769	3.427	3.481
Match	4.134	4.587	4.050	4.439	4.380	4.092	4.256
Mean Difference	-1.916	.465	.108	1.169	.3154	-.497	.767
Median Difference	-.074	-.187	-.274**	-.163	-.213	-.262***	-.107*
Free Cash/Assets:							
Parent	.013	.018	.009	.019	.004	.004	.018
Match	.002	.002	.003	.011	.003	.012	.014
Mean Difference	.003	.001	.005	.026*	.047	.008	.018
Median Difference	-.005	.001	.000	.009*	.005	-.005	.007

Table 8

Median Parent Market Valuation Ratios Versus Matching Samples

Industry matches come from firms with > 75% of sales in the appropriate SIC. If <5 matching firms are available at the 4 digit SIC level then matching is done at the 3 or 2 digit SIC level. Tobin's Q is calculated as (Market Equity + Long Term Debt + Current Liabilities - Current Assets)/(Total Asset - Current Assets). Price Earnings Ratio (P/E Ratio) is (Earnings Per Share Excluding Extraordinary Items) / (Price Per Share). Payout Ratio is (Dividends Per Share)/(Earnings Per Share Excluding Extraordinary Items). T-statistics for the Difference variables are based on the null hypothesis that the mean difference is zero. WSR stands for the non-parametric Wilcoxon Signed Rank test. Observations where both the t-statistic and the WSR p value are significant at the 5% level or better are displayed in bold.

	-3	-2	-1	Year 0	+1	+2	+3
Tobin's Q:							
Parent	1.061	1.104	1.094	1.102	1.108	1.187	1.258
Match	1.291	1.261	1.327	1.364	1.450	1.589	1.567
Difference	-.178	-.316	-.217	-.344	-.190	-.291	-.244
t-statistic	**2.385**	**2.528**	**3.339**	**3.706**	**3.239**	**2.315**	**2.292**
WSR pvalue	**.0049**	**.0107**	**.0001**	**.0001**	**.0001**	**.0025**	**.0028**
P/E Ratio:							
Parent	11.525	13.110	14.433	14.465	14.489	13.161	14.389
Match	8.674	10.068	10.679	11.112	10.898	10.509	10.315
Difference	.538	3.008	2.168	1.445	2.351	.959	.629
t-statistic	1.391	1.493	1.417	.632	**2.172**	.981	.956
WSR p value	*.0421*	*.0011*	.0565	.0832	**.0717**	.6886	.4907
Payout Ratio:							
Parent	.254	.261	.314	.240	.160	.191	.226
Match	0	0	0	0	0	0	0
Difference	.175	.156	.189	.071	.043	.000	.174
t-statistic	2.908	1.241	1.001	**3.063**	**2.563**	1.836	**4.509**
WSR p value	*.0001*	*.0001*	*.0001*	**.0001**	**.0002**	*.0001*	**.0001**

Table 9

Comparison of Carve-out Industry Ratios Versus Industry Ratios of Other Segments of Parent:

Median industry values for Q, ROA, Sales Growth, Asset Growth and CAPX/Assets for the industry of the carve-out are compared to corresponding industry values for all of the other segments of the parent. For example, assume a parent has 6 segments, 1 of which is the carve-out. Median industry Q is calculated for all 6 segments in the year of the carve-out. The upper value shown in each Parent column block is the sales weighted average of its 5 non-carve-out segments. The lower value in parentheses is the median. Difference is the carve-out value minus the parent median value. Industry matches come from firms with > 75% of sales in the appropriate SIC. If <5 matching firms are available at the 4 digit SIC level then matching is done at the 3 digit SIC level. Identification of parent segments comes from COMPUSTAT. Segment data is available for 68 of the 84 parent firms. Data definitions: Tobin's Q = (market value of equity + long term debt + current liabilities - current assets)/(total asset - current assets). ROA_2 = (net income + taxes +interest)/total assets. Growth variables are 1 year growth rates.

	Parent	Carve-out	Difference	t-statistic	sign test p value	WSR p value
Tobin's Q	2.404 (1.280)	2.926 (1.744)	1.230 (.223)	*2.357*	.2451	.1159
ROA_2	.117 (.120)	.124 (.131)	.004 (.013)	.551	.1925	.1085
Sales Growth	.094 (.091)	.154 (.132)	.088 (.051)	**3.603**	**.0027**	**.0003**
Asset Growth	.073 (.049)	.125 (.079)	.057 (.048)	**3.216**	**.0062**	**.0004**
CAPX/Assets	.054 (.049)	.066 (.056)	.012 (.009)	**2.728**	**.0183**	**.0187**

Table 10
Excess Carve-out Portfolio Returns and Empirical Significance

Table lists the year by year buy and hold return and excess return of the carve-out portfolio versus the CRSP equal weighted index (EW Excess) and a portfolio of firms matched by size and market to book ratio (MB/S Excess). In addition, sign test and Wilcoxon signed rank statistics (WSR) are listed. Numbers in parentheses give the percentile of the bootstrap empirical distribution into which the observation falls. Sign test statistics are calculated as p-n/2. Where p is the number of excess returns that are greater than 0 and n is the number of non-zero observations. WSR stands for the non-parametric Wilcoxon signed rank statistic. It is calculated as $(\sum r_i^+) - n(n+1)/4$. Where r_i^+ is the rank of an observation's absolute value after discarding values equal to 0.

	Year +1	Year +2	Year +3	Year +4	Year +5
Carve-out:					
Mean Return	9.8%	19.5%	29.8%	37.2%	45.7%
Median Return	-1.9%	6.9%	7.3%	18.0%	23.1%
Equal Weighted Index:					
Mean Return	7.4%	22.8%	38.2%	57.0%	74.5%
Median Return	8.6%	22.0%	34.8%	58.5%	70.4%
Mean Excess Return					
MB/S Excess	3.78%	-3.16%	-9.35%	-18.48%	-31.86%
	(73)	(47)	(36)	(22)	(10)
EW Excess	2.47%	-3.34%	-8.40%	-19.73%	-28.80%
	(58)	(18)	(8)	(2)	(1)
Median Excess Return					
MB/S Excess	-3.16%	-15.06%	-22.32%	-33.37%	-45.87%
	(79)	(40)	(47)	(37)	(26)
EW Excess	-6.78%	-12.33%	-24.61%	-35.80%	-51.43%
	(34)	(31)	(15)	(9)	(2)
Sign Test Statistic					
MB/S Excess	-5	-9	-10	-20	-23
	(76)	(63)	(68)	(9)	(5)
EW Excess	-6	-5	-5	-11	-12
	(49)	(64)	(69)	(27)	(24)
WSR Test Statistic					
MB/S Excess	-133.5	-699.5	-690.5	-1017.5	-1376.5
	(84)	(34)	(49)	(13)	(4)
EW Excess	-239.5	-632.5	-551.5	-881.5	-1119.5
	(57)	(14)	(25)	(5)	(1)

Table 11
Empirical Distribution Data

Percentiles, mean and median values describe the distribution of 5 year buy and hold excess returns from 5000 randomly selected portfolios of 115 securities versus the CRSP equal weighted index (EW Excess) and versus portfolios matched on the basis of size and market to book ratios (MB/S Excess). Time period of sample is 1980-1996. Sign test statistics are calculated as p-n/2. Where p is the number of excess returns that are greater than 0 and n is the number of non-zero observations. WSR stands for the non-parametric Wilcoxon signed rank statistic. It is calculated as $(\sum r_i^+)$- n(n+1)/4. Where r_i^+ is the rank of an observation's absolute value after discarding values equal to 0.

	1st percentile	5th percentile	10th percentile	Median	Mean	90th percentile	95th percentile	99th percentile
Average Excess Portfolio Return								
MB/S Excess	-50.5%	-39.9%	-32.4%	-9.6%	-6.0%	22.4%	32.9%	73.9%
EW Excess	-24.0%	-12.8%	-6.6%	16.4%	20.7%	50.7%	61.3%	92.8%
Median Excess Portfolio Return								
MB/S Excess	-67.0%	-59.0%	-54.7%	-37.9%	-22.3%	-21.0%	-16.3%	-6.0%
EW Excess	-54.8%	-45.7%	-40.9%	-22.7%	-22.8%	-3.7%	0.0%	9.0%
Portfolio Sign Test Statistic								
MB/S Excess	-26.5	-23.0	-21.0	-14.0	-14.4	-8.0	-6.5	-3.0
EW Excess	-20.0	-17.0	-15.0	-8.5	-8.4	-2.0	0.0	3.5
Portfolio WSR Test Statistic								
MB/S Excess	-1521.0	-1322.0	-1202.5	-811	-809	-422.5	-293.5	-83.5
EW Excess	-1071.5	-855.0	-747.0	-345.5	-342.8	57.0	182.5	386.0

Table 12
Split Sample Carve-out Returns

Carve-outs are split into 2 groups. The first group contains carve-outs that occurred prior to 1/1/88 (50 observations), the second group contains all later carve-outs (65 observations). Yearly mean and median buy and hold returns are reported for each sub-sample. The final column gives the t-statistic for a standard difference in means test under the assumption of equal sub-sample population variance.

	Before 1988		After 1988		Difference in means
	Mean	Median	Mean	Median	t statistic
Carve-out - EW index					
t+1	4.8%	-6.7%	1.6%	-6.5%	2.12
t+2	25.5%	13.8%	-23.3%	-38.4%	23.16
t+3	28.3%	23.5%	-34.6%	-46.2%	29.81
t+4	24.5%	10.2%	-48.9%	-62.5%	30.28
t+5	18.2%	13.8%	-61.9%	-82.4%	30.26

Table 13
Net Long Term Stock Market Performance of Parent Firms:

Pre-event returns are calculated up until the day before the carve-out. Post-event returns are calculated from the day after the carve-out until 5 years later. Parent returns reported in the first two rows have been filled out with the returns of the CRSP equal weighted index in situations where the parent does not trade for the entire time span. The value weighted index was used to fill out parent returns when calculating excess return with respect to the value weighted index.

	Year -5..0	Year -4..0	Year -3..0	Year -2..0	Year -1..0	Year 0..+1	Year 0..+2	Year 0..+3	Year 0..+4	Year 0..+5
Parents:										
Mean Return	137.3%	108.2%	74.5%	53.6%	35.5%	2.5%	15.5%	33.0%	51.5%	76.5%
Median Return	103.6%	79.1%	39.9%	26.4%	20.9%	-6.1%	11.1%	26.2%	37.9%	42.8%
Equal Weighted Index:										
Mean Return	105.3%	73.2%	53.7%	38.1%	24.0%	6.7%	21.8%	37.6%	54.1%	72.7%
Median Return	93.0%	65.8%	42.8%	38.8%	20.6%	8.4%	20.7%	34.9%	61.8%	71.2%
Value Weighted Index:										
Mean Return	115.3%	83.0%	58.6%	38.0%	21.1%	8.0%	24.0%	43.6%	62.9%	80.5%
Median Return	100.9%	80.6%	53.0%	32.7%	18.9%	9.3%	20.8%	47.3%	64.5%	76.7%
Parent - EW Index:										
Mean	30.5%	33.6%	20.3%	15.4%	11.5%	-4.2%	-6.4%	-4.6%	-2.6%	3.7%
Median	16.7%	7.8%	-1.9%	-6.2%	3.6%	-8.2%	-7.0%	-10.0%	-21.5%	-33.3%
Parent - VW Index										
Mean	22.0%	25.2%	15.9%	15.5%	14.5%	-5.4%	-8.6%	-10.3%	-10.0%	-3.2%
Median	1.8%	-5.1%	-7.3%	2.3%	1.0%	-9.7%	-9.5%	-13.0%	-32.8%	-31.8%

Table 14
Net Long Term Stock Market Performance of Carve-out Industries:

Industry returns are the mean returns of firms with greater than 75% of sales in the same SIC as the carve-out. If fewer than 5 firms match at the 4 digit SIC then industry matches are made at the 3 or 2 digit level. Industry pre-event returns are calculated up until the day before the corresponding carve-out. Post-event returns are calculated from the day after the corresponding carve-out until 5 years later. Returns have been filled out with the returns of the CRSP equal weighted index in situations where a matching firm does not trade for the entire time span.

	Year -5..0	Year -4..0	Year -3..0	Year -2..0	Year -1..0	Year 0..+1	Year 0..+2	Year 0..+3	Year 0..+4	Year 0..+5
Industry of Carve-out:										
Mean Return	136.3%	98.9%	74.6%	53.9%	36.8%	9.1%	22.7%	36.6%	44.9%	55.2%
Median Return	27.7%	36.7%	45.6%	63.4%	88.2%					
Industry - EW Index:										
Mean	26.7%	24.8%	22.1%	16.6%	13.4%					
Median	-21.1%	-11.3%	-7.9%	-1.5%	4.3%					
Industry-Carveout:										
Mean						-0.7%	2.2%	4.9%	3.4%	6.6%

Table 15

Regression Analysis of Carve-out Equity Market Under-performance.

All independent variables with the exception of Percent Sold are measured as of t-1 in order to minimize accounting related distortions in observed data. Explanation of independent variables: Percent Sold = shares sold/total shares, Market Leverage=(long term debt + short term debt)/(Market value of common and preferred equity + long term debt + short term debt), Interest Coverage=(net income + interest + tax)/interest, Free Cash Flow=(net income + depreciation - capx)/total book assets.

Table 15, Panel A: Year +1 Excess Returns

Constant	Year Dummy	Pct_2	Pct_5	Relative Proceeds	Parent Leverage	Parent Free Cash	R^2 Adj. # Obs	F stat p value
.0768	-.0538	-.1144	.2195				.0036	.4632
(2.742)	(.485)	(1.916)	(1.561)				115	
.2407	-.0795	-.2947	.2220	-.5734			.1055	.0176
(2.319)	(.731)	(2.362)	(1.585)	(1.886)			76	
.3708	-.0562	-.2707	.1477	-.6952	-.4052		.1091	.0274
(2.579)	(.471)	(2.070)	(.956)	(2.135)	(1.336)		71	
.2608	-.0744	-.3126	.2226	-.5487		-.3051	.0928	.0378
(2.252)	(.663)	(2.416)	(1.513)	(1.777)		(.558)	75	

Table 15, Panel B: Year +2 Excess Returns

Constant	Year Dummy	Pct_2	Pct_5	Relative Proceeds	Parent Leverage	Parent Free Cash	R^2 Adj. # Obs	F stat p value
.3405	-.5078	-.2344	.2868				.0792	.0068
(2.331)	(3.246)	(1.330)	(1.446)				115	
.5668	-.5240	-.4733	.2677	-.9248			.2211	.0002
(3.707)	(3.270)	(2.576)	(1.298)	(2.065)			76	
.7923	-.5071	-.4661	.1923	-1.1481	-.5648		.2556	.0002
(3.825)	(2.958)	(2.481)	(.866)	(2.453)	(1.296)		71	
.5457	-.5061	-.4684	.2388	-.9149		.1360	.2032	.0008
(3.193)	(3.055)	(2.453)	(1.100)	(2.077)		(.169)	75	

Table 15, Panel C: Year +3 Excess Returns

Constant	Year Dummy	Pct_2	Pct_5	Relative Proceeds	Parent Leverage	Parent Free Cash	R^2 Adj. # Obs	F stat p value
.4310	-.6536	-.3856	.4265				.1494	.0001
(2.932)	(4.151)	(2.174)	(2.136)				115	
.6677	-.6248	-.6631	.3959	-.9337			.3194	.0001
(4.422)	(3.949)	(3.655)	(1.944)	(2.112)			76	
.9582	-.6055	-.6509	.2944	-1.215	-.7347		.3788	.0001
(4.815)	(3.666)	(3.596)	(1.376)	(2.695)	(1.750)		71	
.5987	-.6018	-.6259	.3442	-.9561		.7264	.3119	.0001
(3.564)	(3.967)	(3.335)	(1.613)	(2.134)		(.916)	75	

Table 15, Panel D: Year +4 Excess Returns

Constant	Year Dummy	Pct_2	Pct_5	Relative Proceeds	Parent Leverage	Parent Free Cash	R^2 Adj. # Obs	F stat p value
.3889	-.7538	-.3668	.3840				.1424	.0002
(2.336)	(4.228)	(1.826)	(1.698)				115	
.6475	-.6935	-.6781	.3790	-1.083			.2307	.0001
(3.256)	(3.328)	(2.838)	(1.413)	(1.860)			76	
.9303	-.6406	-.6194	.2139	-1.365	-.8947		.2635	.0001
(3.528)	(2.928)	(2.583)	(.755)	(2.285)	(1.608)		71	
.5936	-.6544	-.6617	.3130	-1.068		.3987	.2132	.0006
(2.680)	(3.049)	(2.674)	(1.113)	(1.808)		(.382)	75	

Table 15, Panel E: Year +5 Excess Returns

Constant	Year Dummy	Pct_2	Pct_5	Relative Proceeds	Parent Leverage	Parent Free Cash	R^2 Adj. # Obs	F stat p value
.2349	-.8238	-.1708	.2661				.1108	.0011
(1.236)	(4.047)	(.745)	(1.031)				115	
.4920	-.7458	-.4508	.2227	-1.275			.1454	.0042
(2.070)	(2.995)	(1.579)	(.711)	(1.833)			76	
.7427	-.6112	-.4796	.0247	-1.469	-.7388		.1441	.0093
(2.262)	(2.244)	(1.607)	(.070)	(1.984)	(1.067)		71	
.3936	-.6731	-.4218	.1058	-1.246		.7153	.1270	.0127
(1.500)	(2.648)	(1.439)	(.317)	(1.780)		(.578)	75	

2.9 Appendix 1: Variable Definitions

Asset Turns: $\frac{Sales}{Total\ Book\ Assets}$

Book Leverage: $\frac{Long\ Term\ Debt + Short\ Term\ Debt}{Total\ Book\ Assets}$

CAPX: *Capital Expenditures*

EBITD: *Earnings Before Interest Taxes and Depreciation*

Free Cash Flow: $Net\ Income + Depreciation - CAPX$

Market to Book: $\frac{Year\ End\ Stock\ Price * Shares + Preferred + Long\ Term\ Debt + Short\ Term\ Debt}{Total\ Book\ Assets}$

Market Leverage: $\frac{Long\ Term\ Debt + Short\ Term\ Debt}{Year\ End\ Stock\ Price * Shares + Preferred + Long\ Term\ Debt + Short\ Term\ Debt}$

Payout Ratio: $\frac{Dividends\ per\ share}{Earnings\ per\ share\ before\ extraordinary\ items}$

P/E Ratio: $\frac{Year\ end\ stock\ price}{Earnings\ per\ share}$

ROA_1 : $\frac{Operating\ Income\ Before\ Interest, Taxes\ and\ Depreciation}{Total\ Book\ Assets}$

ROA_2: $\frac{Net\ Income + Interest + Taxes}{Total\ Book\ Assets}$

ROA_3 : $\frac{Net\ Income}{Total\ Book\ Assets}$

Tobin's Q: $\frac{Price * shares + Preferred + Long\ Term\ Debt + Current\ Liabilities - Current\ Assets}{Total\ Book\ Assets - Current\ Assets}$

Sales Margin: $\frac{Sales - Cost\ of\ Goods\ Sold - SG\&A\ Expense}{Sales}$

2.10 Appendix 2: Accounting Treatment of Carve-outs.

Generally Accepted Accounting Principles in the U.S. stipulate three different methods to account for investments in subsidiaries, depending on the percentage parent ownership of subsidiary voting shares:

1. Greater than 50% (controlling interest)-subsidiary financials are consolidated with parent. Parent and subsidiary are treated as one legal entity. Minority interest accounts are used on liabilities side of the balance sheet and on the income statement to account for the portion of net worth (book value of equity) and of net income that accrue to minority shareholders of the subsidiary. All other accounts are calculated by simply adding together accounts for parent and subsidiary.

2. 20% to 50% (significant influence)-equity method is used to account for subsidiary. Interest in the subsidiary is shown in one account; Investment in Subsidiary on the asset side of the balance sheet. Other balance sheet accounts are not commingled as they are when a controlling interest is held. Each period, a proportionate share of subsidiary net income is added to this account. A proportionate share of subsidiary dividends are deducted from this account. A proportionate share of income from the subsidiary is recognized on the parent income statement each period.

3. Less than 20% (passive interest)-lower of cost or market method is used to account for subsidiary. Passive investments are carried on the balance sheet in an Investment in Subsidiary account. Changes in carrying value occur only when dividends are paid. Net income from the subsidiary is not recognized.

Prior to the typical carve-out in this sample, the parent often receives a special divi-

dend funded by short term debt, or a note payable. Proceeds from the actual carve-out are used to retire the new short term debt or the note payable as applicable. Accounting for the various steps in the transaction is relatively straight-forward except that the parent may recognize income in the form of a Gain on Sale of Securities. For example, assume that a parent sells 20 of 100 total shares in a subsidiary for $15, and that the initial book value of each share is $10. The parent recognizes a Gain on Sale of Securities of $80 representing an 80% share of the $5 difference on 20 shares. The remaining $220 in proceeds shows up directly on the balance sheet as an increase in cash and an increase in Minority Interest.

