**Abstract**

This paper examines security price reactions of European demergers. For a period ranging from one and a half years prior to the demerger announcement through to three years after the execution date, the relative performance of the parent, spin-off and the combined effect is analysed relative to the overall market performance. Significant announcement effects were established for a sample of 48 European demergers. In addition, significant positive long-term value creation, in particular in year 2 after the demerger, was found for the spin-off but not for the parent firm. While size has, on average, a decisive but inverse impact on performance for both parent and spin-off, takeover activity does not.

Keywords: Corporate restructuring, demerger, spin-off.

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# The Performance Effects of European Demergers


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# 1. Introduction

This paper investigates the short- and long-term effects of the demerger of European companies on shareholder wealth. In a demerger, usually referred to in the US as a spin-off, a firm is broken up into two or more independent entities. In the process a wholly owned subsidiary becomes an independent entity, with its shares being distributed to the shareholders of the parent company on a pro-rata basis. This process is considered to be a non-cash dividend by the parent firm and is tax-free provided that a substantial proportion (though not necessarily all) of the shares in the spin-off are distributed to the shareholders at no cost. In contrast to prior research, this paper analyses European as opposed to North American demergers and looks at the share price reaction over a much longer period from 1.5 years prior the demerger announcement to 3 years after the separation. Between 1989 and 1999, a significant positive announcement effect is documented for 48 voluntary European demergers that are preceded by a period of significant underperformance by the parent company. Moreover, spin-offs – but not parent firms - show significant positive abnormal returns up to three years after the demerger.

# 2. Theoretical Reasons for Demergers

Demergers were an American invention of the 1920s and became common since the 1950s. In 1980, the British Chancellor of the Exchequer introduced tax incentives for demergers to facilitate the de-conglomeration of the British industry. In continental Europe, demergers are a relatively recent phenomena, in part initiated by legislation drawn up by the European Commission in 1990.

At first sight, it is far from obvious how a 'simple' break-up of an organisation into smaller units would create value. "If there are no synergies between the parent and the subsidiary, the sum of the post-divestitures' cash flows would equal the combined cash flow had the two units remained as one" (Hite and Owers, 1983, p. 411). The value of two business units should be identical before and after a demerger, unless some positive or negative synergies exist that create or destroy value under a combined ownership structure.

A demerger is therefore a sensible option if negative synergies or diseconomies of scale exist that can be eliminated by separating the firm into two or more independent

entities. Possible explanations for such a value creation are plentiful and can be broadly categorised into five different types.

a. *Dismantling of conglomerates.* Historically, demergers were used to dismantle conglomerates after it became apparent that the costs of running such organisational structures outweighed the benefits in the economic environment of the 1980s and 1990s. The 'dismantling of conglomerates' argument is widely based on the idea of removing inefficient organisational structures and hence the elimination of negative synergies.

b. *Organisational improvements.* From an organisational perspective, value can be created through the elimination of misfits in the strategic focus or organisational properties of the organisation. In addition, the reduction of the size of an organisation leads to an over-proportional reduction in 'information loss' within the hierarchy.

c. *Capital market improvements.* More focused units might improve access to the capital market or attract a new set of investors, thereby eliminating barriers to growth from a capital market perspective.

d. *Corporate Governance improvements.* Value creation through improvements in the role and function of the head office, improvements in the structuring of managerial incentives and more effective market based governance mechanisms due to increased transparency.

e. *Bondholder expropriation.* Value redistribution from bondholders to shareholders through a reduction of quality of the collateral provided (Hite and Owers, 1983).

## 3. Empirical Evidence

The empirical literature currently available on the performance effects of demergers is largely limited to the experience of US firms. This can be explained by the longer history and the higher frequency of demergers in the US as compared to Europe.

The first empirical paper[1] on this subject was published by Miles and Rosenfeld (1983), analysing announcement effects of 55 demergers/spin-offs between 1963 and 1980. Analysing a time period ranging from 120 trading days before, to 60 trading days after, the demerger announcement, they found a statistically significant[2] cumulative average adjusted return of 22%.

The immediate announcement effect (i.e. at day zero and day one) is +3.3%, for the longer period from day –10 to day +10 it is +7.6%[3]. This indicates a noteworthy positive assessment of demergers by the market. Most surprising of all is the considerable value creation between the days –120 to –11 before the demerger announcement. Although puzzling, this phenomenon is broadly consistent with the findings of this paper.