Chapter 3

Spin-offs, Sell-offs and Equity Carve-outs, Finding the Right Tool for the Job

3.1 Introduction

Firms restructure for a variety reasons: financial constraints may force a firm to get rid of money losing divisions, unrelated divisions that lack synergies may operate more efficiently when not burdened with corporate overhead or firms might simply decided to focus limited resources on different core activities. A wide array of actions are available for the restructuring firm, from layoffs to levering the capital structure to divesting divisions. Spin-offs, sell-offs and equity carve-outs are three alternative methods for parent corporations to reduce or eliminate their presence in a particular industry. Previous research documents that announcements of these restructuring transactions result in positive cumulative abnormal returns of similar magnitude. These announcement effects are consistent with the belief that all three transactions generate increases in efficiency, as structural inefficiencies endemic to diversified firms are removed. Little is known, how-

ever, about the factors that influence the chosen form of restructuring. Is it true that the three transaction alternatives share similar motivations? In this study, I analyze a sample of 161 spin-offs, 81 sell-offs and 167 carve-outs occurring between 1981 and 1996 in an effort quantify the determinants of the restructuring choice.

For a spin-off to occur, the parent corporation must first incorporate the prospective business/division so that it can legally stand on its own. Shares are created for the new business via a registration with the SEC and are then distributed on a pro-rata basis to the parent's current shareholders on a pro-rata basis. Equity carve-outs are similar to spin-offs in that the entity must be legally incorporated and shares must be created via registration with the SEC. Shares are then sold in the marketplace in an initial public offering (IPO). Typically only a portion of the newly created shares will be sold. The rest are retained by parent who often maintains a controlling interest.[1] In a sell-off, no new corporate entities are created. The parent firm simply sells the business in question directly to another firm, either for cash, securities, assumption of debt, or a mixture of all three.

While different in substance, these three transactions all share an important common trait; on average, when parents announce an intention to pursue a spin-off, sell-off or carve-out, they enjoy a positive jump in their stock price of 1% to 3%. This common trait has lead to a somewhat myopic acceptance by outside observers that these deals are similar and interchangeable. This study says that they are not. I find that carve-outs are more likely when parents are financially constrained, there is a bull market, the carve-

[1]The percentage retained by the parent is important for several reasons. If the parent owns more than 80% of the shares in the carve-out, then the carve-out can be consolidated on the parent's tax return. Losses from one entity can be applied to gains from the other entity. If more than 50% is retained by the parent then consolidation on financial statements is allowed. In addition, ownership of more than 50% of the carve-outs shares will give the parent unequivocal control of the carve-outs board. It is likely, however, that significantly less ownership than 50% will still give defacto control to the controlling shareholder.

out's industry has outperformed the market, the carve-out operates in an industry which is closely related to the core industry of the parent and the division has superior operating performance and significant potential for growth. Sell-off are likely when parents are financially constrained as well and when the sell-off division has good operating performance. Unlike carve-outs, however, sell-offs tend to be in industries that are unrelated to the core parent industry and that have not had prior positive excess returns. Finally, spin-offs are likely when the parent is not highly levered or financially constrained. The spin-off divisions themselves tend to have poor operating performance, are in industries unrelated to the core parent industry, and occur when market and industry returns have been lackluster. Spin-offs also tend to be more likely when there is significant insider and CEO ownership of parent shares.

A central implication of these characteristics is that while spin-offs may be driven by desires to enhance shareholder value by dismantling structural inefficiencies, sell-offs and carve-outs are equally influenced by financial motives, i.e. a need to monetize an asset and raise cash. Other financing schemes such as seasoned equity offerings typically result in a decrease in the price of equity upon announcement, whether because of signaling issues or potential free cash flow problems. It is likely that similar forces impact an additional finding of this paper that announcement effects associated with carve-outs and sell-offs are significantly less than announcement effects associated with spin-offs.

The remainder of this paper consists of six sections covering the following areas: 1) reasons for refocusing and predictions for the three types of divestitures, 2) summary of existing research, 3) description of the data, 4) univariate analysis of division, parent, industry and market characteristics, 5) multivariate analysis using logistic choice regressions and 6) a conclusion.

3.2 Why Restructure/Refocus?

I broadly classify motives for restructuring as either financial or structural. Financial motives are characterized by a straightforward need for capital, whether to fund profitable growth opportunities, reduce leverage or to provide funds for future acquisitions. Firms have three basic options: sell additional securities, sell assets, or cut back on expenditures. Finding the cheapest possible way to meet funding requirements should be the overriding concern.

Restructuring for financial reasons is best accomplished via sell-offs and carve-outs. Carve-outs result in a direct increase in overall equity capital. In comparison, sell-offs simply monetize an asset and will not directly alter leverage ratios. Both, however, generate cash which can be redeployed to other divisions or paid out to various claimants.[2] If generating capital is the only objective, the choice between sell-off and carve-out will likely center on where the best price can be attained and how willing the parent is to end participation in the division's industry. Prices will be a function of market conditions, existence and liquidity of potential acquirors and asymmetric information between all potential participants. Implicit financial restructuring can also be achieved simply by severing ties to a division that is a net user of capital. Spin-offs and sell-offs achieve this objective by fully severing ties with the divested division. Legally, carve-outs become separate firms, however, it is unclear in practice what the future relationship will be between parent and carve-out.

Structural rationales are more complex, revolving around beliefs that the current corporate organization is somehow inefficient. A large body of work in corporate strategy

[2]Carve-outs can be an effective method of generating funds for the parent. In this sample, 82 percent of proceeds flow to the parent, either directly if the parent sells secondary shares in the offering, or indirectly via special dividends paid to the parent or as payment due on notes owed by the carve-out to the parent.

analyzes potential sources of inefficiency (referred to as X-inefficiencies). Williamson (1967) argues that distortions in information due to organizational complexity put a limit on diversification and size. Complexity can result in "management by the numbers" as discussed by Ravenscraft and Scherer (1987) when headquarters is forced to make decisions based on accounting numbers as opposed to a visceral understanding of actual conditions. Slater (1980) argues that a primary limit to growth is the difficulty involved in recruiting and training quality managers. Prahalad and Bettis (1986) believe that firms operate under a "dominant logic" which can be inappropriate when applied to unrelated industries. In the news reports announcing the restructurings in this sample, firms often claimed that they were motivated by a desire to focus efforts on a core industry; a shorthand method of saying that they want to limit X-inefficiencies.

Work in corporate finance has discussed how incentives for high level divisional managers may be muted by the fact that their division is buried within a larger organization. This necessarily limits the effectiveness of incentive compensation based on parent company equity prices.[3] In addition, lack of public trading in the division means that equity prices cannot be used to judge division manager performance or help in decisions about inter-company capital allocation. Scharfstein and Stein (1997) and Rajan, Servaes and Zingales (1997) discuss how political maneuvering within diversified firms can result in inefficient capital budgeting decisions as low quality divisions are granted excessive capital allocations in order to entice their managers to "get with the program". On a less rigorous level, a common insider quote for the spin-offs and carve-outs in this sample was that the market "incorrectly" values the conglomerate, whether because analysts were unwilling to follow multi-industry firms[4] or because problems in one division overshad-

[3]See Diamond and Verrecchia (1983), Holmstrom and Tirole (1993) or Burkhart, Gromb and Panunzi (1997) for various models of managerial incentives related to this issue.

[4]Recent research supports this claim. Gilson, Healy, Noe and Palepu (1997) analyze 45 stock breakups (spin-offs, carve-outs, targeted/tracking stock) between 1990-1995 where management specifically men-

owed opportunities in other divisions.[5]

Spin-offs, sell-offs and carve-outs all have the potential to alleviate various structural inefficiencies. Spin-offs and carve-outs both create new equity securities tied specifically to the divested division. This can generate improved analyst coverage, better incentives for division managers and additional information useful for corporate decisions. Potentially inefficient transfers of capital are stopped. Spin-offs and sell-offs directly reduce X-inefficiencies associated with complex conglomerates by totally severing ties with the divested division. In contrast, carve-outs are a less direct method of simplification. Legally, carve-outs and parents are separate firms with separate boards of directors. Parents, however, typically maintain substantial ownership in the carve-out division with corresponding representation on the board of directors.[6] Given the relationship, it is difficult to judge how effective carve-outs are at eliminating X-inefficiencies, however, efficacy is probably an increasing function of the percentage sold.[7]

The type of restructuring actually chosen by the parent will depend on the interplay of a variety of factors:

1. **Financial Need**: Parents of carve-outs and sell-offs are expected to have a greater need for funds than parents of spin-offs. Since carve-outs are the most direct method

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tioned the paucity of analyst coverage as a rationale for the breakup. In general there is significant turnover in analyst coverage and improvement in consensus earnings forecasts. Moreover, improvement in earnings forecasts is positively correlated with analyst turnover. Bhushan (1989) also finds evidence that analyst coverage is negatively related to the degree of firm diversification.

[5]Kimberly-Clark's 1995 spin-off of Schweitzer-Maudit International, a maker of cigarette rolling paper, is a classic example of a firm distancing itself from an industry with potential litigation problems. Another example is Union Carbides 1992 spin-off of Praxair. In this example it was the parent who was affected by litigation uncertainty stemming the Bhopal disaster.

[6]In the carve-outs in this sample, average (median) parent ownership after the carve-out is 73% (79%). Carve-out boards of directors usually contain executives and directors from the parent, the percentage being a function of parent ownership.

[7]Thermo-Electron Corporation is by far the most prevalent generator of carve-outs. Between 1983 and 1995, Thermo-Electron completed eight carve-outs. Four additional carve-outs were completed by the initial children creating a class of Thermo-Electron grandchildren. Thermo-Electron extols the level of independence that it gives these offspring. Still, it is difficult to imagine that this level of complexity actually reduces X-inefficiencies. For a complete clinical analysis of Thermo-Electron see Allen (1998).

of reducing leverage, I expect carve-out parents to have slightly higher leverage than sell-off parents.

2. **Financial Opportunity:** Parents will be unwilling to sell an asset via a carve-out or sell-off if the prospective price is low relative to intrinsic value will. Price will necessarily be a function of buyer ability to pay and willingness to pay. Unfortunately, we are only able to observe the price for the restructuring method actually chosen. Nevertheless, I expect proxies for ability and willingness to pay to be positively correlated with the restructuring method which is chosen. For ability to pay, I expect carve-outs to occur during bull markets and during periods of positive excess returns in the carve-out industry. I expect spin-offs will occur during bear market periods and in underperforming industries.[8] Market characteristics for sell-offs should be somewhere between the bounds delineated by carve-outs and spin-offs.[9] For willingness to pay, casual empiricism seems to show that buyers will judge a book by its cover. Detailed inspection will often be foregone when easily observable public information indicates an asset is of high quality. Risk aversion makes buyers *more* worried that a price is above intrinsic value and that problems lurk below the surface when public information like profitability figures are weak. This problem is amplified when buyers have limited inspection capability. Given this personal observation, I expect divisions being sold publicly to look better on the surface than sell-off or spin-off divisions, showing higher accounting returns and

[8]Spin-offs can be viewed as a commitment to sell a division at a later date. Rather than the parent firm deciding when to sell, it is now up to the individual shareholder to pick the most opportune time.

[9]A good sell-off price requires an interested buyer with sufficient capital. Acquisition capital can come in the form of internal cash flow or bidder stock. Bidders are more likely to have surplus capital during bull markets. In addition, potential buyers are more likely to be in industries related to the sell-off's industry, implying that excess returns in the industry are likely to be positive. Due to the construction of the sell-off portion of the dataset, the ability to pick up any bull market effect in sell-offs will be limited. This is because the sell-offs are artificially spread evenly through time. Cross-sectional effects of industries relative to the market should still be evident, however.

stronger growth characteristics. I expect the same relative relationship of sell-off divisions to spin-offs.

3. **Focus:** Spin-offs and sell-offs result in a complete severing of ties with the divested division while carve-outs result in a partial separation which is a function of the percentage of ownership sold. Recent evidence suggests that diversified firms (conglomerates) underperform focused firms.[10] Given the emphasis on reducing diversification during the 80's and 90's, I expect spin-offs and sell-offs will be more likely if the divested division is unrelated to the parent. I also expect that carve-outs where a small percentage of ownership is sold will be more likely to be related to the parent than carve-outs where a large percentage of ownership is sold. Additionally, I expect a greater percentage of spin-off and sell-off parents to announce that a desire to refocus is a primary motivation for the restructuring. Finally, I expect spin-off and sell-off parents to show greater diversification prior to the restructuring.

4. **Managerial Incentives:** The downside of generating additional liquid capital is that it might be frittered away on frivolous project by self-interested managers. Spin-offs generate no cash and actually reduce the size of the firm. From the standpoint of a manager who enjoys private benefits or official compensation correlated with firm size, doing a spin-off is an altruistic act. Cynicism regarding altruistic motives leads me to expect that managerial incentives will be more aligned with shareholder interests in spin-off parents relative to sell-off or carve-out parents. An observable implication is that CEO and insider ownership should be greatest in spin-off parents. An alternative implication is that outside blockholders will be more prevalent in spin-off parents since outside blockholders may push managers

[10] See Comment and Jarrell (1995), Berger and Ofek (1995) or Lang and Stulz (1994).

to pursue spin-offs rather than waiting for market or bidder conditions to improve.

The matrix below provides a concise summary of expectations.

		Financial Factors: strong	Financial Factors: weak
Structural Factors	strong	sell-off	spin-off
	weak	carve-out	nothing

3.3 Prior Research

Existing research on spin-offs, sell-offs and carve-outs has developed in three parallel threads with limited crossover. Early research concentrated on event studies that documented significant positive cumulative abnormal returns (CARS) for parent equity when parent firms announced intentions to conduct any one of the three types of deals. Studies find two day CAR's on the order of 2.5% to 3.5% for spin-off announcements[11], 1.5% to 2.5% for carve-out announcements[12] and 1% to 2% for sell-off announcements.[13] [14] There is moderate dispersion in the results, but spin-offs generally produce the largest announcement period returns followed by carve-outs and finally sell-offs.

CAR's for all three events seem to be positively related to the size of the division relative to the parent[15] and to future merger/takeover activity for spin-offs and carve-

[11]Examples include Miles and Rosenfeld (1983), Hite and Owers (1983), and Schipper and Smith (1983).

[12]Examples include Schipper and Smith (1986), Klein, Rosenfeld and Beranek (1991), Byers, Lee and Opler (1996), Allen and McConnel (1997) and Hand and Skantz (1997).

[13]Examples from the sell-off literature include Alexander, Benson and Kampmeyer (1984), Hearth and Zaima (1984), Jain (1985), Klein (1986), Hite, Owers and Rogers (1987), Trifts, Sicherman, Roenfeldt and Cossio (1990), Lang Poulsen and Stulz (1995), Loh, Bezjak and Toms (1995). John and Ofek (1995).

[14]Note, different studies do not always report results across the same event window. Some event windows are as wide as thirty days before and thirty days after the divestiture announcement, while others are a more concise 2 day event window.

[15]For spin-offs, see Hite and Owers (1983) or Miles and Rosenfeld (1983). For carve-outs see Allen and McConnel (1997), Byers, Lee and Opler (1997) or Hand and Skantz (1997). For divestitures see Klein (1986), Hearth and Zaima (1984) and Hite, Owers and Rogers (1987)

outs.[16] The relatively high level of mergers/takeovers experienced by both spin-offs and carve-outs indicates that these deals may serve to put the divested division "in play". The merger/takeover relationship is consistent with the findings of Cusatis, Miles and Woolridge (1993) who document superior long term returns (up to 3 years) for their subsample of spin-offs subjected to mergers/takeovers during that 3 year span.

Since carve-outs and sell-offs share the characteristic that cash is raised by the deal, it is not surprising that they seem to share a "free cash flow" effect. Byers et.al. (1997) and Allen and McConnell (1997) find that carve-out CAR's are larger if the parent firms have committed to disburse the future inflows via debt repayments or dividends. Lang, Poulsen and Stulz find a similar result for sell-offs. Finally, focus seems to matter. John and Ofek (1995) find that sell-off CAR's are larger if the parent is selling a division that is unrelated to the core industry of the parent. Daley, Mehrotra and Sivakumar (1996) find similar results for spin-offs.

Event studies have lead to further research into operational changes in divisions and parents after the event. Wruck and Wruck (1996) and Daley et.al. find evidence of post-spin-off improvements in operating performance measures, such as Return on Assets (ROA), particularly when spin-off divisions are unrelated to core parent industries.[17] Chapter one reports the opposite effect in a sample of carve-outs. Carve-out divisions have strong operating performance at the time of the carve-out, but experience significant declines in the ensuing 2-3 years. Parents of carve-outs show no appreciable changes in operating performance. This is interpreted as evidence of market timing by carve-out parents. Unfortunately, analysis of sell-off division operating performance is difficult since they are never directly exposed to the disclosure requirements imposed on publicly traded

[16] for spin-offs see Hite and Owers (1983). For carve-outs see Klein, Rosenfeld and Beranek (1991).

[17] The authors define subsidiaries as unrelated if they operate in a 2 digit SIC which differs from the primary SIC of the parent.

firms. John and Ofek (1995) do find, however, that parents of sell-offs, particularly those which are increasing their focus, experience improvements in operating performance after the sell-off.

A growing body of work looks at restructuring from a more general perspective. Bethel and Liebeskind (1993) find that ownership structure matters in refocusing. In 95 Fortune 500 firms between 1981 and 1987, firms with large block-holder and significant institutional ownership were more likely to decrease their diversification and were more likely to do so via asset divestitures. Liebeskind and Opler (1995) analyze refocusing activities of the 2500 largest firms in the United States between 1981 and 1987 where their proxy for refocusing is changes in the relative number of employees between core and peripheral divisions.[18] They find significant cross-sectional differences in the level of refocusing where firms which go from public to private ownership are more likely to refocus, firms with low market to book ratios (poor performers) are more likely to divest assets, firms with high market to book ratios are more likely to acquire additional core assets, and firms with significant intangible/extensible assets are less likely to refocus.[19]

The least explored area in the realm of divestiture/refocusing activities is direct study of relationships among the different methods of restructuring. Slovin, Sushka and Ferraro(1995) analyze CAR's of competing firms in the same industries as parents and divisions divested via spin-offs, sell-offs and carve-outs. They find a negative CAR (comparable to the effect they find with IPO's) for competitors of carve-out divisions. In contrast, excess returns for competitors of parents and of spin-off and sell-off divisions are approximately zero. Khan and Mehta (1996) analyze sell-offs versus spin-offs and find

[18]The core is defined as the 4 or 2 digit SIC code that constitutes the greatest percentage of company sales. Rather than using COMPUSTAT data, they use the more finely split data available on TRINET.

[19]In a similar study Markides (1996) analyzes 250 firms, randomly selected from the 1985 Fortune 500, Markides finds that refocusing firms are characterized by high diversification and poor performance relative to their industry counterparts. Additionally, firms are more likely to increase focus if their core industry has high profitability, size, few competitors and high advertising intensity.

that firms which do sell-offs tend to have higher leverage and lower cash flow. Divisions divested via a spin-off are more likely to be in risky industries (as measured by their equity beta) and to be large relative to the parent. Jongbloed looks at a small sample of spin-offs and carve-outs and concludes that, relative to their parents, carve-outs tend to have greater growth opportunities than spin-offs. Comparisons to matching firms not undertaking divestitures indicate that firms with large differences in divisional investment opportunity sets are more likely to engage in some form of divestiture.

3.4 The Data

The sample consists of 161 spin-offs, 81 sell-offs and 167 carve-outs that occurred between 1981 and 1996. The spin-off sample is identical to the one used in Powers and Scharfstein (1998). The spin-offs are identified by Securities Data Company who provided a list of domestic spin-offs of public parent companies from their New Issues database. The carve-out sample is a modified version of the one used in Powers (1997) which consists of 115 carve-outs occurring between 1981 and 1993. These carve-outs are identified via the SDC New Issues database for the period 1981-1990 and via an annual summary of deals in *Mergers and Acquisitions* for the 1991-1993 period. Additional observations for the years 1994-1996 (identified via *Mergers and Acquisitions)* are included. 18 observations from the original sample are excluded because the parents are not listed on COMPUSTAT or CRSP. The result is the current carve-out sample of 167 deals. The sell-offs are also identified via *Mergers and Acquisitions* using the journal's annual spring summary of the year's 25 biggest deals.[20] These articles provide 400 potential sell-offs, only a portion

[20]The shear number of sell-offs each year makes an exhaustive inclusion of all sell-offs daunting at best. Starting with the 25 largest sell-offs each year may induce some biases to the analysis, however, it should be recognized that the spin-off and carve-out samples are also biased towards the larger deals each year since these are the deals where data is most likely to be available.

of which are useful for this study. In order for a sell-off to be included in this sample, the parent firm's COMPUSTAT data must include a segment that corresponds to the divested entity.[21]

Since the intent of this study is to analyze situations where a parent firm could pursue either of the three potential divestiture choices, only sell-offs that look like they could have operated as an independent entity are included in this sample. Divisions which correspond to a segment prior to the sell-off but where the segment disappears from COMPUSTAT after the sell-off are representative of the appropriate group. Since sell-offs are a transaction between two parent firms, they never enter the public arena and are thus never required to disclose standard operating information. Segment data provides a limited window into the operations of these sell-off divisions while part of the original parent. Inclusion in the sample required that data was available for the segment for 2 of the 3 years prior to the event.[22] Sell-offs which are not included are often collections of assets like oil wells in a particular geographic location.

Divestitures of financial service firms such as banks and insurance companies (SIC code between 6000 and 6500) are not used in this study. Deals where the spin-off or carve-out is a Limited Partnership (LP) or an American Depository Receipt (ADR) are also not included. These exclusions are done in order to focus on a set of firms that report comparable financial information.

All parent firms must have data available on COMPUSTAT and CRSP for the year prior to the actual event. For the spin-offs and carve-outs, the divested division must be

[21] FASB No. 14 and SEC Regulation S-K require firms to report segment information for any segment accounting for more than 10% of consolidated sales, total assets, or profits.

[22] Firms are required to report divested entities as discontinued operations in the year that they are divested. Many firms report these divisions as discontinued operations as soon as they begin shopping the division around. This can be well before the divestiture actually occurs. These policies make it difficult to find data on the divested division immediately prior to the event. Looking at data for discontinued operations is not an option since results for multiple divisions can be included in this catch-all category.

listed on COMPUSTAT and CRSP for the year after the event. In addition the initial annual report must be available for the spin-offs and the offering prospectus must be available for the carve-outs. These two sources provide pro-forma financial data for the divested entity prior to the data typically available on COMPUSTAT.

Annual reports and prospectus generally provide balance sheet data for 2 years prior to the current date, income statement data for 4 years prior and cash flow statement data for 3 years prior. Summary data on the division such as total assets, revenues and net income are generally given for 5 years prior. Prospectuses also contain data on the actual deal such as offering price, number of shares sold, total shares sold, over-allotment provisions, and deal expenses. Finally, prospectuses include a brief 1 paragraph statement on the proposed use of the proceeds. COMPUSTAT segment data is not nearly as descriptive. Useful items include identifiable assets, sales and operating profit.

Data is aligned into an event time panel of years -5 to +5 where year 0 is the fiscal year during which public trading begins. In several areas of the analysis, comparisons are made to industry medians. I first identify firms which effectively operate in only one industry. Firms are considered pure-plays in an industry if in their COMPUSTAT segment data, they report more than 95% of their sales in that industry.[23] [24] This pure-play identification is done at three digit, two digit and one digit SIC levels by combining like segments.[25] After pure-play firms are identified, their firm wide COMPUSTAT data are

[23]The 95% cutoff level was somewhat arbitrarily chosen. Analysis of the COMPUSTAT segment data shows that there are a non-negligible number of firms that report a segment for headquarters operations or for discontinued operations. If these segments are small then there is really no reason not to classify the firm as a pure-play.

[24]COMPUSTAT segment data is used for this pure-play classification. Segment data is useful for two reasons: 1) SIC codes are included for each year in segement data. In contrast, the SIC code reported in the annual full firm data applies only to the most recent year, 2) Diversified firms like General Electric report only one SIC code in the annual full firm data. Because of GE's diversification, it is specious to compare GE to other firms in that primary SIC code.

[25]Assume a firm has three segments with SIC codes of 3125, 3128 and 3144. When identifying pure-plays at the three digit level we first combine the 3125 and 3128 segments into a 3120 "division", then see whether 95% of sales are in this "division". When identifying pure-plays at the two digit level we

used to calculate industry medians for items such as ROA, Tobin's Q, capital expenditures, etc. A median for an industry is only included if there are five or more pure-plays available. If there are not enough pure-plays to identify a median value at the three digit level in a particular year, then subsequent matching will be done at the two digit or one digit level.

Parents and spin-offs themselves are often comprised of multiple segments in different industries. Thus, in comparing these firms to an industry median, a weighted average of the various industries in which the firm operates is used. I weight by segment assets and calculate a "chop-shop" median. For example, in the Kenner Parker Toys spin-off from General Mills in 1985, Kenner Parker Toys reports a Toys and Games segment (SIC 3944) with 419.2 in assets. General Mills reports 3 segments: Consumer Foods (SIC 2043), Restaurants (SIC 5812) and Specialty Retailing (SIC 5621) with assets of 1091.8, 467.8, and 195.5 respectively. Thus, the industry, or "chop-shop" Q for Kenner Parker Toys will simply be the industry median for SIC 3940. For General Mills, the industry Q will be a weighted average of 62% SIC 2040, 27% SIC 5810 and 11% SIC 5620.

3.5 Univariate Analysis: General Characteristics

3.5.1 Overview

Table 1 lists the number of deals each year and the market value of the entities involved.[26] The spin-off and carve-out samples include a large percentage of the population of events that have occurred since 1981. The sell-off sample, however, represents only the tip of the

combine all three segments into a 3100 "division", etc.

[26]Market value for spin-offs and carve-outs is calculated as the sum of the market value of equity (using stock price and shares outstanding at the end of year 0) plus the book value of debt. Market value for sell-offs is the price paid for the division as reported by *Mergers and Acquisitions*. This price includes items like assumed debt and is therefore a valid comparison to the other market values.

iceberg as far as total reported sell-offs. For example, *Mergers and Acquisitions* reports a total of 2,503 deals for 181.7 billion dollars in 1996. Admittedly, 1996 was a big year, however, all years between 1987 and 1996 have at least 1,000 deals for at least 53 billion dollars. Since I develop the sell-off sample by analyzing the 25 largest deals each year, this group is artificially spread across the time span.

One fact which will be revisited later in the paper is that carve-outs are tracking the rising and falling IPO market. Bayless and Chaplinsky (1996) analyze the total volume of IPO's from 1968 to 1990 and classify months as hot, cold or neutral. Hot periods are 11/80-02/84, 07/85-08/87 and 04/88-09/88. Cold periods are 03/68-02/69, 08/73-02/75, 09/76-09/79, 02/89-10/89 and 05/90-12/90.[27] Between 1980 and 1991, 59% of carve-outs occur during hot periods while 14% occur during cold periods. For spin-offs, 49% occur during hot periods, while 22% occur during cold periods.

Table 2 lists the industries of the various divestitures. There are several industries where noticeable differences occur across the three types of divestitures. The natural resource extraction industries (SIC codes 1000-1400) witnessed a large number of spin-offs (14) and carve-outs (21) in the 1984-1988 and 1993-1995 time periods. In contrast, only 3 large sell-offs occurred in these industries. These deals tended to occur at peaks or troughs in the price of the extracted commodity. For example, 5 spin-offs and 12 carve-outs occurred in the petroleum extraction SIC of 1311, as integrated oil firms decided to expose these segments to the market via either a spin-off or carve-out. The 5 spin-offs all occurred in the mid 1980's when oil prices were low. Conversely, all of the carve-outs in this industry occurred after 1989 when oil prices stabilized. Other industries where there appear to be noticeable differences across the three divestiture forms are

[27]The central point of Bayless and Chaplinsky (1996) is that IPO's are underpriced less during hot markets (identified by IPO volume). They interpret this as evidence of "windows of opportunity" when either asymetric information is low, or the cost associated with asymetric information is low.

Industrial/Commercial Machinery & Computer Equipment (3500), Electrical Equipment Except Computers (3600), Electric Gas & Sanitary Services (4900) and Business Services (7300). None of these industries, however, seem to have experienced the concentrated wave of divestitures that occurred in the natural resource extraction group.

3.5.2 Divestiture Divisions.

Table 3 presents basic operating characteristics of divestiture divisions relative to industry values.[28] As shown in Powers (1997), carve-out mean (median) ROA peaks in the year of the event (year 0) at 18.0% (16.7%).[29] This compares to weighted average (median) industry values of 14.7% (12.8%). Average (median) industry adjusted values of 3.5% (3.7%) are both significant at the 1% level using a two sided t-test and a standard sign test. ROA increases in the years prior to the carve-out and declines in the years after the carve-out. Sign test statistics for differences relative to industry are significant in years -1 and 1, but t-test statistics are insignificant. A sharp decline in ROA brings it down to industry levels by year 2. Spin-offs show the opposite of the carve-out pattern with ROA at a minimum of 4.8% (11.7%) in year 0. Industry adjusted values of -9.5% (-.8%) are significant at the 1% and 10% levels respectively. Spin-off ROA climbs moderately to 7.6% (12.5%) in year 2. T-tests are still significant at the 1% level, however, sign tests are no longer significant. Sell-off ROA shows no real pattern. Mean (median) values of 16.7% (17.2%) are not significantly different from industry levels and do not differ appreciably from prior years. As noted, follow on data is not available for sell-offs after they become part of the acquiring firm.

Carve-outs begin life with high Q values of 2.338 (1.753) versus industry values of

[28] Industry adjusted values will have a prefix of I_.

[29] Throughout this study I have winsorized data elements at the 1^{st} and 99^{th} percentiles in order to control for outliers. Skewness in accounting variables makes outliers a problem. Winsorizing has been done on industry values as well.

1.838 (1.474). Industry adjusted values of .513 (.255) are significant at the 1% level. Q for the carve-outs declines in the ensuing years, partly due to stagnating stock prices, partly due to increases in their asset base.[30] Spin-offs, by comparison, begin life with relatively low Q values of 1.481 (1.196) versus industry values of 1.606 (1.306). Industry adjusted values of -.102 (-.087) are not statistically significant. Q for the spin-offs increases in the ensuing years.[31]

Table 4 shows that differences between the three samples are statistically significant. Differences between the low ROA of the spin-offs and the high ROA's of the carve-outs and sell-offs are significant at the 1% level. There is no significant difference, however, between carve-out and sell-off ROA. Spin-offs also have lower Tobin's Q, higher leverage, and greater diversification than carve-outs, significant at the 1% level.[32]

Parents sometimes bundle several unrelated, unwanted divisions into a new firm and then spin the bundle off. The U.S. Industries spin-off from Hanson Plc. in 1995 and the Henley Group spin-off from Allied Signal in 1986 are prime examples of this phenomenon. U.S. Industries was formed as a conglomeration of 34 disparate, unwanted industries which included Ames garden tools; Ertl, an international toy company specializing in die-cast miniatures; the Lighting Group, a maker of commercial and residential lighting; Office Group America, office furniture; Rexair vacuum cleaners; Farberware cookware and Tommy Armour golf clubs. Henley was spun-off as a group of 35 unwanted divisions. Major businesses included Fisher Scientific, a distributor of health care supplies; Green

[30]Powers (1997) finds that carve-outs underperform the market over the long term and that they invest heavily in their initial years as a public entity.

[31]In their analysis of 163 spin-offs that occured between 1965 and 1998, Cusatis, Miles and Woolridge (1993) find that the spin-offs post statistically significant matched firm adjusted (abnormal) returns of 25% two years after the spin-off and 33.6% at the three year point. Much of the excess returns is attributable to the large number of firms subject to takeover activity, suggesting that a primary effect of spin-offs is to put the firm "in play".

[32]Diversification is measured via an asset based Herfindahl index calcuated as $\sum \left(\frac{asset_i}{\sum asset_i} \right)^2$ where $asset_i$ denotes the identifiable assets for segment i as reported in the firm's COMPUSTAT segment data.

River, a soda ash producer; M.W. Kellogg Co. an engineering and construction firm; and Signal Environmental Systems, a waste energy producer. In contrast, carve-outs are almost always individual divisions, capitalizing on a perceived investor desire for pure-play firms.

In similar analyses of spin-off announcement effects, Hite and Owers (1983) and Schipper and Smith (1983) also looked at prices of senior securities for evidence of "expropriation". One source of the positive parent spin-off gains could be expropriation of wealth from bondholders as spin-off assets (collateral) are moved out from underneath the parent company bondholders. Their results are inconclusive. Given the relatively high leverage of the spin-offs themselves, this outcome is not surprising. Spin-offs are sent out with approximately the same leverage as the parent thus there is little opportunity for expropriation. The average spin-off has a leverage_2 value[33] which is only 3.2% (1.6%) (not reported in tables) less than the corresponding value for its parents. These differences are not significant. In contrast, carve-outs have leverage_2 values which are a statistically significant 19.7% (18.4%) less than parent values.

Differences between the divisions are consistent with expectation about the willingness to pay effect discussed earlier. Divisions which are sent out to the public market where asymmetric information is likely to be most problematic appear to be in the best condition. Their operating profits are high, they operate in high growth industries, and they are packaged with relatively low leverage. Conversely, spin-off divisions are in relatively poor shape. Operating profits are low and they are packaged with relatively high leverage. Since spin-off parents are not forced to market these divisions, however, financial appearance is of little consequence. Not surprisingly, sell-off divisions exist in the middle ground.

[33] $\text{leverage}_2 = \frac{long\ term\ debt + current\ debt}{long\ term\ debt + current\ debt + market\ value\ of\ equity}$

3.5.3 Divestiture Parents.

Parents are somewhat less distinctive than the divestiture divisions. Table 5 presents basic operating data for divestiture parents. Carve-out and sell-off parents are performing moderately below their industry levels. For carve-outs, t-statistics significant at the 1% level show that year -1 and year 1 ROA values of 11.8% (12.0%) and 10.5% (10.6%) are less than industry values of 13.8% (12.3%) and 13.6% (12.0%). Carve-out parent ROA of 13.1% (12.4%) in year 0 is potentially misleading since many parents recognize the premium above book value received for the shares sold as income, thus artificially inflating the year 0 ROA.[34] For sell-offs, t-statistics for differences from industry ROA are significant at the 5% level for year 0 and at the 1% level for year -1 and year 1. Spin-off parents are unremarkable with ROA figures close to industry levels. Patterns in parent Tobin's Q are similar to patterns in ROA. Carve-out and sell-off parents have Q values below their industry average, while spin-off parents have Q values moderately above their industry average.

More interesting are differences between the three parent samples. The most notable difference is that carve-out and sell-off parents carry a high debt burden relative to spin-off parents. Table 6 shows that for carve-out and sell-off parents, total debt as a percentage of market value, is 38% and 40.5% respectively, while for spin-off parents it is a more moderate 32%. Differences between the high and low leverage groups are significant at the 5% level or better using a variety of parametric and non-parametric statistical tests.

[34]Prior to 1983, any gain on sale had to allocated directly to additional paid in capital without passing through the income statement. In March 1983, the SEC issued Staff Accounting Bulletin no. 51 "Accounting for Sales of Stock by a Subsidiary" which gave firms the additional option of allocating the gain on sale to income. Hand and Skantz (1997b) analyze 100 carve-outs occuring between 1983 and 1993 and find that 81% use the income statement path. For their sample, pre-tax carve-out gain is a median 59% of parent pre-gain income. They find that higher leverage parents and parents with future positive earnings surprises are more likely to use the income statement path, seemingly consistent with a desire to smooth/manage earnings. Baldwin and Forsyth (1996) document that Thermo-Electron actively uses carve-outs and the associated gain on sale as a method of managing earnings, ensuring that the firm delivers continuing improvements in earning.

Sell-offs also have lower values of Tobin's Q: 1.320 versus 1.490 for spin-offs and 1.649 for carve-outs. Differences between carve-outs and sell-offs are significant at the 5% level or better, while differences between spin-offs and sell-offs are significant at the 10% level or better. Finally, at the year end prior to the event, sell-off parents are more diversified than spin-off or carve-out parents. Differences in leverage and ROA are not surprising. Consistent with the financing need prediction, parents with a greater apparent need for cash are the ones doing the cash generating events.

3.5.4 Divestiture Divisions Compared to Parents.

Table 7 presents data on the divestiture divisions relative to parents.[35] In year -1, spin-offs are a slightly larger percentage of parent book value than are carve-outs or sell-offs. In general, all groups comprise about 20% of parent book value. Differences arise when looking at ROA and Tobin's Q. As expected from tables 3 through 6, carve-outs are star performers relative to their parents while spin-offs are comparative dogs. Sell-off divisions do not differ significantly from their parents.

For carve-outs, ΔROA of 7.06% (10.2%) and ΔQ of .880 (.386) are significant at the 1% level. In comparison, spin-offs have ΔROA of -.079 (-.023) significant at the 1% (5%) levels. Spin-off ΔQ of -.203 (-.283) is significant at the 10% (1%) levels. Industry comparisons as seen in table 8 are similar. Carve-outs operate in industries with higher ROA and Tobin's Q than the average parent industry. Sell-offs also operate in industries with slightly higher ROA than the average parent industry. Spin-offs operate in industries with comparable characteristics to the average parent industry, indicating that it is the spin-off itself which is a sub-par performer, not that it comes from a struggling industry.

[35] Differences between the divestiture division and the parent have a prefix of Δ.

3.5.5 Market and Industry Returns.

Announcement dates for each deal come from the first newswire or newspaper report of the impending spin-off, sell-off or carve-out listed on Lexis-Nexis. Market and industry returns are calculated for the 12 months before and after the announcement dates. Pre-event returns are the buy and hold returns starting 1 year prior to the first day of announcement month up to the first day of the announcement month. Post-event returns run from the first day of the month after the announcement month until 1 year later.

Table 9 gives mean and median of pre and post-event returns for the CRSP value weighted index, the industry, and the excess return of industry minus the index. The appropriate industry is identified as the 3 digit industry in which the divested entity has the greatest sales. Stand-alone firms in this industry then comprise the matching sample. The industry return is then the market value weighted average for the stand-alone firms.[36]

Consistent with expectations of financial opportunity, pre-event market returns are strongest for the carve-outs with mean (median) values of 18.78% (16.96%). By comparison, pre-event market returns for spin-offs and sell-offs are 15.35% (16.09%) and 14.64% (16.09%) respectively. Differences in pre-event market returns for carve-outs relative to spin-offs are significant at the 5% level. Relative to sell-offs, differences are significant at the 10% level, partly due to the smaller sample size. Contemporaneous spin-off and sell-off market returns are not significantly different. Relative post-event returns are the mirror image of pre-event returns. Carve-outs correspond to the lowest post-event market returns while sell-offs correspond to the largest post-event market returns. Differences of carve-outs relative to spin-offs and sell-offs are again significant at the 5% level.

Differences in industry returns are even more significant. Carve-out industries have pre-event returns of 31.30% (23.05%) while spin-off and sell-off industries have pre-event

[36]Results for median values for each industry and for the CRSP equal weighted index are comparable.

returns of 16.55% (11.59%) and 16.11% (9.05%) respectively. After controlling for market returns, differences between carve-out and spin-off industries are significant at the 1% level while differences between carve-out and sell-off industries are significant at the 5% level. Again, spin-off and sell-off industries are not significantly different. Market adjusted post event industry returns are modestly greater for carve-outs relative to spin-offs: 3.62% (-1.39%) versus -2.9% (-4.20%), significant at the 10% level for a t-statistic, but insignificant for a non-parametric ranksum test.

3.5.6 Announcement Effects

In order to verify comparability of this dataset with previous studies, announcement date cumulative abnormal returns are calculated. I use a market model with a 200 day estimation period beginning 250 days prior to the announcement date and ending 50 days prior to the announcement date.[37] Parameter estimates $(\alpha, \beta)$and residuals are calculated by regressing daily parent returns on the CRSP value weighted index. CAR's over a three day span from announcement date -1 to announcement date +1 are then calculated using these parameters. Standard error are calculated using the methodology discussed in Campbell, Lo and MacKinlay (1996) chapter 4. This methodology accounts for the uncertainty generated by the initial parameter estimation as well as the normal residual noise. These unbiased standard errors are then used to calculate Campbell et.al's normally distributed J1 and J2 statistics to test for significance (see appendix at the end of chapter 2 for details).

Table 10 reports the results of this event analysis. Consistent with prior studies, spin-offs are associated with the largest CAR's at 3.63%, followed by carve-outs at 2.16% and sell-offs at 1.14%. All results are significantly different from zero with J1 and J2

[37] I thank Don Cram for providing access to a personal library of SAS routines developed for this purpose.

statistics which are significant at better than the 1% level. Non-parametric analysis indicates that 71.3% of spin-off CAR's, 60.5% of carve-out CAR's and 58.1% of sell-off CAR's are greater than 0. Sign tests show that the spin-off percentage is significant at better than the 1% level, carve-outs are significant at just under the 1% level, while sell-off percentages are not statistically significant.

An obvious question to ask is whether these CAR's are different from each other. Table 11 shows that spin-off CAR's are significantly greater than either carve-out or sell-off CAR's. The difference relative to carve-outs is significant at the 5% level while the difference relative to sell-offs is significant at the 1% level. Market reactions to carve-out and sell-off announcements are not significantly different from each other. It is possible that spin-offs are taken more seriously by the market due to the absence of confounding financial motives.

3.5.7 Equity Ownership.

Table 12 presents basic data, gathered from corporate proxy statements, on equity ownership in the parent.[38] CEO ownership represents the percentage ownership of the most powerful insider. In most cases this is the CEO, however, in some cases where the CEO and Chairman of the Board are separate individuals, it is apparent that the Chairman of the Board is the primary decision maker. Therefore, the CEO data may represent either individual. Insider ownership represents combined ownership of all board members and officers of the company. Finally, outsider ownership represents combined ownership of all 5% beneficial owners who are not insiders.[39] Insider and CEO ownership includes

[38]The proxy statement used is the last regular proxy statement prior to the announcement date.

[39]Care needs to be taken when analyzing 5% beneficial owners since there will often be insiders who are part of this group. Additionally, a corporate pension plan administered by an investment advisory firm will often be a 5% beneficial owner. Voting power for shares in the pension plan often rest with a committee comprised of board members, thus, including pension plans in the outsider group would be inappropriate.

shares actually held and options/warrants exercisable within the next 60 days. A more complete analysis would include the value of unexerciseable options, however, the lack of a standard reporting method would make this a very time consuming level of analysis. [40]

The primary observation is that CEO, insider and outsider ownership are substantially lower in sell-off parents. Between spin-off and carve-out parents, median insider and CEO ownership is marginally larger in the spin-offs at 7.36%, 1.72% versus 4.71%, 0.85%. Mean ownership, however, is quite similar. Outsider ownership is highest in the carve-out sample at 15.54% (8.96%) versus 9.25% (5.41%) for spin-offs and 7.41% (0.0%) for sell-offs. Finally, the tenure of carve-out and spin-off parent CEO's measured as the amount of time spent as a member of the corporate board is significantly greater than the tenure of the sell-off CEO's. These differences are significant at the 1% level.