Schipper and Smith (1983) studied 93 voluntary demerger announcements between 1963 and 1981. Using a market model (CAPM), they established a significant positive announcement effect of approximately +2.8% for a two-day announcement period. They also noted that most spun-off subsidiaries (72 out of the total of 93 firms) were operating in dissimilar industries to the parent firm. For 18 out of the 93 transactions, regulatory pressure was the reported prime motive. The market rewarded those transactions with an average abnormal return of +5.07% compared with +2.29% for the remainder of the sample.

Hite and Owers (1983) studied the security price reactions of 123 voluntary demergers between 1963 and 1981, and established a statistically significant positive cumulative abnormal return of +7% for the period ranging from 50 days prior to the announcement through to the completion date. Of this, +3.3% took place in the two-day period from day –1 to day 0.

Copeland, Lemgruber and Mayers (1987) extended the above research by comparing two different samples. The first sample with no post-selection bias included all firms that had announced a demerger decision; the second sample suffering from a post-selection bias only contained firms that both announced and executed the demerger. Copeland *et al.* established that the two-day abnormal return for the fixed sample is +3.03%, whereas for the re-balanced sample it is +2.49%. In addition, he established that about 11% of all firms never executed their announced demergers, a result that is roughly in line with the findings of this study. These results are based on a sample of demergers that occurred between 1962 and 1983.

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1 The first empirical paper was in fact by Kudla and McInish (1983) but is of doubtful quality as it analyses only six firms.

2 Significant at the 1% level.

3 Both statistically significant at the 1% level.

In the most recent study, Cusatis, Miles and Woolridge (1993) analysed the performance of a sample of 146 demergers taking place between 1965 and 1988. As in this paper, it analyses a much longer time-period ranging from six months to three years following the execution date of the demerger. Announcement effects were excluded from the research. Their research indicates that "both the spin-off and their parents offer significantly positive abnormal returns for up to three years beyond the spin-off announcement date" (Cusatis *et al*., 1993, p. 294).

**Table 1: Announcement Effect of Demergers**

| Author(s) | Year | Sample Period | Sample Size | Investigation Period | Result |
|---|---|---|---|---|---|
| Miles and Rosenfeld | 1983 | 1963-1980 | 55 | -10 to +10 | +7.6% |
| Schipper and Smith | 1983 | 1963-1981 | 93 | -1, 0 | +2.8% |
| Hite and Owers | 1983 | 1963-1981 | 123 | -50 to 0<br>-1, 0 | +7.0%<br>+3.3% |
| Copeland *et al.* | 1987 | 1962-1983 | 73 | | +2.5% |

Using matched firm adjusted returns, the cumulative positive average abnormal return for the parent in each of the three years following the demerger are +4.5%, +25.0% and +33.6%. For the spin-off, the corresponding results are +12.5%, +26.7% and +18.1% respectively. Of particular interest is the exceptionally good performance of both parent and spin-off in the second year after the demerger. However, after a closer examination of the distribution[4] it becomes apparent that *laggards* and *high performers* almost balance each other out, albeit with a slight majority of the latter. Both parent and spin-off had created considerable value above and beyond their peer groups in the three years following the demerger execution. This indicates that the market might not have fully anticipated the likely value creation at the time of the demerger announcement.

These authors discovered that both the parent and the spin-off were more likely to be subsequently taken over than their matched firms; spin-offs about four times, and parent firms about two and a half times as much. Given their method of calculation, the researchers

[4] For both parent and spin-off.

could establish that after controlling for the takeover premium, the statistically significant positive long-run effect for both parent and spin-off disappeared[5].

According to this research, the potential value gains that were not anticipated at the time of the demerger announcement are attributable to two effects: a strong effect from an incorrect evaluation of the takeover probability for the two or more parts of the firm; and a much smaller effect from other unknown sources.

## 4. Data and Methodology

### 4.1. Sample selection

This paper aims to analyse European demergers. Demergers are considered European if the parent company was located in one of the countries of the European Economic Area. Demergers were identified using several European press databases in *FT Profile* and, in a second step, verified via annual reports and *Datastream*. The performance effects of demergers were measured using share price performance relative to the overall market indices. These were collected using *Datastream*. The announcement date ('day 0') was defined as the day when the news broke to the market and the execution date as the first day of trading for the spin-off. The time period under investigation was between 1989 and 1999. Following the demerger, the sample was divided into parent and spin-off. Those parts of the firm that kept the original name were identified as parents. Those firms that executed their announced demerger are labelled as standard demerger.