One potential problem is that sell-off parents are generally larger than spin-off or carve-out parents, thus the amount of money necessary to accumulate a 1% share is proportionally greater. In order to control for this, I divide the value of a CEO's share holdings by cash compensation in the previous year. This provides a rough proxy for the relative amount of CEO wealth tied up in their firms equity. Using this metric, CEO's of spin-off parent have the greatest percentage of personal wealth tied up in their firm's equity with the equivalent of 4.566 (.461) years of salary. Carve-out parent CEO's have the next greatest commitment with the equivalent of 2.167 (.294) years of salary. Sell-off parent CEO's lag well behind the other two with the equivalent of .299 (.073) years of salary invested. These differences between spin-offs and carve-outs are significant at the 5% level. Differences between sell-offs and both spin-offs and carve-outs are significant

[40]Data has also been collected on ownership of class B common shares and preferred shares if these are part of the capital structure. Inclusion of these security classes, however, does not change the relative ordering in the subsamples nor does it appreciably change the significance statistics.

at the 1% level.

These results are partly consistent with managerial incentive expectations. The fact that spin-offs lessen the size of the empire governed by the CEO lead us to expect that incentives for spin-off parent CEO's will be most closely aligned with shareholders interests, i.e. spin-off parent CEO's will own more stock. As a percentage of cash compensation, this expectation is true. In addition, unadjusted insider ownership is slightly greater in the spin-off sample. The fact that outsider ownership is greatest in the carve-out sample, however, is not expected.

3.6 Multivariate Analysis: Logistic Regressions on Divestiture Choice.

Factors associated with the financial need, financial opportunity, focus and managerial incentive predictions are used as independent variables to determine what influences the choice between spin-off, sell-off or carve-out. A multinomial logit model is an effective means of testing models like this where the dependent variables is categorical and where there are more than 2 categories. [41] Proxies for financial need include parent leverage, industry adjusted parent leverage, rate of asset growth over the prior two years and parent profitability. If parents are highly levered, growing rapidly and only moderately profitable then I expect these parents to be choosing carve-outs or sell-offs. Proxies for

[41] In a multinomial logit model, maximum likelihood estimates are computed for coefficients. Assume three potential outcomes $i \in (1,2,3)$. The maximization procedure solves for the coefficients that maximize the three equations $\Pr(y=1) = \frac{e^{X\beta_1}}{\sum e^{X\beta_i}}, \Pr(y=2) = \frac{e^{X\beta_2}}{\sum e^{X\beta_i}}, \Pr(y=1) = \frac{e^{X\beta_3}}{\sum e^{X\beta_i}}$ where X is the vector of independent variables. Since this set of equations is unidentified with respect to scaling of the $\beta's$,one set of coefficients will be set to 0. This set is referred to as the base case. Assume that the base case is y=1. Given a specific X vector, The relative probability (odds ratio) of y=2 to y=1 is then simply $e^{X\beta_2}$. One way to conceptualize this is that the exponentiated value of coefficient j for outcome i, $(e^{\beta_{i,j}})$ is the relative risk ratio for a one unit change in $X_{i,j}$. The relative probability of y=2 to y=3 is the slightly more complex $\frac{e^{X\beta_2}}{e^{X\beta_3}}$.

financial opportunity are prior market returns, prior industry returns, industry Tobin's Q and division ROA. I expect that carve-outs will be most sensitive to stock market conditions and industry growth characteristics while both carve-outs and sell-offs will be positively correlated with the profitability of the divested division. With the focus prediction, diversified parents are expected to be more likely to choose spin-offs or sell-offs and these deals will be more likely to involve divisions that are unrelated to the core industries of the parent. Finally, I expect that ownership will matter with spin-offs being more likely when insider and CEO ownership is high, or when outsider ownership is high.

Tables 13 through 15 present multinomial logit results. In tables 13 and 14, spin-offs are the base case since carve-outs and sell-offs to be relatively similar across the factors analyzed there. In table 15, carve-outs are the base case since spin-offs and sell-offs should be relatively similar across the structural characteristics shown there. As expected from the univariate analysis, table 13 shows that financial need matters. For the carve-out subsample, coefficients for parent industry adjusted leverage and asset growth over the prior two years are both positive and significant at the 1% level with coefficients of 1.785, 1.531 respectively.[42] Parent ROA has a negative coefficient or -2.503, significant at the 10% level. This is consistent with the expectation that more profitable firms will have less need for external finance. For the sell-off subsample, parent Δ leverage and asset growth are positive and significant at the 5% level with coefficients of 1.478 and 1.037. Parent ROA for the sell-offs, however, generates a negative and insignificant coefficient. When all financial need variables are combined together, leverage and asset growth remain significant, however, parent ROA is insignificant for both subsamples.Table 14 presents a similar analysis for characteristics associated with the financial opportunity predictions. Carve-outs are more likely if the division has good profitability, is in a high Q industry,

[42] As an example of interpretation, holding all else constant, an increase in leverage from 10% to 20% would result in an increase of the odds of a carve-out relative to a spin-off of $e^{.1785} = 1.195$.

comes during a bull market and is in an industry with positive excess returns. Coefficients on ROA and industry Q are 2.847 and .5840, significant at the 1% level. Coefficients on market returns for the 12 months prior to the announcement date and median excess industry returns over the same period are 1.644 and 1.376, also significant at the 1% level. For sell-offs, the only variable with a significant coefficient is division ROA with a coefficient of 2.587, significant at the 1% level. These results are consistent with the expectation that divisions with only the best financial characteristics will emerge as carve-outs and only at the most opportune times.

Table 15 displays results for characteristics associated with the focus and managerial incentive predictions. Spin-offs and sell-offs are more likely to occur if the division is in an industry which is unrelated to the remaining industries of the parent.[43] Coefficients for the related dummy variable of -.7296 and -1.501 are both significant at the 1% level. Spin-offs and sell-offs differ in their sensitivity to the level of diversification (measured as an asset based Herfindahl index). Our expectation was that spin-offs and sell-offs would be more likely if the parent was highly diversified. Only sell-offs show this effect with a coefficient of -1.922, significant at the 1% level. Surprisingly, spin-offs have a positive coefficient of .7111 which is significant at the 10% level.

The expectation with respect to managerial incentives was that spin-offs would be more likely to occur when CEO, insider and outsider ownership was high. These would be situations when either managerial incentives are aligned with shareholder interests, or strong outsiders would be able to force management to take empire reducing actions.

[43]Rather than basing related on a comparison of overall firm SIC codes. We individually coded each parent-division pair by visually analyzing the reported segment data for the parent in the year following the event and comparing it to what we knew about the divested division from COMPUSTAT data, news reports, prospectuses, proxies etc. This heuristic method allows us to code vertically related entities as related or to code entities that we feel have similar attributes as related, even if the SIC coded do not match up exactly. Admittedly this is an inexact science and subject to reviewer biases, however, we expect any biases to apply equally to each deal type.

Results for these predictions are mixed. For spin-offs, CEO ownership is insignificant, insider ownership (all insiders exclusive of the CEO) is positive and significant at the 5% level and outsider ownership is negative and significant at the 1% level. For sell-offs, CEO and outsider ownership are negative and significant at the 5% level or better. Insider ownership, however, is insignificant. As noted in the univariate analysis, sell-off parents are generally larger than spin-off or carve-out parents, thus, we should not be surprised by lower CEO and insider ownership. To control for this CEO wealth risk (log of the value of the CEO's equity ownership divided by his cash compensation from the previous year) is included. Logs are used due to the skewness of this variable. Again, coefficients for the sell-off sample are negative and significant at the 1% level, while coefficients for spin-off parent are positive and insignificant. Composite results when all variables are included together are not significantly different from individual results.

Table 16 presents the composite analysis of characteristics which were of the greatest interest in the previous tables. The first two lines in the table present a summary multinomial logit model with spin-offs as the base case. As expected, carve-outs are more likely if the parent is financially needy, the division is in good financial condition and market conditions are favorable. These characterizations are based on significant coefficients for parent leverage (1% level) and parent asset growth (1% level); division ROA (1% level) and division industry Q (1% level); prior equal weighted index return (10% level) and prior industry excess return (5% level). It is difficult to characterize whether carve-outs are more likely when there is a need for refocusing since the coefficient on the related dummy variable is positive and significant at the 1% level while the coefficient on herfindahl index is negative and significant at the 5% level. Variables which are insignificant include parent ROA and the CEO wealth risk variable.

Sell-offs are less clear-cut than carve-outs. Significant coefficient are parent asset growth (1% level), division ROA (1% level), herfindahl index (1% level) and CEO wealth

at risk (1% level). It is difficult to conclusively state that sell-offs are more likely if the parent is financially needy since the positive parent leverage coefficient has a p-value of only 14%, while the sensitivity to parent ROA is essentially zero. Perhaps this is not surprising given that a sell-off really just amounts to a redeployment of assets from one industry to another. Sell-offs are more likely to occur when the division is in good financial condition, but they are not sensitive to the growth potential in the divisions industry, nor are they sensitive to market conditions. Given that there is no need to market this division via the typical IPO road show, these non-results are not surprising. Sell-offs are more likely to occur when there is a need for refocusing and they are less likely to occur if the CEO has substantial wealth at risk. Overall, the composite multinomial regression is highly significant and explains a decent amount of the variation in the sample with a χ^2 value of 129.82 and pseudo R^2 of 18.06%.

The remaining lines in table 14 display results from similar regressions run as binomial comparisons directly between the three different groups. The first two comparisons of spin-offs versus sell-offs and spin-offs versus carve-outs reaffirm what was revealed by the previous multinomial regressions. The third comparison of carve-out versus sell-offs is helpful in clarifying the differences between these two subsamples. We see that coefficients on parent leverage, parent ROA and parent asset growth are all insignificant at conventional levels, indicating that carve-outs are not significantly more sensitive to financial need than are sell-offs. The coefficient on market return is positive and significant at the 5% level while the coefficient on industry excess return is positive but insignificant, indicating that carve-outs are more likely in a bull market but are not conditional on industry attractiveness. Finally, positive and significant (1% level) coefficients on relatedness and CEO wealth at risk confirm earlier observations.

3.7 Conclusion.

The unsurprising conclusion from this analysis is that spin-offs, sell-offs and equity carve-outs are different. This fact has tended to be dismissed due to a focus on market reactions to event announcements. Many previous studies have analyzed spin-offs, sell-offs or carve-outs in isolation, consistently finding positive cumulative abnormal returns around announcement dates and leading to the conclusion that since announcement affects are similar, motivations and subsequent affects of these deals must be similar. This is fundamentally untrue.

I find that spin-offs are more likely to occur when a parent firm has an unrelated and poorly performing division that is a drain on corporate resources. While a sell-off or a carve-out of a significant number of shares might be an option, the weak market conditions, poor growth opportunities and poor profitability seen with spin-off divisions likely make some form of sale in the face of asymmetric information difficult. If spin-offs truly generate long term value, then moderately higher ownership of spin-off parents by corporate insiders, particularly the CEO may mean that spin-off parents are more willing to cut a division loose without receiving any assets in return. The relatively low leverage seen with spin-off parents contributes to the willingness to give up something (the spin-off) for nothing.

Carve-outs are found to be more likely when the parent has a related and strongly performing division with significant growth potential. Since parents typically maintain majority control of the carve-out, it is not surprising that carve-out divisions tend to be more closely related to other parent divisions. Maintaining control allows for better exploitation of synergies between the carve-out division and the rest of the parent. Investment bankers would have one believe that carve-outs are done strictly to unlock hidden value in the firm by exposing the carve-out division to the scrutiny of the market. Public

scrutiny is beneficial if it results in informative equity prices which are useful for incentive contracts or for aiding in corporate decisions about resource allocation. Public trading in carve-out equity can also be valuable if it opens up access to capital that previously was unavailable. Facts that I have discussed regarding carve-outs, however, leads one to take the investment banker's fee driven optimism with a grain of salt. Carve-outs are more likely to occur when the parent is highly levered, has grown rapidly and when bull market periods have driven market wide prices to high levels. Additionally, carve-outs are more likely to occur when the industry of the carve-out has had strong prior returns. Coupled with the fact that the parent overall is a lackluster performer, carve-outs are likely to be partly motivated by a desire to monetize a potentially overvalued asset.

Sell-offs seem to be most similar to carve-outs. They are more likely to occur when the parent is highly levered and has poor profitability. They are also more likely when the division has good profitability. Unlike the carve-out, however, sell-offs are generally not in industries which are related to other parent industries, they are not associated with industries that have strong prior market returns nor are they associated with industries that seem to have significant growth potential. Given our perception that IPO markets focus on growth and glamor to the exclusion of value, it is not surprising that sell-offs are exchanged privately. Sell-offs do generate increased focus in the parent firm, however they do not result in structural changes which are likely to unlock hidden value (unless of course the acquiring company is a more effective operator of the sell-off divisions). Low CEO, insider and outside block holder ownership of sell-off parents is consistent with the characterization that sell-offs are driven to monetize a cash cow business into cash today that can be re-invested in the corporation.

The concise conclusion is that spin-offs are driven predominantly be structural factors, i.e. a desire to sever ties with a division that has poor fit with the rest of the parent corporation and that is a drain on corporate resources. The potential selling price today

for the spin-off division may be low due to unfavorable market conditions. The parent could always wait until the price firms and then sell the division via a sell-off or carve-out, however, spin-off parents do not appear to need additional cash. Thus, spin-off parents are willing to give the division away. Carve-outs occur because parents need cash and they have an asset that can generate that cash. Carve-outs provide a handy way of monetizing a hot commodity when market conditions are favorable. Best of all, the parent can maintain control of the carve-out if synergies with the parent are strong. Sell-offs share characteristics of spin-offs and carve-outs. They occur when a parent needs cash but when market conditions are unfavorable. Parents likely have limited reason to maintain an interest in the sell-off since they are generally in unrelated industries.

Table 1: Number of Divestitures and Market Value in millions of 1996 $ By Year.

Year	Spin-offs	Sell-offs	Carve-outs
1981	0	9	2
		(5488.3)	(252.7)
1982	1	10	0
	(64.9)	(5118.8)	
1983	4	4	8
	(1682.9)	(1209.5)	(3957.7)
1984	7	5	3
	(2866.8)	(8682.4)	(566.5)
1985	12	10	3
	(3614.1)	(12059.2)	(1454.2)
1986	10	10	8
	(9031.9)	(11873.3)	(15249.7)
1987	13	7	13
	(6012.2)	(6429.9)	(11014.0)
1988	17	5	7
	(8880.3)	(13464.9)	(10229.0)
1989	18	4	9
	(7175.1)	(4291.6)	(7113.4)
1990	10	3	9
	(4569.4)	(5127.2)	(3198.4)
1991	8	0	7
	(4295.9)		(3811.2)
1992	12	2	13
	(7430.5)	(1949.9)	(4119.4)
1993	19	3	13
	(21376.8)	(5579.4)	(3148.3)
1994	16	4	29
	(14023.3)	(11583.8)	(12029.6)
1995	10	5	16
	(7790.4)	(14076.5)	(19605.3)
1996	4	3	25
	(1578.8)	(9210.0)	(33045.6)
Total	161	82	167
	(100393.3)	(116214.7)	(128795.0)

Table 2: Divestitures By Primary 2 Digit Industry.

2 Digit SIC	Spin-offs	Sell-offs	Carve-outs	Industry Name
100	1			Agricultural Production-Crops
200	1		1	Agricultural Production-Livestock
1000	3		6	Metal Mining
1200	3	1		Coal Mining
1300	8	2	14	Oil and Gas Extraction
1400			1	Mining, Quarry Non-metal Minerals
1500			2	Building Construction & General Contracting
1700			1	Construction, Special Trade
2000	3	5	6	Food and Kindred Products
2200	1		1	Textile Mill Products
2300	2	1		Apparel & Other Finished Products
2400	1			Lumber & Wood Products Except Furniture
2500			1	Furniture & Fixtures
2600	5	3	3	Paper & Allied Products
2700	1	1	2	Printing, Publishing & Allied Products
2800	12	12	12	Chemical & Allied Products
2900	1	2	2	Petroleum Refining & Related Industries
3000	6	2	2	Rubber & Miscellaneous Plastic Products
3100	1			Leather & Leather Products
3200	3	1	4	Stone, Clay, Glass & Concrete Products
3300	4	3	5	Primary Metal Industries
3400	6	2	2	Fabricated Metal Except Machinery or Transportation
3500	12	5	7	Industrial/Commercial Machinery & Computer Equip.
3600	12	3	5	Electrical Equipment Except Computers
3700	6	5	6	Transportation Equipment
3800	5	2	11	Measuring Instruments, Photo Goods, Watches
3900	2		3	Miscellaneous Manufacturing
4000	1			Railroad Transportation
4200	2	1		Motor Freight Transport, Warehousing
4400	1	1		Water Transportation
4500	1		3	Air Transportation
4700		1		Transportation Services
4800	7	3	9	Communications
4900	5	3	10	Electric Gas & Sanitary Services
5000	6		4	Durable Goods Wholesale
5100	3		2	Non-durable Goods Wholesale
5200	2			Building Material/Hardware/Garden Retail
5300	3	4	3	General Merchandise Stores
5500			1	Auto Dealers, Gas Stations
5600		1	3	Apparel & Accessory Stores
5700	1		2	Home Furniture & Equipment Stores
5800	5	1		Eating & Drinking Places
5900	4	1	8	Miscellaneous Retail
6500	3	1		Real Estate
7200			1	Personal Services
7000	1	4		Hotels, Other Lodging Places
7300	4	3	13	Business Services
7500		3		Auto Repair, Services, Parking
7800	3	1	1	Motion Pictures
7900	3	2		Amusement, Recreation
8000	1	2	2	Health Services
8200	4		2	Educational Services
8300	1		2	Social Services
8700	2		2	Engineering, Accounting, R&D, Mgmt, Related Svcs.
Total	161	82	167	

Table 3: Comparison of Division to Industry

Data is aligned so that the year of the event is year 0. All data elements have been winsorized at the 1st and 99th percentiles in order to limit the influence of outliers. These winsorizing percentile values are calculated using all non-financial firms in COMPUSTAT reporting between 1980 and 1996. ROA is Return on assets calculated as (Earnings before Interest, Taxes and Depreciation)/ (Total Assets). Q is Tobin's Q calculated as (Market Value of Equity -Book Value of Equity + Total Assets - Deferred Taxes)/ (Total Assets - Deferred Taxes). Industry values are calculated in two ways. The upper value in each industry cell is a weighted average of firms in that industry. For example, Industry ROA can be viewed as the ROA of the entire industry if it were coalesced into one firm. The lower value in each industry cell is the median value for each industry. The upper and lower I_ROA and I_Q values are mean and median industry adjusted values. Significance at the 10%, 5% and 1% levels is denoted by *, **, *** where significance is calculated using a two sided t-test for the mean and with a sign test for the median.

	Year -2	Year -1	Year 0	Year 1	Year 2
Carve-outs:					
ROA	.145	.165	.180	.146	.124
	.142	.156	.167	.140	.130
Industry ROA	.145	.146	.147	.148	.144
	.124	.122	.128	.124	.123
I_ROA	.001	.019	.035***	-.002	-.020
	.017	.028***	.037***	.023***	.001
Q			2.338	2.090	1.883
			1.753	1.540	1.477
Industry Q	1.696	1.821	1.838	1.787	1.783
	1.367	1.470	1.474	1.424	1.473
I_Q			.513***	.311**	.089
			.255***	.065	.044
Spin-offs:					
ROA	.090	.053	.048	.070	.076
	.120	.115	.117	.121	.125
Industry ROA	.139	.139	.144	.141	.138
	.133	.126	.122	.127	.123
I_ROA	-.052**	-.086***	-.095***	-.067***	-.062***
	-.017*	-.011	-.008*	-.001	-.003
Q			1.481	1.559	1.681
			1.196	1.252	1.239
Industry Q	1.548	1.604	1.606	1.600	1.688
	1.264	1.306	1.306	1.306	1.341
I_Q			-.102	-.019	.018
			-.087	-.050	-.037*
Sell-offs:					
ROA	.169	.169	.167		
	.171	.159	.172		
Industry ROA	.175	.174	.168	.152	.155
	.144	.144	.134	.140	.134
I_ROA	-.006	-.010	-.016		
	-.002	.008	.012		
Industry Q	1.507	1.509	1.542	1.574	1.399
	1.290	1.280	1.270	1.291	1.225

Table 4: Comparison of Divisions.

This table reports the results of comparing 5 variables across each of the 3 types of restructuring transaction divisions. All data elements have been winsorized at the 1st and 99th percentiles in order to limit the influence of outliers. These winsorizing percentile values are calculated using all non-financial firms in COMPUSTAT reporting between 1980 and 1996. ROA is Return on assets calculated as (Earnings before Interest, Taxes and Depreciation)/ (Total Assets). Q is Tobin's Q calculated as (Market Value of Equity -Book Value of Equity + Total Assets - Deferred Taxes)/ (Total Assets - Deferred Taxes). $Leverage_1$ is (long term debt) / (market value of equity + long term debt), $Leverage_2$ is (long term debt + short term debt) / (market value of equity + long term debt + short term debt). ROA comparisons are done using year 4 data when divestitures are involved and year 5 data for the comparison of carve-outs to spin-offs. Q and leverage comparisons are done using year 6 data, the first year of independent operation. P-values are reported for a two sided t-test assuming unequal sample variances and the Mann-Whitney ranksum test. P-values less than .05 are displayed in bold. P-values between .05 and .10 are displayed in italics.

				Significance test p-values		
	Carve-outs	Spin-offs	Sell-offs	Carve-outs vs. Spin-offs	Carve-outs vs. Sell-offs	Spin-offs vs. Sell-offs
ROA	.179	.056	.170	**.0000**	.5007	**-.0074**
				.0000	.5098	**-.0032**
Tobin's Q	2.276	1.478		**.0000**		
				.0000		
$Leverage_1$	.153	.261		**.0000**		
				.0000		
$Leverage_2$	.164	.296		**.0000**		
				.0000		
Asset Herfindahl Index	.958	.887		**.0002**		
				.0001		

Table 5: Comparison of Parent to Industry

Data is aligned so that the year of the event is year 0. All data elements have been winsorized at the 1st and 99th percentiles in order to limit the influence of outliers. These winsorizing percentile values are calculated using all non-financial firms in COMPUSTAT reporting between 1980 and 1996. ROA is Return on assets calculated as (Earnings before Interest, Taxes and Depreciation)/ (Total Assets). Q is Tobin's Q calculated as (Market Value of Equity -Book Value of Equity + Total Assets - Deferred Taxes)/ (Total Assets - Deferred Taxes). Industry values are calculated in two ways. The upper value in each industry cell is a weighted average of firms in that industry. For example, Industry ROA can be viewed as the ROA of the entire industry if it were coalesced into one firm. The lower value in each industry cell is the median value for each industry. The upper and lower I_ROA and I_Q values are mean and median industry adjusted values. Significance at the 10%, 5% and 1% levels is denoted by *, **, *** where significance is calculated using a two sided t-test for the mean and with a sign test for the median.

	Year -2	Year -1	Year 0	Year 1	Year 2
Carve-out Parents:					
ROA	.130	.118	.131	.105	.109
	.129	.120	.124	.116	.120
Industry ROA	.141	.138	.138	.136	.141
	.125	.123	.123	.120	.122
I_ROA	-.012**	-.020***	-.007	-.031***	-.034***
	-.001	-.004	.003	-.010	-.012
Q	1.538	1.569	1.502	1.456	1.461
	1.251	1.259	1.305	1.244	1.324
Industry Q	1.582	1.604	1.614	1.609	1.654
	1.279	1.332	1.348	1.345	1.371
I_Q	-.067	-.052	-.128**	-.157***	-.198***
	-.013	-.066**	-.052*	-.056*	-.048*
Spin-off Parents:					
ROA	.145	.134	.128	.144	.134
	.146	.140	.145	.142	.150
Industry ROA	.140	.140	.143	.142	.140
	.129	.122	.122	.121	.120
I_ROA	.005	-.006	-.013	.03	-.006
	.020***	.007*	.013	.020	.018
Q	1.472	1.490	1.678	1.678	1.682
	1.288	1.259	1.388	1.415	1.409
Industry Q	1.512	1.548	1.595	1.600	1.582
	1.286	1.290	1.301	1.333	1.300
I_Q	-.042	-.054	.077	.085	.132*
	-.014	-.010	.060*	.056**	.042
Sell-off Parents:					
ROA	.147	.131	.120	.130	.145
	.155	.138	.116	.141	.145
Industry ROA	.164	.154	.153	.156	.147
	.142	.131	.128	.127	.131
I_ROA	-.019**	-.024**	-.032***	-.027**	-.010
	.009	-.003	-.014	-.001	.009
Q	1.281	1.322	1.334	1.377	1.434
	1.072	1.140	1.210	1.173	1.269
Industry Q	1.429	1.424	1.445	1.486	1.464
	1.264	1.289	1.276	1.274	1.224
I_Q	-.150**	-.094**	-.089*	-.107**	-.045
	-.142***	-.062**	-.047*	-.002	-.010

Table 6: Comparison of Parents.

This table reports the results of comparing 5 variables across each of the 3 types of restructuring transaction divisions. All data elements have been winsorized at the 1st and 99th percentiles in order to limit the influence of outliers. These winsorizing percentile values are calculated using all non-financial firms in COMPUSTAT reporting between 1980 and 1996. ROA is Return on assets calculated as (Earnings before Interest, Taxes and Depreciation)/ (Total Assets). Q is Tobin's Q calculated as (Market Value of Equity -Book Value of Equity + Total Assets - Deferred Taxes)/ (Total Assets - Deferred Taxes). $Leverage_1$ is (long term debt) / (market value of equity + long term debt), $Leverage_2$ is (long term debt + short term debt) / (market value of equity + long term debt + short term debt). ROA comparisons are done using year 4 data when divestitures are involved and year 5 data for the comparison of carve-outs to spin-offs. Q and leverage comparisons are done using year 6 data, the first year of independent operation. P-values are reported for a two sided t-test assuming unequal sample variances and the Mann-Whitney ranksum test. P-values less than .05 are displayed in bold. P-values between .05 and .10 are displayed in italics.

				Significance test p-values		
	Carve-outs	Spin-offs	Sell-offs	Carve-outs vs. Spin-offs	Carve-outs vs. Sell-offs	Spin-offs vs. Sell-offs
ROA	.118	.134	.131	*-.0703*	-.2321	.7883
				-.0988	-.1036	.9992
Tobin's Q	1.649	1.490	1.320	.3270	*.0501*	*.0624*
				.5409	**.0047**	**.0319**
$Leverage_1$	.336	.284	.359	**.0420**	-.4914	**-.0215**
				.0453	-.4573	**-.0196**
$Leverage_2$	.380	.320	.405	**.0207**	-.4614	**-.0101**
				.0187	-.5120	**-.0091**
Asset Herfindahl Index	.557	.601	.382	*-.0913*	**.0003**	**.0000**
	(.624)	(.674)	(.489)	*-.0517*	**.0003**	**.0000**

Table 7: Comparison of Division to Parent

Means (medians) for Assets Ratio, Sales Ratio, Δ ROA and Adjusted Δ ROA are calculated using year -1 data for carve-outs and spin-offs, and year -2 data for the sell-offs. Δ Q and adjusted Δ Q are calculated using year 0 data (the first year when an independent stock price is available for the division). Year -2 data is used for divestiture data elements since many divested divisions are listed as discontinued operations in year -1, limiting the ability to find clean data for these divisions. Data definitions: Assets Ratio is division assets divided by parent assets, Sales Ratio is division sales divided by parent sales, ΔROA and ΔQ are the division value minus the parent value. Adjusted ΔROA and Adjusted ΔQ are industry adjusted differences between the division and the parent. Significance is measured by a two sided t-test for mean values and a standard sign test for median values. 1%, 5% and 10% levels are denoted by ***, **, * respectively.

	Assets Ratio	Sales Ratio	ΔROA	Adjusted ΔROA	ΔQ	Adjusted ΔQ
Carve-outs:	.175	.251	.076***	.079***	.880***	.974***
	(.102)	(.122)	(.102)***	(.063)***	(.386)***	(.594)***
Spin-offs:	.243	.278	-.079***	-.074***	-.203*	-.286*
	(.206)	(.208)	(-.023)**	(-.028)*	(-.283)***	(-.104)*
Sell-offs:	.149	.172	.015	.034**		
	(.126)	(.126)	(-.006)	(-.034)		

Table 8: Comparison of Division and Parent Industries.

All reported values are the weighted average industry value for the divested division minus the weighted average industry value for the parent, where industry values are computed using the "chop-shop" methodology. Comparison is made using year 0 data (year of the event). ROA is return on assets, Q is Tobin's Q, CAPXA is capital expenditures divided by assets. Significance is measured by a two sided t-test and a standard sign test. 1%, 5% and 10% levels are denoted by ***, **, * respectively.

	Industry ΔQ	Industry ΔROA	Industry ΔCAPXA
Carve-outs:	.203***	.009**	.011***
	(.098)***	(.001)	(.003)**
Spin-offs:	.065	-.001	.001
	(.008)	(.000)	(.000)
Sell-offs:	.126*	.011**	.008
	(.019)	(.034)	(.001)

Table 9: Annual Industry Returns, Pre and Post-announcement.

Table presents mean (median) returns for the CRSP Value Weighted Index, market weighted industry returns and excess industry returns for the 12 months before and after the announcement date of the respective carve-out, spin-off or sell-off. Prior return variables are generated using monthly returns from month t-12 through t-1. After return variables are generated using monthly returns from month t+1 through t+12. The appropriate matching industry is determined by identifying the SIC code in which the divested division has the greatest percentage of sales in the year of the event. Firms comprising each industry matching sample are firms with more than 95% of their sales in the applicable SIC for that year. Industry matching is done at the 3 digit SIC level if there are 5 or more matching firms available for that industry/year, otherwise, matching is done at the 2 digit or 1 digit SIC level. Numbers reported in the 3 significance test columns are p values for a two sided test of equality in means (upper value) and a ranksum test for equality in medians (lower value) between the two respective subsamples. Positive signs for the p-values indicate that the first subsample contains the larger value. Negative signs for the p-values indicate that the second subsample has the larger values.

				Significance test p-values		
	Carve-outs	Spin-offs	Sell-offs	Carve-outs vs. Spin-offs	Carve-outs vs. Sell-offs	Spin-offs vs. Sell-offs
VW Index Return Prior	.1878	.1535	.1464	**.0241**	**.0388**	.7778
	(.1696)	(.1609)	(.1609)	**.0500**	*.0713*	.7270
VW Index Return After	.1210	.1551	.1631	**-.0170**	**-.0374**	-.6879
	(.1265)	(.1609)	(.1778)	**-.0161**	**-.0327**	-.4779
Industry Return Prior	.3130	.1655	.1611			
	(.2305)	(.1159)	(.0905)			
Industry Return After	.1583	.1376	.1919			
	(.0976)	(.0994)	(.1485)			
Excess Return Prior	.1228	.0085	.0147	**.0017**	**.0244**	-.8588
	(.0759)	(-.0351)	(.0036)	**.0019**	**.0136**	-.8008
Excess Return After	.0362	-.0209	.0193	*.0830*	-.6617	-.3038
	(-.0139)	(-.0420)	(-.0098)	.1271	-.7686	-.1323

Table 10: Announcement Date Abnormal Returns

Cumulative abnormal returns (MM_CAR) are market model abnormal returns from t-1 to t+1 where t=0 is the earliest announcement date of the event. Market model parameters (α,β) are the OLS coefficients obtained from regressing parent daily returns versus the CRSP value weighted index for the period t-250 to t-50. For security i, MM_CAR_i is then $\Sigma (R_{m,t} - (\alpha + \beta_i R_{m,t}))$ over the 3 day announcement period. The J1 and J2 statistics are calculated as described in Campbell, Lo and MacKinlay (1996) and represent the MM_CAR divided by the appropriate standard error. Both statistics are asymptotically normally distributed, thus the numbers in parentheses under the statistics are the p-values associated with a standard normal distribution. % > 0 is the percentage of observations greater than 0. The numbers underneath % > 0 are the p-values associated with a non-parametric sign test.

	MM_CAR	J1 stat.	J2 stat.	% > 0	# Obs.
Carve-outs	.0216	6.050	8.307	60.5%	152
		(.0000)	**(.0000)**	**(.0117)**	
Spinoffs	.0363	10.734	14.501	71.3%	157
		(.0000)	**(.0000)**	**(.0000)**	
Divestitures	.0114	2.948	4.388	58.1%	74
		(.0016)	**(.0001)**	(.2007)	

Table 11: Comparison of Announcement Date Abnormal Returns

ΔMM_CAR is the difference in mean cumulative abnormal returns where MM_CAR is as defined in panel a. T-stat is a standard t-test for the difference in means between the two subsamples under the assumption of equal variance, and with p-values (reported in parentheses) calculated for a two sided test. Ranksum stat is the Mann-Whitney ranksum test with p-values reported in parentheses.

Comparison	ΔMM_CAR	t-stat	ranksum stat
Spinoffs - Carveouts	.0147	2.134	2.178
		(.0332)	**(.0294)**
Spinoffs - Divestitures	.0249	3.272	2.376
		(.0001)	**(.0175)**
Carveouts - Divestitures	.0101	1.296	.501
		(.1970)	(.6165)

Table 12: Stock Ownership Characteristics.

Table presents mean (median) ownership statistics of respective carve-out, spin-off or sell-off parent. Percentage ownership numbers come from the last parent proxy statement prior to the actual event. $Insider_{pct}$ is percentage of common share ownership by corporate officers and board members. $Outsider_{pct}$ is percentage of common shares held by individuals or institutions holding more than 5% of common shares (5% beneficial ownership) who are not insiders. CEO_{pct} is percentage of common shares owned by the Chief Executive Officer. $\log(CEO_{pay}/CEO_{val})$ is the log ratio of CEO cash compensation divided by the market value of CEO shares. CEO_{val}/CEO_{pay} is market value of CEO shares divided by CEO cash compensation. Tenure is the number of years that the CEO has been a member of the corporate board. Numbers reported in the 3 significance test columns are p values for a two sided test of equality in means (upper value) and a ranksum test for equality in medians (lower value) between the two respective subsamples. Positive signs for the p-values indicate that the first subsample contains the larger value. Negative signs for the p-values indicate that the second subsample has the larger values.

				Significance test p-values		
	Carve-outs	Spin-offs	Sell-offs	Carve-outs vs. Spin-offs	Carve-outs vs. Sell-offs	Spin-offs vs. Sell-offs
$Insider_{pct}$	.1527	.1746	.0456	-.3898	**.0002**	**.0000**
	(.0471)	(.0736)	(.0118)	*-.0230*	**.0000**	**.0000**
$Outsider_{pct}$	.1554	.0925	.0741	**.0010**	**.0024**	.3295
	(.0896)	(.0541)	(.0000)	**.0049**	**.0001**	*.0592*
CEO_{pct}	.0925	.0850	.0136	-.6918	**.0005**	**.0000**
	(.0085)	(.0172)	(.0020)	-.1409	**.0000**	**.0001**
CEO_{val}/CEO_{pay}	2.167	4.566	.299	**-.0385**	**.0000**	**.0075**
	(.294)	(.461)	(.073)	**-.0380**	**.0001**	**.0000**
CEO Tenure	15.4	15.0	11.4	.6886	**.0012**	**.0016**
	(13)	(14)	(11)	.9797	**.0040**	**.0015**

Table 13: Financial Need and Restructuring Choice.

Multinomial (polytomous) logistic regressions of restructuring choice on parent financial need characteristics. Leverage$_2$ is calculated as (long term debt + short term debt)/(long term debt + short term debt + market value of equity). Δ Leverage is (parent leverage - industry leverage). Asset growth is (assets(yr-1) – assets(yr-3))/assets(yr-1). ROA is (Operating Income Before Depreciation)/(total book assets). Values reported in parentheses under each coefficient are z-statistics. Regressions are run with spin-offs designated as the base case.

	Parent Industry Leverage$_2$	Parent Δ Leverage$_2$	Parent Asset Growth	Parent ROA	R^2 # Obs	χ^2 p-val
Carve-out	-.853	1.785			.0174	13.81
	(1.020)	(2.792)			377	(.0079)
Sell-off	1.230	1.478				
	(1.294)	(1.965)				
Carve-out			1.531		.0231	18.39
			(3.623)		379	(.0000)
Sell-off			1.037			
			(2.178)			
Carve-out				-2.503	.0039	3.03
				(1.685)	371	(.2195)
Sell-off				-.5930		
				(.322)		
Carve-out	-.7734	1.994	1.578	-1.093	.0461	35.60
	(.876)	(2.751)	(3.730)	(.659)	368	(.0000)
Sell-off	1.565	1.904	1.205	1.180		
	(1.562)	(2.229)	(2.455)	(.564)		

Table 14: Financial Opportunity and Restructuring Choice.

Multinomial (polytomous) logistic regressions of restructuring choice on froth and lemons characteristics. ROA is (Operating Income Before Depreciation)/(total book assets). Q is Tobin's Q, calculated as (market value of equity - book value of equity + total book assets - deferred taxes)/(total book assets - deferred taxes). EW Index is the buy and hold return of the CRSP equal weighted index over the 12 months prior to the restructuring announcement. EX_EW Index is the median buy and hold return in the industry of the restructured division for the 12 months prior to announcement, minus the EW Index return. Values reported in parentheses under each coefficient are z-statistics. Regressions are run with spin-offs designated as the base case.

	Division ROA	Division Industry Q	EW Index	EX_EW Index.	R^2 # Obs	χ^2 p-val
Carve-out	2.847				.0330	26.18
	(4.066)				380	(.0000)
Sell-off	2.587					
	(3.127)					
Carve-out		.5840			.0162	13.13
		(2.752)			386	(.0014)
Sell-off		-.2877				
		(.923)				
Carve-out			1.644	1.376	.0211	17.07
			(2.717)	(2.845)	385	(.0019)
Sell-off			.0927	.5798		
			(.122)	(.956)		
Carve-out	2.491	.6476	1.272	.9270	.0623	49.40
	(3.656)	(2.774)	(2.007)	(1.854)	379	(.0000)
Sell-off	2.813	-.1670	-.0131	.0109		
	(3.212)	(.508)	(.017)	(.017)		

Table 15: Focus, Managerial Incentives and Restructuring Choice.

Multinomial (polytomous) logistic regressions of restructuring choice on focus and free cash flow characteristics. Related is a dummy variable coded 1 if the divested division is in an industry deemed to be related to the remaining industries of the parent. Herfindahl index is a measure of parent diversification calculated as the sum of squared segment assets divided by total assets. CEO pct ownership, Insider pct ownership and outside pct ownership are the percentage of common shares owned by the CEO, all corporate directors and officers exclusive of the CEO, and all non-insider 5% blockholders. CEO wealth risk is the value of the CEO's equity holdings divided by prior year cash compensation. Values reported in parentheses under each coefficient are z-statistics. Regressions are run with carve-outs designated as the base case.

	Related	Herfindahl Index	CEO pct. Ownership	Insider pct. Ownership	Outside pct Ownership	CEO wealth risk	R^2 # Obs	χ^2 p-val
Spin-off	-.7296						.0334	27.04
	(3.166)						386	(.0000)
Sell-off	-1.501							
	(4.790)							
Spin-off		.7111					.0280	22.43
		(1.682)					382	(.0000)
Sell-off		-1.922						
		(3.255)						
Spin-off			-.3629	2.739	-2.239		.0810	61.77
			(.506)	(2.157)	(2.812)		367	(.0000)
Sell-off			-21.287	-2.699	-3.848			
			(2.551)	(.829)	(2.870)			
Spin-off						.0592	.0325	24.36
						(.794)	361	(.0000)
Sell-off						-.4180		
						(3.950)		
Spin-off	-.8491	1.198	-.8316	2.325	-2.539		.1291	97.73
	(3.332)	(2.527)	(1.094)	(1.783)	(2.984)		364	(.0000)
Sell-off	-1.559	-.5567	-21.184	-2.502	-3.330			
	(4.407)	(.814)	(2.550)	(.801)	(2.377)			
Spin-off	-.9362	1.268				.0370	.0899	66.91
	(3.721)	(2.718)				(.482)	358	(.0000)
Sell-off	-1.466	-1.276				-.4559		
	(4.221)	(1.883)				(4.074)		

Table 16: Overall Restructuring Choice

Multinomial (polytomous) and binomial logistic regressions of restructuring choice on all relevant characteristics. Δ Leverage is (parent leverage - industry leverage). ROA is (Operating Income Before Depreciation)/(total book assets). Q is Tobin's Q, calculated as (market value of equity - book value of equity + total book assets - deferred taxes)/(total book assets - deferred taxes). EW Index is the buy and hold return of the CRSP equal weighted index over the 12 months prior to the restructuring announcement. EX_EW Index is the median buy and hold return in the industry of the restructured division for the 12 months prior to announcement, minus the EW Index return. Related is a dummy variable coded 1 if the divested division is in an industry deemed to be related to the remaining industries of the parent. Herfindahl index is a measure of parent diversification calculated as the sum of squared segment assets divided by total assets. CEO wealth risk is the value of the CEO's equity holdings divided by prior year cash compensation. The first two lines are a multinomial logistic regression with spin-offs as the base case. All remaining lines are for binomial logistic regressions. Values reported in parentheses under each coefficient are z-statistics. Regressions are run with carve-outs as base case.