A preliminary attempt was made to divide the sample into two groups by the degree of product relatedness between parent and spin-off, as measured by the two-digit SIC code. It was however established that most demergers actually occurred between unrelated lines of business. As the related sample was very small and the results insignificant, they are not reported here[6].

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Note: In this case, returns are computed with the assumption of a buy and hold strategy. If a firm is also delisted or is being taken over, the longest available return is used to present the whole period. The researchers adjust for takeover premiums by removing the six-month period prior to the merger/takeover from the sample.

[6] As the expected gains can be highest from demergers of unrelated lines of business, most of the demergers were found to be of this nature. The remaining sample of five firms with related demergers was very small, and for some of the smaller firms and countries there was data available for the line of business the companies were engaged in. Due to the small number of firms in the sample, the results are statistically insignificant and are not reported in this paper.

The sample was also stratified by size, whereas each sample was divided by market capitalisation at the announcement and execution dates[7]. Four samples were thus created, dividing firms into small and large based upon their market capitalisation at the announcement and execution date. The former sample (pre-demerger selection) allows us to derive information about the possible impact of a firm's initial size on the demerger performance, the latter (post-demerger selection) on the impact of size of the new entity on value creation following the demerger.

In addition, further homogeneous subgroups were created for demergers that were announced but never executed (aborted demergers) as well as technical demergers. Technical demergers were so classified if one of the constituent parts was in a simultaneous process of merging and demerging[8].

Two different samples were collected to test for the performance effects of demergers. The first, re-balanced sample was designed to include the maximum number of firms. This means that the sample varies from period to period due to natural drop out, mergers and acquisitions and the unavailability of data. The second, fixed sample includes firms for which a full set of data is available for the entire period under investigation.

The re-balanced sample consists of 48 firms in total. Of those, 38 demergers[9] were either completed or were in the process of being completed[10]. Another five demergers were classified as technical demergers, with the remaining five demergers having been announced but never completed (aborted demerger).

The second, fixed sample consists of 21 parents and 23 spin-offs. In contrast, the dynamic sample consists of 34 parent and 41 spin-off firms at the execution date. With technical demergers included, the sample size is 38 and 46 respectively. Multiple spin-offs cause the number of spin-off firms to exceed the number of parents. In the case of multiple simultaneous spin-offs, the parent firm was included in the post-demerger sample only once[11]. Where a multiple sequential spin-off occurred within three years following the demerger, the parent firm was dropped from the post-demerger sample 10 trading days before

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7 The sample was divided into two groups of equal proportion. Given the fact that every division of a sample into large and small firms is somewhat random, it was felt that the most appropriate form of dividing the sample was split into two groups of equal size.

8 Technical demergers were excluded from the standard demerger group.

9 One demerger announcement can lead to more than one spin-off.

10 In three cases, the demerger was announced but not yet completed.

11 For the four-way split of Hanson, Hanson (building materials) was categorised as a spin-off, not a parent firm.

the announcement date. Following the execution date, the parent group contains 15 large firms[12], and 18 small firms[13]; the spin-offs are 21 and 19 respectively.

### 4.2. Methodology

The analysis is divided into four parts: the pre-announcement period; the announcement period, the execution date phase as well as the time after the demerger.

To establish the pre-announcement characteristics of the sample, a period of 400 trading days or slightly more than 1.5 years preceding the announcement was selected. Event study methodology was used to test the announcement effects (Fama *et al.*, 1969, and Sirower, 1997). A set of five time windows was studied ranging from a 2 to 21 day periods. To test for ex-date effects, returns are calculated for the five days following the demerger execution.

The post-demerger period under consideration spans over 780 trading days (approximately 3 years) following the demerger transaction. It would be unnecessary to study the post-demerger period if a perfectly efficient financial market could be assumed. The value creation should have been foreseen and discounted at the announcement date, and no significant abnormal return should be identifiable. However, various authors (e.g. Sirower, 1997 and Limmack, 1991) have indicated that the market seems to systematically under- or overestimate the long-term performance effects of mergers and acquisitions at the announcement date.

Over this three-year period, a substantial number of firms disappeared from the sample due to their subsequent acquisition or the natural dropout from the sample.

### 4.3. Performance measure

The analysis of the performance effects of demergers relies on market-based measures. Such measurement is preferable to accounting-based measures as it allows the comparison of European data without regard for different national accounting conventions[14].