	Parent Δ Leverage	Parent ROA	Division ROA	Division Industry Q	EW Index	EX_EW Index.	Related	Herfindal Index	CEO wealth risk	R^2 # Obs	χ^2 p-val
Carve-out	2.641	-2.291	3.565	.6951	1.233	1.300	1.081	-1.367	-.0210	.1806	129.82
	(3.284)	(1.209)	(3.772)	(2.641)	(1.691)	(2.254)	(3.764)	(2.500)	(.236)	345	(.0000)
Sell-off	1.546	.8956	3.126	.0617	-.9343	.5316	-.3304	-2.441	-.4860		
	(1.543)	(.378)	(2.618)	(.166)	(1.025)	(.697)	(.897)	(3.399)	(4.014)		
Spin-off vs	-2.307	-.8108	-3.556	.309	.4530	-.0167				.0781	21.32
Sell-off	(2.407)	(.361)	(3.303)	(.949)	(.589)	(.023)				219	(.0016)
							.4585	2.935	.5703	.1766	47.04
							(1.267)	(4.073)	(4.536)	219	(.0000)
	-2.312	-3.313	-3.198	.0170	1.335	-.8537	.3118	3.064	.6017	.2369	60.45
	(1.874)	(1.229)	(2.756)	(.046)	(1.519)	(.957)	(.799)	(3.809)	(4.216)	208	(.0000)
Spin-off vs	-2.005	3.032	-3.464	-.5141	-1.366	-1.104				.1378	56.34
Carve-out	(2.797)	(1.729)	(4.083)	(1.983)	(1.907)	(2.015)				295	(.0000)
							-.9382	1.291	.0209	.0456	18.48
							(3.710)	(2.710)	(.274)	293	(.0004)
	-2.574	3.214	-3.231	-.6510	-1.166	-1.134	-1.117	1.367	-.0010	.1925	75.20
	(3.185)	(1.639)	(3.477)	(2.403)	(1.540)	(2.303)	(3.813)	(2.424)	(.011)	282	(.0000)
Carve-out vs	1.031	-2.346	.9296	1.009	2.164	1.301				.0837	22.53
Sell-off	(1.183)	(1.107)	(.858)	(2.973)	(2.528)	(1.948)				214	(.0010)
							1.450	1.259	.4643	.1683	42.96
							(4.110)	(1.842)	(3.821)	204	(.0000)
	1.322	-3.085	1.549	.8087	2.445	.8287	1.318	.9527	.5058	.2238	55.78
	(1.336)	(1.246)	(1.126)	(2.133)	(2.351)	(1.088)	(3.508)	(1.279)	(3.726)	200	(.0000)

3.9 Appendix 1

3.9.1 Calculation of Cumulative Abnormal Returns.

The process for calculating cumulative abnormal returns comes from Campbell, Lo and Mackinlay (1997). I use a market model (CAPM) to compute the predicted returns over the event period. Parameter estimates $(\alpha, \beta)$for the market model are calculated by regressing parent daily returns on the CRSP value weighted index during an estimation period. Our estimation period is a 200 day window running from 250 days prior to the announcement date to 50 days prior to the announcement date. Event period length is denoted by L_1. The vector of estimation period residuals for each security, $\hat{\epsilon}_i$ are used to calculate the estimated variance of abnormal returns $\hat{\sigma}^2_{\epsilon_i}$:

$$\hat{\sigma}^2_{\epsilon_i} = \frac{1}{L_1 - 2}\hat{\epsilon}_i'\hat{\epsilon}_i \tag{3.1}$$

Next, the market model parameters are applied to the event period and used to calculate abnormal returns $\hat{\epsilon}^*_i$ for each day of the event period. Event period length is denoted by L_2. The conditional covariance matrix V_i for each security's event period abnormal returns is:

$$V_i = I\sigma^2_{\epsilon_i} + X^*_i(X_i'X_i)^{-1}X^{*\prime}_i\hat{\sigma}^2_{\epsilon_i} \tag{3.2}$$

The second term in V_i accounts for the errors and cross correlation introduced by estimating and using the α and β parameters from the estimation period. X^*_i is a $2\text{x}L_2$ vector of 1's and the market return from the event period. X_i is a $2\text{x}L_1$ vector of 1's and the market return from the estimation period. Cumulative abnormal returns $(\widehat{CAR_i})$ are calculated for each security across the three days of the event period then an average is calculated across all securities, $\overline{CAR}$. Significance of the $\overline{CAR}$ can be calculated in 2

ways:

Method 1:

$$V = \frac{1}{N^2} \sum_{i=1}^{N} V_i \tag{3.3}$$

$$\hat{\bar{\sigma}}^2 = \mathbf{1}' V \mathbf{1} \tag{3.4}$$

$$J_1 = \frac{\overline{CAR}}{\hat{\bar{\sigma}}^2} \overset{a}{\sim} \mathcal{N}(0,1). \tag{3.5}$$

Method 2:

$$\hat{\sigma}_i^2 = \mathbf{1}' V_i \mathbf{1} \tag{3.6}$$

$$\widehat{SCAR}_i = \frac{\widehat{CAR}_i}{\hat{\sigma}_i} \tag{3.7}$$

$$\overline{SCAR} = \frac{1}{N} \sum_{i=1}^{N} \widehat{SCAR}_i \tag{3.8}$$

$$J_2 = \left(\frac{N(L_1 - 4)}{L_1 - 2} \right)^{\frac{1}{2}} \overline{SCAR} \overset{a}{\sim} \mathcal{N}(0,1). \tag{3.9}$$

Chapter 4

Inefficient Internal Capital Markets: Evidence from Spin-offs (Co-authored with David Scharfstein)

4.1 Introduction

The 1960s and 1970s were the heyday of diversified conglomerates until many of them were busted up in the takeover wave of the 1980s. Many of these conglomerates traded at discounts below their break-up value (Lang and Stulz, 1994 and Berger and Ofek, 1995), and those that traded for greater discounts were more likely to be broken up (Berger and Ofek, 1996). These facts suggest that conglomerates are in some way inefficient, but it is less clear in exactly what way. A recent line of research — both theoretical and empirical — has argued that conglomerates tend not to allocate capital efficiently, practicing a kind of "socialism" in which bad divisions are given too much capital and good divisions too little.

This paper investigates empirically a theory of socialism in capital allocation proposed by Scharfstein and Stein (1998). The key to this theory is that conglomerates can be thought of as a two-tiered agency relationship — at the top between outside investors and corporate headquarters and below between corporate headquarters and division managers. At the lower tier, divisions managers are tempted to "rent-seek" — in particular, spend time trying to increase their outside labor market options rather than engage in productive work. Like in many models of rent seeking, managers of relatively weak divisions will rent seek more because the returns from productive effort are lower; as a result, they will be compensated more than they would otherwise. What form this compensation takes — whether cash or an excessively large capital budget that division managers personally value — depends on the incentives of corporate headquarters. If headquarters acts on behalf of investors, it would simply pay the division manager more in cash rather than distort the capital budget. However, if headquarters is only an agent of outside investors, it might be inclined to distort the capital budget towards the weak divisions since it does not bear the full costs of capital misallocation.

Thus, there are two key implications that emerge from this theory. The first is that there will be more misallocation in firms in which headquarters' value-maximizing incentives are weak, perhaps because they or outside investors have small ownership stakes. The second implication is that there will be a greater misallocation of capital if divisions differ significantly in their investment opportunities. In particular, what matters is the *relative* strength of divisions; a weak division will invest more if the other division is strong, while a strong division will invest less if the other division is weak.

This theory share some similarities with Rajan, Servaes and Zingales. Their model is also based on the idea — originally proposed by Meyer, Milgrom and Roberts (1992) — that managers of weaker divisions will have greater incentives to rent seek. And their model also predicts that the more diverse the investment opportunities the greater

will be the capital misallocation. But there are two key differences in the theories. One is that their model is of *related* divisions with differing investment opportunities. Second, their model is of the *optimal* misallocation of capital, one that investors would choose to solve agency problems at the divisional level. The empirical work will try to distinguish between these theories by investigating whether capital misallocation exists across related divisions and in companies where agency problems between headquarters and shareholders are likely to be small.

This is by no means the first empirical paper examining the functioning of internal capital markets. Lamont (1997) is probably the first. He shows that internal capital markets are different from external capital market by showing that exogenous reductions in one division's cash flow lowered capital expenditures in completely unrelated divisions in the company. While this study shows that an internal capital market exists it was essentially silent on whether capital is allocated in an efficient or an inefficient manner — whether it is taken from divisions with poor investment opportunities and given to the divisions with good investment opportunities or vice versa.

The subsequent literature seems to suggest that the internal capital market is inefficient. Shin and Stulz (1998) show that when capital is reallocated it does not seem to go in any systematic way to the divisions with the better investment opportunities. Scharfstein (1998) shows that, in unrelated conglomerates, divisions in good industries tend to invest less than their industry peers and divisions in bad industries tend to invest more. This problem is more pronounced in firms where management has small ownership stakes. Similarly, Rajan, Servaes and Zingales (1998) show that conglomerates invest more in relatively bad divisions when the conglomerate operates in businesses with very different investment opportunities.

This paper takes another approach to these issues by examining spin-offs of multi-divisional companies. In a spin-off, the parent company establishes one of its divisions

as a new publicly-traded company and distributes the shares of this company to the parent's existing shareholders. Eastman Kodak's 1993 spin-off of its Eastman Chemical division to its shareholders is one such example. The goal of this paper is to understand how the allocation of capital changes when a division is spun off, in particular, whether the empirical patterns that look like socialism disappear when the units are separated.

There are a number of advantages of this approach. The first is that the segment so central to the other studies is not as critical here. There are a number of problems with the segment data. First, earlier studies effectively equate reported segments with actual operating business units that compete for capital in the budgeting process. This need not be the case: there may be several segments within an actual business unit or several business units within a segment. By contrast, spin-offs are real businesses that can operate as stand-alone entities and are more likely to have been competing for capital within the conglomerate. Second, in the first annual report of the spin-off, the newly formed company provides pro forma financial statements for two or more years while it was part of the parent company. These data are more comprehensive than the limited information provided in the segment data and are likely to be more reliable.

The third advantage of looking at spin-offs is that we can compare the investment behavior of the *same* business in two different regimes for allocating capital — an internal capital market and an external capital market. This addresses one criticism of previous work — that segments of conglomerates are somehow different than stand-alone firms and so should be investing differently.

Analyzing spin-offs is, of course, not without problems. If undertaking a spin-off is endogenous — as we suspect it is — then it may be that we are picking up only the companies where investment misallocation is particularly severe. One would not want to draw conclusions about how widespread the problem is from a sample of spin-offs. Moreover, it may be that companies undertake spin-offs because they *anticipate* a change

in the optimal investment of a business. For example, it could be that weak divisions are spun off when a turn-around is expected and the optimal investment level is expected to increase.

The evidence that we present is generally consistent with the existence of socialism in internal capital markets. We show that, as part of conglomerates, spin-off divisions with poor investment opportunities (i.e. low Q industries) tend to invest more if the other divisions in the conglomerate have good investment opportunities (high Q industries). Just the opposite holds for the good divisions. This suggest that low Q divisions get cross-subsidized by the high Q divisions. This pattern disappears once the division is spun off.

Interestingly, we also show that this investment pattern only exists for divisions that are unrelated to the rest of the company and in companies where ownership stakes of outside investors are small. Both of these facts are consistent with Scharfstein and Stein (1998) and inconsistent with Rajan, Servaes, and Zingales (1998).

The paper is organized as follows. Section 2 discusses the construction of our sample and Section 3 summarizes some of the key elements of the data. Section 4 presents the basic empirical results and Section 5 concludes.

4.2 The Data

The sample consists of 161 spin-offs occurring between 1981 and 1996. We started with Securities Data Company's list of 324 domestic spin-offs. However, in order to be included in our sample, a spin-off on this list must satisfy the following criteria: (1) COMPUSTAT and CRSP data are available for at least one year after the spin-off begins public trading; (2) a copy of the first spin-off annual report is available; (3) COMPUSTAT and CRSP data are available for the parent before the spin-off; (4) the spin-off is not a bank,

financial services, insurance firm or financial holding company; (5) it can be verified that the transaction is actually a spin-off by checking the annual report or a Lexis-Nexis news report; (6) the spin-off is a "clean" transaction where the parent company goes from 100% ownership to 0% ownership through a pro-rata distribution of shares.

Thirty-one spin-offs were eliminated due to a lack of COMPUSTAT and/or CRSP data. Eight additional spin-offs were eliminated due to non-availability of parent COMPUSTAT and/or CRSP data. Inability to locate an initial annual report eliminates five spin-offs. Fifty-one spin-offs with SIC codes between 6000-6500 (financial service and insurance firms) were eliminated in order to concentrate on firms where physical assets requiring capital expenditures are a significant part of the business. Twelve spin-offs were eliminated after we were unable to verify via annual reports or news reports on Lexis-Nexis that a spin-off actually occurred.

The remaining spin-offs were eliminated because they were not clean transactions. Several spin-offs were prior equity carve-outs where the parent had previously sold a portion of its ownership in the spin-off division in a public offering. After a delay ranging from 1 to 4 years, the parent was now spinning off its remaining ownership interest to its shareholders. Others on the list were actually rights offerings rather than simple pro-rata distributions of shares. Still others were in fact joint ventures with one parent deciding to relinquish its ownership interest in the venture by spinning off its share. The remaining group of approximately 25 potential spin-offs generally were part of a much more complex financial restructuring where it was difficult to determine if a true spin-off actually occurred.

Spin-off operating data is generally available on COMPUSTAT starting with the fiscal year when public trading begins.[1] In about half the spin-offs, operating data begins with

[1]2 spin-offs in the sample are so small that they actually begin public trading prior to the start date listed on CRSP. 1 firm trades solely on the Pacific Stock Exchange initially. The other firm begins

the fiscal year prior to the start of public trading. For earlier years, operating data is taken from the first annual report, which generally includes 3 years of income and cash flow statement data and 2 years of balance sheet data.[2] In addition, annual reports include a table of summary financial data which will include about 5 years of the most important balance sheet and income statement data such as net income and total assets. Combining all of the available data generally provides 2-3 years of usable pre-spin-off cash flow and capital expenditure data for the spin-off. Parent operating data comes exclusively from COMPUSTAT. In 12 instances, parent data stops at the time of the spin-off because the parent is involved in other financial transactions such as a merger.

Data is aligned into an event time panel of years -5 to +5 where year 0 is the fiscal year during which public trading begins. Thus, year 1 constitutes the first full year of independent operations for the spin-off, while year -1 is the last full year of existence inside the parent. In several areas of the analysis, comparisons are made to industry medians. We first identify firms which effectively operate in only one industry. Firms are considered stand-alones in an industry if in their COMPUSTAT segment data, they report more than 95% of their sales in that industry.[3] [4] This stand-alone identification is done at three digit, two digit and one digit SIC levels by combining like segments.[5] After

trading on the NASDAQ "pink sheet".

[2]All references to financial statement data will be in millions of dollars unless explicitly stated otherwise.

[3]The 95% cutoff level was somewhat arbitrarily chosen. Analysis of the COMPUSTAT segment data shows that there are a non-negligible number of firms that report a segment for headquarters operations or for discontinued operations. If these segments are small then there is really no reason not to classify the firm as a stand-alone.

[4]COMPUSTAT segment data is used for this stand-alone classification. Segment data is useful for two reasons: 1) SIC codes are included for each year in segement data. In contrast, the SIC code reported in the annual full firm data applies only to the most recent year, 2) Diversified firms like General Electric report only one SIC code in the annual full firm data. Because of GE's diversification, it is specious to compare GE to other firms in that primary SIC code.

[5]Assume a firm has three segments with SIC codes of 3125, 3128 and 3144. When identifying pure-plays at the three digit level we first combine the 3125 and 3128 segments into a 3120 "division", then see whether 95% of sales are in this "division". When identifying stand-alones at the two digit level we combine all three segments into a 3100 "division", etc.

stand-alone firms are identified, their firm wide COMPUSTAT data are used to calculate industry medians for items such as cash flow, Tobin's Q, capital expenditures, etc. A median for an industry is only included if there are five or more stand-alones available. If there are not enough stand-alones to identify a median value at the three digit level in a particular year, then subsequent matching will be done at the two digit or one digit level.[6]

Parents and spin-offs themselves are often comprised of multiple segments in different industries. Thus, in comparing these firms to an industry median, we need to take a weighted average of the various industries in which the firm operates. We weight by segment assets and calculate a "chop-shop" median. For example, in the Kenner Parker Toys spin-off from General Mills in 1985, Kenner Parker Toys reports a Toys and Games segment (SIC 3944) with 419.2 in assets. General Mills reports 3 segments: Consumer Foods (SIC 2043), Restaurants (SIC 5812) and Specialty Retailing (SIC 5621) with assets of 1091.8, 467.8, and 195.5 respectively. Thus, the industry, or "chop-shop" Q for Kenner Parker Toys will simply be the industry median for SIC 3940. For General Mills, the industry Q will be a weighted average of 62% SIC 2040, 27% SIC 5810 and 11% SIC 5620.

Spin-off segment data is never available prior to year -2 and only sporadically available for year -1. In addition, as noted earlier, several parents cease operations as a public corporation around the spin-off date.[7] In both instances, we use segment weights from the closest available year to generate the chop-shop values for the missing years. Note, however, that the industry median values will still come from the appropriate year. Only the weights are not from the actual year.

[6] Approximately 60% of observations are matched to industries at the 3 digit level, 30% are matched at the 2 digit level and the remaining 10% are matched at the 1 digit level.

[7] Some spin-offs are leftovers from a merger or takeover involving the parent. For example, a broadcasting+cellular phone firm was acquired by AT&T. For regulatory reasons, AT&T could not make use of the cellular phone business so a spin-off occured immediately prior to the acquistion.

Finally, CRSP data are used to calculate spin-off and parent returns over the five years after the spin-off, and parent returns over the five years prior to the spin-off.[8]

4.3 Characteristics of the Sample

Tables 1-3 present basic information on our sample. Table 1 lists the number of spin-offs in each year and the total market value of equity spun off in that year (denominated in 1996 dollars.) Table 2 describes the distribution across industries for both parents and spin-offs. There are no industries which seem to be over-represented. The apparently large number (10-12) of spin-offs in the 2800, 3500 and 3600 SIC blocks reflects the large overall number of firms operating in these industries.

Table 3, panels A through C, provide summary statistics on some of the key variables for the spin-off and parents in years -1 to +1. In year 0, spin-offs have mean (median) total assets of 497.3 (154.3) and total sales of 517.8 (195.4). Parents are roughly 5-6 times larger than spin-offs with total assets of 3172.8 (846.4) and sales of 2379.1 (876.5). These tables suggest that, on average, parents spin off underperforming divisions in relatively good industries. Panel C indicates that the mean and median Q of the spin-off industry are somewhat higher than that of the other parent industries. However, when spun off, the actual Q of the spin-off is below the Q of the parent. Spin-off cash flow is also lower than parent cash flow.[9] These summary statistics, however, do not tell the whole story. There is wide variation in all of the comparisons between spin-off and parent. The standard deviation for the difference in industry Q, for example, is .464, suggesting

[8]Prior period returns are calculated relative to the announcement date of the spin-off. Post period returns are calculated relative to the start of public trading for the spin-off. These two dates are generally separated by about two months, however, there are isolated cases where the announcement date occurs up to a year prior to the start of public trading.

[9]Tobins Q is calculated as (market value of equity - book value of equity + total assets - deferred taxes)/(total assets - deferred taxes). Cash flow (CFA) is calculated as (Income before extraordinary items + interest + taxes + depreciation)/(total assets).

that in some cases companies spin off underacheivers while in other cases they spin off overachievers.

Parent stock returns (not reported in tables) prior to the spin-off also suggest that there is considerable heterogeneity in the types of spin-offs that occur. Cumulative returns relative to the CRSP Equal Weighted Index (EWI) for the three years prior to the announcement of the spin-off are 18.9% (-5.8%) with 10th and 90th percentile values of -78% and +136%. Excess returns are not significantly different from 0, indicating that on average, parents do not over or under-perform the equally weighted index over the prior period. This heterogeneity is consistent with the considerable differences in the rationales for spin-offs offered by management. In some cases, companies that have performed poorly use spin-offs to sever ties with their most problematic divisions while in other cases spin-offs are used to allow companies with good growth opportunities to expand more readily outside the umbrella of the parent company.

4.4 Regression Results

4.4.1 Pooled Cross-Sectional Analysis

Table 4 panel A, shows ordinary least squares regressions of the spin-off's industry adjusted capital expenditures (I_CAPXA) in the three years prior to the spin-off, on industry adjusted cash flow (I_CFA) and the difference between the industry Q of the spin-off and the industry Q of the parent (ΔQ_{ind}).[10] Since there are up to three observations per firm in each regression, errors will likely be correlated. Therefore, we report results with significance tests based on White heteroscedastic standard errors that take account

[10]Weighted median industry values are subtracted from actual firm values to produce industry adjusted values.

of the expected clustering.[11]

The central result, shown in the first line of panel a, is that spin-off industry adjusted capital expenditures are sensitive to the difference in Q between parent and spin-off industries. The ΔQ_{ind} coefficient of -.0171, significant at the 5% level, is consistent with the hypothesis that parent firms treat divisions too similarly. Spin-offs operating in industries with significant investment opportunities (high Q) invest less than the comparable stand-alone firm if the spin-off is part of a parent whose other divisions operate in industries with low investment opportunities. Conversely, spin-offs operating in low Q industries invest more than the comparable stand-alone firm if the spin-off is part of an otherwise high Q parent. This coefficient is economically significant as well. A one standard deviation increase in ΔQ_{ind} of .442 implies that average I_CAPXA will decrease by .76%. Average $CAPXA$ in year -1 of 7.36% would therefore decrease to 6.60%, a 10.3% relative decline.

The I_CFA coefficient of .1191, significant at the 1% level, tells us the unsurprising result that relatively profitable businesses invest more than relatively unprofitable businesses. It is unknown, however, whether cash flow proxies for investment opportunity, or whether the positive coefficient reflects internal financing constraints or free cash flow problems. The remaining lines in panel A compare regression results after splitting the sample on whether the spin-off is in an industry which is related to other parent industries, whether there is significant equity ownership on the part of the parent CEO, whether there is at least one outside 5% equity block-holder for the parent and whether

[11]In order to control for outliers, observations with ROA >.5 (16 observations) or ROA<-.4 (18 observations) and with CAPXA>.5 (12 observations) are not included . The main effect is to eliminate some outlying observations in years -3..-1 where the spin-off records large losses while simultaneously registering heavy CAPX. These tend to be very young divisions in their gestation period and are not representative of the sample as a whole. Additionally, since the intent is to analyze changes in CAPX regimes, spin-offs with average CAPXA< .02 (6 firms) are not included since capital expenditures are not an important element in their operation.

parent buy and hold returns over the three years prior to the announcement date have been greater than the CRSP equal weighted index. [12]

Relatedness is determined heuristically by analyzing the reported segment data for both the spin-off and the parent. Thus, a petroleum refining and marketing spin-off like Diamond Shamrock is deemed to be related to its petroleum exploration parent (Maxus Energy) despite no overlap in 2 digit segment SIC codes.[13] CEO ownership and outsider ownership data come from the parent's last regular proxy prior to the spin-off. CEO ownership is deemed to be high if the CEO owns more than 1% of the equity of the parent firm.[14] Outsider ownership is deemed to be high if there is at least one outside block-holder owning at least 5% of the parent's shares.[15] We expect capital allocation problems to be greater when divisions operate in unrelated industries where the parent might not have as much first hand knowledge of how to run the business. We expect, however, that high CEO or insider ownership will reduce the observed capital allocation problems.

As discussed in the introduction, corporate socialism in capital allocations can result when top level management views capital allocations as a form of currency for bribing divisional managers to take certain actions. The more aligned managerial incentives are with shareholder interests, however, the greater will be the shadow price of this currency

[12] Announcement dates were gathered by searching the Lexis-Nexis database for the first announcement of parent intentions to spin-off the division in question. The three year prior returns are calculated using the 36 monthly returns prior to the announcement month, thus, they do not include the days between the start of the announcement month and the actual announcement date.

[13] 75 spin-offs are coded related, 86 are coded unrelated.

[14] In a few firms with separate Chairman and CEO's, it is obvious that the Chairman is the true head of the corporation, thus we utilize the Chairman's ownership data in lieu of the CEO's data.

[15] Firms are required to report, in their proxy, the identity of any firm or individual who owns more than 5% of the outstanding shares. Care must be taken in using this information. Often, a 5% blockholder will be an officer of the corporation, the firm's pension fund or a trust set up for charity. Since pension fund shares and trust shares are usually voted by a commitee of corporate board members they were not included as blockholders. We also exclude any blockholders if they were current or former officers of the firm.

to top level management. Therefore, as CEO ownership rises, inefficient allocations of capital should drop. High outsider ownership may have a similar direct effect of reducing inefficient allocations of capital. A block-holder may have the ability to stop inefficient corporate actions where a dispersed shareholder would be powerless. Finally, we expect inefficient capital allocations to be associated with poor returns. Poor returns can be a direct effect of inefficient policies or an indication of investors voting with their pocketbooks when they see management implementing inefficient policies. The sample splits in panel A confirm all but one of these expectations. Coefficients on ΔQ_{ind} are larger in absolute value when spin-offs operate in unrelated industries; -.0264 versus -.0031. They are also larger when there is low outsider ownership and when prior returns have been poor; -.0284 versus -.0043 and -.0211 versus -.0017. For the CEO ownership sample split, however, the coefficients are virtually identical; -.0188 for high CEO ownership versus -.0176 for low CEO ownership.

Table 4 panel B reports the same regressions as panel A, but using data from the three years after the spin-off occurred.[16] In none of these regressions is the coefficient on ΔQ_{ind} significant. For the full sample regression the coefficient is .0033 with a t-statistic of .370. Not only is the coefficient never significant, it is generally close to zero, never being more negative than -.0038. The largest value that the coefficient obtains is .0146 when the sample is limited to those firms with low CEO ownership. These results tell us that the results from panel A are not due to spurious correlations between ΔQ_{ind} and I_CAPXA. Conversely, coefficients on I_CFA are of approximately the same magnitude and significance as the corresponding coefficients from the pre-spin-off period. Finally, note that the constant term is always close to, and never significantly different from zero. As noted in the univariate analysis, spin-offs on average do not over or underinvest. The

[16]Note, no regression uses the year 0 data since the spin-off spent some time as both a division and as a stand-alone firm in that year.

action in this data comes in the cross section.

In table 4 panel C, we combine the pre-spin-off and post-spin-off data and make use of dummy variables interacted with I_CFA and ΔQ_{ind}. The variable $Before$ is coded 1 for the observations occurring in years prior to the spin-off and 0 otherwise. When ΔQ_{ind} is multiplied by $Before$, it then indicates the *difference* in sensitivity of I_CAPXA to ΔQ_{ind} between the pre and post-spin-off periods. Across the full sample, $Before * \Delta Q_{ind}$ has a coefficient of -.0205 with a t-statistic of 1.826, significant at the 10% level. Consistent with results in panels A and B, this tells us that industry adjusted capital expenditures are sensitive to the difference in Q between the spin-off segment and the rest of the parent. ΔQ_{ind} alone has a positive coefficient of .0032 with negligible significance, reinforcing that the relationship we see in the early part of the sample is not a spurious correlation between industries. $Before*I\_CFA$ has a positive and insignificant coefficient while I_CFA on its own has a coefficient of .0807, significant at the 1% level.

After applying the sample splits used in panels A and B, we find that the $Before * \Delta Q_{ind}$ is strongest in the subsample of spin-offs that are unrelated to core parent industry, and in the subsamples of spin-offs where CEO ownership and outsider ownership are low. The coefficient for the unrelated group of -.0267 is significant at the 10% level while the coefficient for the low CEO ownership group of -.0326 is significant at the 5% level. Finally, the coefficient for the low outsider ownership group of -.0378 is significant at the 1% level. The larger coefficients when ownership is low are consistent with our expectation that the problems of corporate "socialism" will be most prevalent when the agency problem between headquarters and owners is greatest. Coefficients for I_CFA are generally positive and significant while those for $Before * I\_CFA$ are generally insignificant throughout the sample split regressions. There is, however, a reasonable degree of heterogeneity in these results making conclusions about the relationship of cash flow to investment difficult.

A potential objection to the comparisons of Table 4 is that parents and spin-offs differ between the pre and post-spin-off periods. We naturally expect that the parent will not be operating in exactly the same industries in both periods. To counter this objection, we re-ran these regressions using ΔQ_{ind} values calculated using the industries and weights that the spin-off and parent reported in their segment data for year 0. Results of these regressions (not reported) show comparable results.

4.4.2 Panel Data Regression.

In order to fully exploit the information contained in the data, we make use of panel regressions. Table 5 panel A reports results from random effects panel regressions similar to those run in table 4. Rather than splitting the sample based on relatedness, CEO ownership, etc., we use these variables as interaction terms with $Before * \Delta Q_{ind}$. The first line in panel A gives us a baseline with no interaction effects. Results are comparable to the pooled OLS regressions. Most notably, the coefficient for $Before * \Delta Q_{ind}$ of -.2044 is negative and significant at just over the 1% level. Coefficients for $Before * I\_CFA$ and I_CFA , while positive are not significantly different from zero.[17]

Interaction dummies are coded in the same manner as the sample splits in table 4. For example, if the parent CEO owns more than 1% of parent shares, then *CEO_pct* is coded 1, otherwise it is coded 0. $Before * \Delta Q_{ind}$ is then multiplied by the dummy and by (1-dummy) to produce two separate variables. The sharpest distinction comes when the interaction term is Re*lated*. Unrelated spin-offs have a $Before * \Delta Q_{ind}$ coefficient of -.0316, significant at the 1% level. Related spin-offs have a coefficient of -.0041 which is insignificantly different from zero. The difference between these two coefficients is significant at the 10% level. The sample splits performed on the pooled OLS regressions

[17]If the $Before * I\_CFA$ variable is not included so that there is one cash flow variable across both periods, then the coefficient on I_CFA is positive and significant at the 5% level.

indicated that high outsider ownership reduces the capital misallocation, however, the effect is not evident in the panel regressions. Firms with low outsider ownership have coefficients which are only modestly larger than firms with high outsider ownership. Further regressions (not reported) including multiple interaction effect do not provide any additional insight.

Table 5 panel B, reports similar results except that Re*lated*, *CEO_pct* and *P_return* are included as independent variables, rather than using them as interaction terms. Overall results are comparable to those shown in table 4. In regressions including all firms, coefficients for $Before * \Delta Q_{ind}$ range between -.0245 and -.0258 and are significant at better than the 5% level with t-statistics above 2.5 in all cases. Coefficients on ΔQ_{ind} are positive in all cases at about .0135 and significant at the 10% level in two cases when additional explanatory variables are included. Coefficients on $Before * I\_CFA$ and I_CFA are positive but are not significantly different from zero at conventional levels.[18] Negative coefficients for Re*lated* are significant at the 5% level while positive coefficients for *CEO_pct* are significant at the 1% level. The fact that ΔQ_{ind} alone has a positive coefficient (albeit only marginally significant) is not what we would like to see. Ideally, the coefficient on this variable should be zero indicating that after the spin-off occurs there is no relationship between I_CAPXA and ΔQ_{ind}. The reasons why this vestigial relationship remains are not known.

The exact interpretation for the *CEO_pct* variable is not clear. Spin-offs where the parent CEO owned a substantial percentage of parent equity invest more while they are part of the parent. Remember, however, that *CEO_pct* had relatively little information to add to any of the previous regressions. The negative coefficients for Re*lated* indicate that related spin-offs are investing less when they are part of the parent than when they

[18] *If $Before * I\_CFA$ is excluded then the coefficient on I_CFA becomes significantly different from zero in all cases. Other results in the regressions remain unchanged.*

are stand-alone firms. It is possible that parents spinning off related divisions differ systematically from parents spinning off unrelated divisions. Related divisions are more likely to share operating synergies with the parent. We should, therefore, be less likely to find evidence of inefficiencies in situations where the spin-off is related to the parent. This is consistent with the effect we see in panel A when Re*lated* is interacted with $Before * \Delta Q_{ind}$. Why then, would these related spin-offs occur in the first place? One potential answer is that these spin-offs may be *driven* by exogenous forces like financial distress. If this is true then the related spin-offs would be more likely to emerge from a financially constrained parent where all divisions are underinvesting.

Since spin-offs exist inside an internal capital market prior to the spin-off, additional characteristics of the rest of the parent such as cash flow and capital expenditures may also have explanatory power. The effect of cash flow and capital expenditures of other divisions of the parent on spin-off capital expenditures will depend on a variety of factors. If frictions in the external capital markets force the firm to rely at the margin on internal financial resources, then we expect that spin-off capital expenditures will be positively correlated with the cash flow of other divisions. Capital expenditures of other divisions should be negatively correlated with spin-off capital expenditures since giving more to one division necessarily implies giving less to other divisions.

Table 6 reports the results of including these parent variables in the canonical regression equation. Reading from the third line in the table, spin-off I_CAPXA is positively related to parent cash flow in the pre-spin-off period. The $Before * Parent\ I\_CFA$ coefficient of .0883 is significant at the 5% level. Note that the equivalent coefficient for $Parent\ I\_CFA$ is an insignificant -.0289 indicating that parent cash flow is not a proxy for investment opportunity inside the spin-off. Conversely, the coefficient for $Before * Parent\ I\_CAPXA$ is -.1644 and significant at the 5% level while the coefficient for $Parent\ I\_CAPXA$ is .1158, significant at the 10% level. The negative coefficient

from the pre-spin-off period is consistent with the belief that parents are allocating CAPX from a finite communal fund. The positive coefficient for *Parent I_CAPXA* likely indicates that investment opportunities between parents and spin-offs are correlated. Other coefficients are unchanged by the inclusion of parent variables.

4.4.3 Symmetry of effects

An appropriate question to ask is whether the change in CAPX regimes is symmetric, that is, do spin-offs with $\Delta Q_{ind} = .2$ have an increase in CAPX that is comparable to the decrease seen in a spin-off with $\Delta Q_{ind} =$ -.2? In order to evaluate this question, dummy variables denoting high and low ΔQ_{ind} are employed. High_Q is coded 1 when $\Delta Q_{ind} > .10$ and 0 otherwise. Low_Q is coded 1 when $\Delta Q_{ind} <$ -.10 and 0 otherwise. Approximately 30% of spin-offs fit into either the high_Q or low_Q category. The remaining spin-offs fall somewhere within the middle. Results from table 7 show that the results are strongest for spin-offs with low relative Q's. The coefficient for low_Q across the entire sample is .0216 and is significant at the 1% level. The corresponding coefficient for high_Q is -.0140 and is significant at the 5% level. The difference between the two coefficients is not significantly different from zero, however, we see that the coefficient for low_Q is larger on an absolute basis across both size subsamples. Note that the difference in signs is expected. In the prior regressions, low values of spin-off Q relative to parent Q are registered as negative values while in table 6 they would show as a positive entry of 1 for the Low_Q dummy variable.

When analyzing firms with year -1 assets greater than 150, the low_Q coefficient is .0125, significant at the 10% level, while the high_Q coefficient is an insignificant -.0088. The small firm subsample generates larger coefficients for both variable with low_Q registering .0318, significant at the 5% level, and high_Q registering -.0235 significant

at the 10% level. The marginally stronger effect seen in spin-offs with low relative Q is consistent with findings by Shin and Stulz (1996) that inappropriate levels of CAPX seem most likely in low Q divisions of diversified conglomerates. Their high Q divisions seem to receive funding comparable to stand-alone counterparts, while low Q divisions seem to receive too much. Our results support the belief that one potential problem with diversified firms is an inability to pull the plug on poorly performing divisions. The spin-off parent may be rewarded with an increase in stock price upon spin-off announcement because they have proven to the marketplace that they can swallow their pride and cut their losses.

4.4.4 Relation to Value:

Numerous prior studies find a significantly positive announcement period effect. On average, the parent's stock price increases between 2 and 3 percent more than predicted by various control models. Not surprisingly, this effect is present with this sample as well. We use a market model with a 200 day estimation period beginning 250 days prior to the announcement date and ending 50 days prior to the announcement date.[19] Parameter estimates (α, β) and residuals are calculated by regressing daily parent returns on the CRSP value weighted index. CAR's over a three day span from announcement date -1 to announcement date +1 are then calculated using these parameters. Standard errors are calculated using the methodology discussed in Campbell, Lo and MacKinlay (1996) chapter 4. This methodology accounts for the uncertainty generated by the initial parameter estimation as well as the normal residual noise. These unbiased standard errors are then used to calculate their normally distributed J1 and J2 significance statistics.

Table 8 reports the results of this event analysis. Consistent with prior studies, spin-

[19]We thank Don Cram for providing access to a personal library of SAS routines developed for this purpose.

offs are associated with the CAR's of 3.63%, with J1 and J2 statistics which are significant at better than the 1% level. Non-parametric analysis shows that 71.3% of spin-off CAR's. If internal capital markets are inefficient then it is possible that measures of inefficiency would be correlated with the magnitude of the announcement effect. Markets may bestow the biggest increase on the parent that unwinds the worst internal capital market. Unfortunately, efforts to establish this relationship have not been fruitful. Regressions of announcement period excess returns on the difference in Q between parent and spin-off industries (not reported) have coefficients of the expected sign, but they are far from significant. Relatedness, relative size and prior parent return are also insignificant.

Rajan, Servaes and Zingales hypothesize that a large degree of dispersion in investment opportunities across divisions is bad. In order to investigate this hypothesis, we construct measures of the variance of industry Q's inside the parent using COMPUSTAT segment data. If dispersion is bad, then the more a parent firm decreases Q variance through the spin-off, the larger should be the announcement period effect. As before, however, results are insignificant. Finally, we look at whether the difference in actual spin-off Q and spin-off industry Q in year 0 is a function of the level of over or under-investment in years -2 and -1. If parents are inefficiently over-investing in low Q spin-off division, then we would expect these divisions to have actual Q's lower than their industry median when they become independent. This would be the result of parents bulking up the low Q spin-off division with unproductive assets. Additional unproductive assets generate a 1:1 increase in the denominator of Q, but less than a 1:1 increase in the numerator of Q. Conversely, if parents are starving high Q spin-off divisions, then the opposite effect should be observed. Once the spin-off becomes independent, the market should assign a moderately high market price relative to assets in place due to the unutilized investment opportunities. Unfortunately, these effects are not detectable.

Either of the value implications would provide strong evidence that internal capital

markets are inefficient, not just different. It is not entirely surprising, however, that these effects are not detectable. As stated earlier, there is a large degree of heterogeneity in this spin-off sample, making it impossible to stereotype the motives for spin-off. In general the spin-off may be one of only several restructuring transactions occurring around the announcement period. Additionally, the individual spin-offs tend to be of moderately small size relative to the parent firm. These facts imply that signalling what the parent will do in the future may be of greater importance than committing to undo past transgressions.

4.5 Conclusion:

This study adds further evidence to the observation that internal capital markets are, at the very least, different from external capital markets. As predicted by Scharfstein and Stein's (1998) model of corporate socialism, we find that capital expenditures inside diversified firms are sensitive to proxies for the *difference* in investment opportunity across divisions. Using unique data from a sample of spin-offs we find that divisions in high Q industries (good investment opportunities) which are embedded in parents predominantly participating in low Q industries invest less than comparable stand-alone firms. Conversely, divisions in low Q industries (poor investment opportunities) which are embedded in otherwise high Q parents invest more than comparable stand-alone firms.

Primary evidence is that while the spin-off is still part of the parent firm, we find a significant negative relationship between spin-off industry adjusted capital expenditures and the difference between spin-off and parent industry Tobin's Q. This relationship is robust to alternative measures of the difference in investment opportunity. Most importantly, this relationship is not present once the spin-off becomes an independent entity.

Coefficients for the difference in Q interacted with a dummy variable coded 1 for the pre-spin-off period are consistently around -.02 with significance at the 5% level or better. These results are economically significant. A coefficient of -.02 implies that a one standard deviation increase in the difference between median industry Q's will correspond to a 10% increase in the level of spin-off capital expenditures after separation. The larger is the difference in Q between the spin-off and the parent, the more distorted capital expenditures are from industry levels. This effect appears to be symmetric and of equal magnitude when the spin-off is either the high Q or the low Q entity.

We find that this effect is strongest in spin-offs where the parent is divesting a division operating in an industry which is unrelated to the core industries of the parent. This is consistent with our belief combinations of unrelated divisions under the same corporate headquarters will be situations where allocational inefficiencies are most likely to exist. Spin-offs of related divisions are more likely to be driven by other exogenous factors. Additional evidence shows that allocational inefficiencies are weakly related to managerial incentives. The difference in Q effects are not as pernicious in parents where there is at least one non-insider 5% block-holder.

Additional work remains to firmly establish that these results document an inefficiency inherent in internal capital markets, not just a difference. Linking evidence of allocational inefficiencies to the magnitude of announcement effects or to future changes in profitability would be two potential solutions. Irregardless of this shortcoming, the methods, results and data sample used in this study provide a significant robustness check against previous empirical investigations of internal capital markets. Our contribution stems from the fact that spin-offs provide a unique control sample for themselves. Rather than finding differences relative to stand-alone firms, we are able to show that internal and external capital markets treat the *same* firm differently.

Table 1: Number of spin-offs and total market value per year

Year	Number	Market Value (1996 $)
1982	1	64.9
1983	4	1682.9
1984	7	2866.8
1985	12	3614.1
1986	10	9031.9
1987	13	6012.2
1988	17	8880.3
1989	18	7175.1
1990	10	4569.4
1991	8	4295.9
1992	12	7430.5
1993	19	21376.8
1994	16	14023.3
1995	10	7790.4
1996	4	1575.8

Table 2: Spin-offs and parents by primary 3 digit industry.

2 Digit SIC	Spin-offs	Parents	Industry Name
100	1	1	Agricultural Production-Crops
200	1		Agricultural Production-Livestock
1000	3	2	Metal Mining
1200	3	1	Coal Mining
1300	8	9	Oil and Gas Extraction
1500		2	Building Construction & General Contracting
1600		1	Construction-Special Trade
2000	3	9	Food and Kindred Products
2100		2	Tobacco Products
2200	1	2	Textile Mill Products
2300	2	1	Apparel & Other Finished Products
2400	1	1	Lumber & Wood Products Except Furniture
2500		3	Furniture & Fixtures
2600	5	2	Paper & Allied Products
2700	1		Printing, Publishing & Allied Products
2800	12	12	Chemical & Allied Products
2900	1	3	Petroleum Refining & Related Industries
3000	6		Rubber & Miscellaneous Plastic Products
3100	1		Leather & Leather Products
3200	3	2	Stone, Clay, Glass & Concrete Products
3300	4	2	Primary Metal Industries
3400	6	2	Fabricated Metal Except Machinery or Transportation
3500	12	11	Industrial/Commercial Machinery & Computer Equip.
3600	12	10	Electrical Equipment Except Computers
3700	6	4	Transportation Equipment
3800	5	10	Measuring Instruments, Photo Goods, Watches
3900	2		Miscellaneous Manufacturing
4000	1	2	Railroad Transportation
4200	2	1	Motor Freight Transport. Warehousing
4400	1		Water Transportation
4500	1	1	Air Transportation
4700		1	Transportation Services
4800	7	5	Communications
4900	5	6	Electric Gas & Sanitary Services
5000	6	6	Durable Goods Wholesale
5100	3	1	Non-durable Goods Wholesale
5200	2		Building Material/Hardware/Garden Retail
5300	3	3	General Merchandise Stores
5400		1	Food Stores
5600		2	Apparel & Accessory Stores
5700	1	2	Home Furniture & Equipment Stores
5800	5	3	Eating & Drinking Places
5900	4	3	Miscellaneous Retail
6100		5	Non-depository Credit Institutions
6200		1	Security & Commodity Brokers
6300		3	Insurance Carriers
6500	3		Real Estate
6700		2	Holding Companies, Investment Offices
7000	1	4	Hotels, Other Lodging Places
7300	4	8	Business Services
7500		2	Auto Repair, Services, Parking
7800	3		Motion Pictures
7900	3	1	Amusement, Recreation
8000	1	3	Health Services
8200	4		Educational Services
8300	1	1	Social Services
8700	2	2	Engineering, Accounting, R&D, Mgmt, Related Svcs.

Table 3, Panel A: Parent univariate statistics

Total Assets is book value of assets. CFA= (Earnings before interest, taxes and depreciation) / total assets Tobin's Q is calculated as (market value of equity + total assets - book value of equity - deferred taxes) / (total assets). Q_{ind} is the weighted average of median industry Q for the industries identified in the firm's COMPUSTAT Segment data. I_Q is Tobin's Q - Q_{ind}. CAPXA is capital expenditures / total assets. Herfindahl index is a measure of firm diversification computed as $(\sum asset_i^2) / (\sum asset_i)^2$ where $asset_i$ is the identifiable assets of segment i. Year 0 is the fiscal year of the spin-off. Year -1 and 1 are the years immediately preceding and following the spin-off respectively.

	Mean	Median	5th Pct.	95th Pct.	# Obs.
Total Assets					
year -1	3,519.4	1,029.1	33.3	20,325	154
year 0	3,172.8	846.4	30.4	14,968	149
year 1	3,223.9	929.8	34.6	20,139	
Total Sales					
year -1	2,472.5	1,078.5	22.6	9,602	154
year 0	2,379.1	876.5	25.1	9,244	149
year 1	2,439.7	1,021.2	28.7	9,875	138
CFA					
year -1	.143	.137	.019	.266	155
year 0	.125	.126	-.040	.287	147
year 1	.156	.152	-.013	.315	137
Tobin's Q					
year -1	1.490	1.259	.820	2.943	155
year 0	1.668	1.382	.864	3.505	148
year 1	1.668	1.413	.954	3.376	136
Q_{ind}					
year -1	1.429	1.291	1.004	2.479	
year 0	1.451	1.292	.987	2.340	
year 1	1.438	1.325	.990	2.209	
I_Q					
year -1	.064	-.013	-.922	1.405	
year 0	.219	.073	-.683	1.712	
year 1	.232	.056	-.753	1.394	
CAPXA					
year -1	.070	.056	.006	.204	157
year 0	.059	.047	.004	.162	148
year 1	.070	.051	.004	.192	136
Herfindahl index					
year -1	.655	.564	.276	1	
year 0	.715	.734	.293	1	
year 1	.723	.752	.287	1	

Table 3, Panel B: Spin-off univariate statistics

Total Assets is book value of assets. CFA= (Earnings before interest, taxes and depreciation) / total assets Tobin's Q is calculated as (market value of equity + total assets - book value of equity - deferred taxes) / (total assets). Q_{ind} is the weighted average of median industry Q for the industries identified in the firm's COMPUSTAT Segment data. I_Q is Tobin's Q - Q_{ind}. CAPXA is capital expenditures / total assets. Year 0 is the fiscal year of the spin-off. Year -1 and 1 are the years immediately preceding and following the spin-off respectively.

	Mean	Median	5th Pct.	95th Pct.	# Obs.
Total Assets					
year -1	477.4	150.2	7.0	1989.6	158
year 0	497.3	154.3	8.2	2113.3	159
year 1	534.5	168.3	7.2	2088.5	154
Total Sales					
year -1	488.5	200.4	0.8	1845.4	158
year 0	517.8	195.4	1.1	2056.5	159
year 1	553.4	218.1	3.3	2225.8	154
CFA					
year -1	-.051	.128	-.353	.381	147
year 0	.075	.139	-.412	.362	155
year 1	.094	.133	-.381	.324	153
Tobin's Q					
year 0	1.501	1.215	.654	3.239	155
year 1	1.569	1.263	.679	3.207	151
Q_{ind}					
year -1	1.458	1.318	.918	2.633	
year 0	1.439	1.288	.919	2.666	
year 1	1.436	1.337	.923	2.283	
I_Q					
year 0	.082	-.034	-.832	1.378	
year 1	.145	-.042	-.914	1.655	
CAPXA					
year -1	.149	.061	.015	.323	147
year 0	.123	.065	.012	.417	154
year 1	.084	.058	.009	.218	151

Table 3, Panel C: Univariate statistics of spin-off relative to parent in year -1. CFA is (Earnings before interest, taxes and depreciation) / total assets. Q is calculated as (market value of equity + total assets - book value of equity - deferred taxes) / (total assets). Q_{ind} is the weighted average of median industry Q for the industries identified in the firm's COMPUSTAT Segment data. Ratio variables are spin-off value / parent value. Δ variables are spin-off value - parent value.

	Mean	Median	5th Pct.	95th Pct.	Std. Dev.	# Obs
Ratio of Assets	.243	.204	.013	.656	.197	158
Ratio of Sales	.281	.210	.010	.808	.250	150
ΔCFA	-.074	-.045	-.556	.250	.260	144
ΔCFA_{ind}	-.002	0.0	-.128	.087	.073	144
Ratio of Q_{ind}	1.132	1.070	.726	1.684	.340	161
ΔQ_{ind}	.136	.104	-.504	.938	.464	161
Ratio of Q	1.046	.826	.327	2.049	.903	143
ΔQ	-.192	-.247	-1.532	1.198	1.240	143

Table 4, Panel A: Pre-spin-off pooled regressions of spin-off industry adjusted capital expenditures on spin-off industry adjusted cash flow and the difference between spin-off industry Tobin's Q and parent industry Tobin's Q. I_CAPXA is spin-off CAPXA minus median industry CAPXA, where CAPXA is capital expenditures normalized by current period total assets. I_CFA is spinoff CFA minus industry CFA where CFA is EBITD (earnings before interest, taxes and depreciation) normalized by current period assets. ΔQ_{ind} is the difference between spin-off median industry Tobin's Q and parent median industry Tobin's Q, where Tobin's Q is (market value of equity - book value of equity + total assets - deferred taxes)/(total assets - deferred taxes). Sample splits are done on the basis of whether spin-off is in a industry which is related or unrelated to the remaining parent industries, whether the parent CEO's percentage ownership of parent shares (CEO_pct) is high or low, whether there exists an outsider owning at least 5% of shares (Out_pct) and whether parent returns over the prior 3 years are greater than returns on the CRSP equal weighted index (P_return). Firms with average CAPXA <.02 have been excluded. Observations with CAPXA>.5 or ROA>.5 or ROA<-.4 have been excluded. T-statistics, reported in parentheses under each coefficient are based on a two sided t-test utilizing White heteroscedastic consistent standard errors and accounting for dependence in observations within each firm. The values in parentheses in the F stat column are p values.

Restriction	Const.	I_CFA	ΔQ_{ind}	R^2 # Obs.	Fstat. (p-val)
Full Sample	.0189	.1191	-.0171	.0642	8.10
	(0.329)	(3.151)	(2.503)	283	(.0005)
Related	-.0053	.0680	-.0031	.0274	3.76
	(0.786)	(2.446)	(0.205)	124	(.0290)
Unrelated	.0067	.1684	-.0264	.0975	6.07
	(0.836)	(2.603)	(3.165)	159	(.0038)
High CEO_pct	.0068	.1470	-.0188	.0918	6.01
	(0.715)	(2.867)	(2.085)	141	(.0041)
Low CEO_pct	-.0035	.0531	-.0176	.0316	1.94
	(0.592)	(1.311)	(1.607)	140	(.1517)
High Out_pct	-.0016	.0820	-.0043	.0235	3.05
	(0.209)	(2.470)	(0.521)	128	(.0548)
Low Out_pct	.0046	.1282	-.0284	.1003	9.00
	(0.539)	(2.168)	(2.386)	153	(.0003)
P_Return > 0	.0054	.1579	-.0017	.0651	1.86
	(0.541)	(1.864)	(0.089)	132	(.1648)
P_Return <= 0	-.0013	.0909	-.0211	.0750	8.45
	(0.224)	(3.509)	(2.438)	151	(.0005)

Table 4, Panel B: Post-spinoff pooled regressions of spin-off industry adjusted capital expenditures on spin-off industry adjusted cash flow and the difference between spin-off industry Tobin's Q and parent industry Tobin's Q. See panel A for additional detail.

Restriction	Const.	I_CFA	ΔQ_{ind}	R^2 # Obs.	Fstat. (p-val)
Full Sample	.0012	.0794	.0033	.0428	4.83
	(0.415)	(2.661)	(0.370)	292	.0096
Related	.0047	.0787	.0071	.0281	0.88
	(0.971)	(1.316)	(0.525)	139	(.4192)
Unrelated	-.0018	.0822	.0034	.0622	5.54
	(0.482)	(2.219)	(0.276)	153	(.0081)
High CEO_pct	-.0020	.0673	-.0028	.0365	1.54
	(0.566)	(1.662)	(0.212)	152	(.2218)
Low CEO_pct	.0053	.1059	.0146	.0676	3.81
	(1.104)	(2.612)	(1.361)	140	(.0278)
High Out_pct	.0023	.1300	-.0038	.0662	4.57
	(0.477)	(2.371)	(0.279)	140	(.0143)
Low Out_pct	-.0003	.0443	.0093	.0268	1.19
	(0.097)	(1.240)	(1.037)	152	(.3115)
P_Return > 0	-.0009	.0269	.0113	.0163	1.00
	(0.247)	(0.992)	(1.131)	136	(.3758)
P_Return <= 0	.0021	.1211	-.0025	.0767	4.09
	(0.446)	(2.461)	(0.192)	156	(.0210)

Table 4, Panel C: Combined pre and post spin-off pooled regressions of spin-off industry adjusted capital expenditures on spin-off industry adjusted cash flow and the difference between spin-off industry Tobin's Q and parent industry Tobin's Q. See panel A for additional detail.

Restriction	Const.	Before* I_CFA	I_CFA	Before* ΔQ_{ind}	ΔQ_{ind}	R^2 # Obs.	Fstat. (p-val)
Full Sample	.0019	.0375	.0807	-.0205	.0032	.0584	6.16
	(0.541)	(0.864)	(2.639)	(1.826)	(0.353)	568	(.0001)
Related	-.0053	.0384	-.0006	.0127	-.0016	.0090	0.48
	(1.214)	(0.530)	(0.008)	(0.661)	(0.113)	197	(.7516)
Unrelated	.0033	.0733	.0898	-.0267	.0011	.0882	5.56
	(0.657)	(1.073)	(2.365)	(1.853)	(0.086)	306	(.0006)
High CEO_pct	.0029	.0648	.0773	-.0136	-.0045	.0749	3.93
	(0.511)	(1.081)	(1.843)	(.876)	(0.338)	286	(.0062)
Low CEO_pct	.0016	-.0356	.0972	-.0326	.0145	.0485	2.26
	(0.386)	(0.725)	(2.572)	(2.144)	(1.291)	276	(.0438)
High Out_pct	-.0039	-.0526	.1324	-.0016	-.0039	.0464	3.13
	(0.279)	(0.854)	(2.390)	(0.102)	(0.279)	262	(.0202)
Low Out_pct	.0023	.0756	.0515	-.0378	.0100	.0856	4.79
	(0.417)	(1.308)	(1.342)	(2.660)	(1.130)	301	(.0018)
P_Return > 0	.0022	.1236	.0339	-.0114	.0095	.0549	1.47
	(0.947)	(1.609)	(1.082)	(0.564)	(0.947)	265	(.2217)
P_Return <= 0	.0013	-.0274	.1199	-.0195	-.0025	.0808	6.74
	(0.326)	(0.480)	(2.410)	(1.263)	(0.194)	303	(.0001)

Table 5: Panel regressions (random effects) of spin-off industry adjusted capital expenditures on spin-off industry adjusted cash flow, difference between spin-off industry Tobin's Q and parent industry Tobin's Q, relatedness of spin-off and parent industries, prior parent returns, and equity ownership of parent CEO. I_CAPXA is spin-off CAPXA minus median industry CAPXA, where CAPXA is capital expenditures normalized by current period total assets. I_CFA is spinoff CFA minus industry CFA where CFA is EBITD (earnings before interest, taxes and depreciation) normalized by current period assets. ΔQ_{ind} is the difference between spin-off median industry Tobin's Q and parent median industry Tobin's Q, where Tobin's Q is (market value of equity - book value of equity + total assets - deferred taxes)/(total assets - deferred taxes). Related is coded 1 if the spin-off industry is related to the parent industry, 0 otherwise. P_return is coded 1 if parent equity returns over prior 3 years are greater than the CRSP equal weighted index, 0 otherwise. CEO_pct is the percentage number of parent shares held by the parent CEO at the spin-off announcement date. Firms with average CAPXA <.02 have been excluded. Observations with CAPXA>.5 or ROA>.5 or ROA<-.4 have been excluded. T-statistics, reported in parentheses under each coefficient are based on a two sided t-test. The values in parentheses in the F stat column are p values.

	Const.	Before* I_CFA	I_CFA	Before* ΔQ_{ind}	ΔQ_{ind}	Before* Related	Before* P_return	Before* CEO_pct	R^2 adj. Obs, firm	F stat. (p-value)
Full Sample	.0001	.0512	.0341	-.0245	.0130				.0578	19.11
	(0.022)	(1.612)	(1.282)	(2.553)	(1.607)				558, 134	(.0007)
	.0020	.0382	.0375	-.0248	.0134	-.0091			.0579	22.21
	(0.583)	(1.172)	(1.411)	(2.584)	(1.650)	(1.775)			558, 134	(.0005)
	.0011	.0376	.0349	-.0253	.0143	-.0124	.0071		.0578	23.83
	(0.293)	(1.157)	(1.311)	(2.642)	(1.763)	(2.170)	(1.291)		558, 134	(.0006)
	.0009	.0454	.0380	-.0258	.0139	-.0115		.0617	.0806	31.61
	(0.242)	(1.391)	(1.432)	(2.697)	(1.720)	(2.229)		(3.021)	552, 132	(.0000)
Size > 150	-.0033	-.0018	.0533	-.0227	.0027				.0514	9.04
	(0.918)	(0.043)	(1.494)	(1.806)	(0.289)				347, 80	(.0602)
	-.0011	-.0169	.0605	-.0247	.0048	-.0113			.0549	13.37
	(0.305)	(0.401)	(1.697)	(1.969)	(0.505)	(2.084)			347, 80	(.0202)
	-.0010	-.0176	.0612	-.0246	.0046	-.0109	-.0009		.0558	13.34
	(0.267)	(0.414)	(1.699)	(1.964)	(0.483)	(1.894)	(0.154)		347, 80	(.0379)
	-.0022	-.0053	.0535	-.0232	.0054	-.0117		.0526	.0737	21.75
	(0.567)	(0.126)	(1.502)	(1.867)	(0.579)	(2.190)		(2.847)	342, 79	(.0013)
Size < 150	.0040	.0830	.0251	-.0292	.0208				.0655	10.26
	(0.622)	(1.510)	(0.597)	(1.853)	(1.478)				211, 54	(.0363)
	.0055	.0739	.0265	-.0287	.0203	-.0057			.0655	10.51
	(0.788)	(1.372)	(0.629)	(1.818)	(1.431)	(0.563)			211, 54	(.0621)
	.0036	.0612	.0244	-.0295	.0211	-.0164	.0179		.0793	12.80
	(0.495)	(1.129)	(0.581)	(1.875)	(1.493)	(1.340)	(1.513)		211, 54	(.0463)
	.0040	.0793	.0329	-.0315	.0198	-.0126		.0924	.0984	13.48
	(0.569)	(1.463)	(0.781)	(1.972)	(1.406)	(1.147)		(1.634)	210, 53	(.0360)

Table 6: Panel regressions (random effects) of spin-off industry adjusted capital expenditures on spin-off industry adjusted cash flow, parent industry adjusted cash flow, parent industry adjusted CAPXA, difference between spin-off industry Tobin's Q and parent industry Tobin's Q, relatedness of spin-off and parent industries, and equity ownership of parent CEO. Parent data items have been adjusted to correspond to the businesses that are not part of the spin-off. I_CAPXA is CAPXA minus median industry CAPXA, where CAPXA is capital expenditures normalized by current period total assets. I_CFA is CFA minus industry CFA where CFA is EBITD (earnings before interest, taxes and depreciation) normalized by current period assets. ΔQ_{ind} is the difference between spin-off median industry Tobin's Q and parent median industry Tobin's Q, where Tobin's Q is (market value of equity - book value of equity + total assets - deferred taxes)/(total assets - deferred taxes). Related is coded 1 if the spin-off industry is related to the parent industry, 0 otherwise. P_return is coded 1 if parent equity returns over prior 3 years are greater than the CRSP equal weighted index, 0 otherwise. CEO_pct is the percentage number of parent shares held by the parent CEO at the spin-off announcement date. Firms with average CAPXA <.02 have been excluded. Observations with CAPXA>.5 or ROA>.5 or ROA<-.4 have been excluded. T-statistics, reported in parentheses under each coefficient are based on a two sided t-test. The values in parentheses in the F stat column are p values.

Const.	Before* I_CFA	I_CFA	Before* Parent I_CFA	Parent I_CFA	Before* Parent I_CAPXA	Parent I_CAPXA	Before* ΔQ_{ind}	ΔQ_{ind}	Before* Related	Before* CEO_pct	R^2 adj. Obs, firm	F stat. (p-value)
.0002	.0436	.0482	.0759	-.0204			-.0237	.0141	-.0130	.0647	.0997	35.23
(0.052)	(1.276)	(1.714)	(1.768)	(0.593)			(2.297)	(1.566)	(2.382)	(3.095)	506, 130	(.0000)
-.0002	.0407	.0470			-.1433	.1080	-.0251	.0140	-.0101	.0685	.0907	33.22
(0.064)	(1.192)	(1.663)			(1.783)	(1.480)	(2.449)	(1.549)	(1.873)	(3.226)	502, 130	(.0001)
.0001	.0471	.0501	.0883	-.0289	-.1644	.1158	-.0229	.0132	-.0125	.0703	.1009	38.95
(0.031)	(1.372)	(1.773)	(2.003)	(0.826)	(2.030)	(1.583)	(2.275)	(1.453)	(2.275)	(3.310)	500, 129	(.0000)

Table 7: Panel regressions (random effects) of CAPXA on ROA, Q_{ind}, Before*High_Q, Before*Low_Q, Before* Related and Before*Preturn. CAPXA is capital expenditures normalized by current period total assets. ROA is EBITD (earnings before interest, taxes and depreciation) normalized by current period assets. Q_{ind} is the weighted average of median industry Tobin's Q. Low_Q is coded 1 if in year 0, (spinoff Q_{ind} - parent Q_{ind}) <-.2 and 0 otherwise. High_Q is coded 1 if in year 0, (spinoff Q_{ind} - parent Q_{ind}) >.2 and 0 otherwise. Related is coded 1 for spin-offs in industries related to the remaining industries of the parent and 0 otherwise. Preturn is coded 1 for parents with cumulative returns over the prior 3 years which are less than the CRSP Equal Weighted Index and 0 if cumulative returns are greater. Before is a dummy variable coded 1 for years before the spin-off and 0 for years after the spin-off. Firms with average CAPXA <.02 have not been included. Observations with CAPXA>.5 or ROA>.5 or ROA<-.4 have not been included. Numbers in parentheses are t-statistics based on a two sided t-test with the exception of the χ^2 column where it is a p-value.

Restriction	Const.	ROA	Q_{ind}	Before* High_Q	Before* Low_Q	Before* Related	Before* Preturn	Before	Obs, firm	R^2	χ^2 stat.
Full Sample	.0496	.0819	.0094	-.0140	.0216	-.0174	.0090	.0051	689, 142	.0809	66.05
	(5.742)	(4.949)	(1.844)	(1.968)	(3.120)	(2.952)	(1.550)	(0.860)			(.0000)
Size>150	.0462	.0759	.0076	-.0088	.0125	-.0147	.0131	.0011	404, 77	.0671	34.48
	(4.974)	(3.725)	(1.275)	(1.246)	(1.877)	(2.580)	(2.286)	(0.187)			(.0000)
Size<150	.0584	.0838	.0082	-.0235	.0318	-.0214	.0108	.0102	285, 65	.0999	32.78
	(3.793)	(3.089)	(0.974)	(1.642)	(2.128)	(1.710)	(0.886)	(0.803)			(.0000)

Table 8: Announcement Date Abnormal Returns

Cumulative abnormal returns (MM_CAR) are market model abnormal returns from t-1 to t+1 where t=0 is the earliest announcement date of the event. Market model parameters (α,β) are the OLS coefficients obtained from regressing parent daily returns versus the CRSP value weighted index for the period t-250 to t-50. For security i, MM_CAR_i is then $\Sigma (R_{m,t} - (\alpha + \beta_i R_{m,t}))$ over the 3 day announcement period. The J1 and J2 statistics are calculated as described in Campbell, Lo and MacKinlay (1996) and represent the MM_CAR divided by the appropriate standard error. Both statistics are asymptotically normally distributed, thus the numbers in parentheses under the statistics are the p-values associated with a standard normal distribution. % > 0 is the percentage of observations greater than 0. The numbers underneath % > 0 are the p-values associated with a non-parametric sign test.

	MM_CAR	J1 stat.	J2 stat.	% > 0	# Obs.
Carve-outs	.0216	6.050	8.307	60.5%	152
		(.0000)	**(.0000)**	**(.0117)**	
Spinoffs	.0363	10.734	14.501	71.3%	157
		(.0000)	**(.0000)**	**(.0000)**	
Divestitures	.0114	2.948	4.388	58.1%	74
		(.0016)	**(.0001)**	(.2007)	

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