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[12] Of the 19 firms that were identified as large firms before the demerger, three were not yet standard, and one firm (Hanson) split itself into too many small parts to allow meaningful conclusions to be drawn from it. Hanson was dropped from the large sample.

[13] Of the 19 small firms that were identified as such before the demerger, one was taken private, one taken out of the sample due to illiquid trading, and one (Saveland-Hercules) was included after the demerger only.

Based on the market adjusted return model, the performance of the individual stock is compared to the performance of the overall market index; hence daily[15] abnormal returns ($A_{i,t}$) are calculated for each individual security i at time t as follows:

$$A_{i,t} = R_{i,t} - R_{m,t}$$

where $R_{i,t}$ is the actual return or raw return of the security i on day t, and $R_{m,t}$ is the return on the respective market index on day t. Compared with the market model described below, this method has the advantage that it is free from the parameter bias of the estimation period, a problem which is particularly severe when studying demergers over a long investigation period.

In a second step, the abnormal returns ($A_{i,t}$) are accumulated for each firm in the sample over the investigation period ($CR_i$) and then averaged across all firms in the sample.

Cumulative average abnormal returns (CAR) are hence calculated as follows:

$$CAR = \frac{1}{N}\sum_{i=1}^{N} CR_i \quad \text{where} \quad CR_i = \sum_{t=0/1}^{T} A_{i,t}$$

N denotes the number of firms in the sample, $CR_i$ the cumulative abnormal return of firm i. Cumulative abnormal returns ($CR_i$) are calculated starting at day 0 for the calculation of post-demerger performance effects, otherwise starting at day 1. This calculation method is based on a buy-and-hold investment strategy to avoid the bias associated with portfolio rebalancing.

However, to allow the illustration of the results in a graphical format, this methodology needs to be adapted. The adaptation is based on a daily-rebalanced portfolio. With a deliberate trade-off between preciseness and vividness in mind, the second method is adopted. The average of the above abnormal returns ($AR_i$) for firm i is calculated, and accumulated over the period under investigation. The cumulative average abnormal returns (CAR) are then calculated as follows:

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[14] To test for the performance effects of demergers, Sirower's (1997) methodology to evaluate the performance effects of mergers is adopted.

[15] It was suggested by Brown and Warner (1980) to calculate two-day abnormal returns to avoid an overestimation of abnormal returns. Tests performed on this sample established that there are no estimation differences between calculating daily and two-day abnormal returns.

$$CAR_t = \sum_{t=0/1}^{T} AR_t \quad \text{where} \quad AR_t = \frac{1}{N_t} \sum_{i=1}^{N_t} A_{i,t}$$

where $N_t$ is the number of firms in the sample on day t.

The results of this second method can be found in Figures 1 and 4. As can be seen, these charts overestimate the abnormal returns when compared with the preceding tables. Such overestimation is documented in the literature (see for example: Blume and Stambaugh, 1983 and Roll, 1983). Whereas the results presented below are based on a buy and hold strategy, the methodology used to compute the figure data is based on the daily re-balancing of the portfolio. The different calculation methods employed produce slightly different results, as "individual asset returns are not as well-behaved as we might like" (Roll, 1983, p. 372). In most instances, however, the reported performance difference is well below 2% over the 780 trading day period. The charts are intended to give a graphical illustration of the value creation properties over time, and are not intended to provide a precise reading of the cumulative abnormal returns.

The market adjusted return model has some further limitations. It can be seen as a restricted market model that is based on the CAPM model.

The market adjusted return model implicitly assumes that the '$a_i$ (of this CAPM model) is constrained to be zero, and ß$_i$ constrained to be one' (MacKinlay, 1997, p. 18). In most if not all of the cases, it can be assumed that the ß for the individual security is not one, introducing a certain measurement bias. The situation is further complicated by the fact that the betas (individual risk of security i) will be different before and after the demerger. It can be assumed that the betas are increasing with the reduction of size in a demerger. It is impossible to adjust for the bias arising from the imposed restriction of beta to be one, and of the changes in beta after the demerger. Brown and Warner (1980), however, could establish that the market adjusted return model is as good as any other method in measuring abnormal returns, indicating that the introduced measurement bias is small compared to the overall effect.

# 5. Results/Empirical findings

## 5.1. Pre-announcement performance

The pre-announcement period focuses on the 400 trading days prior to the demerger announcement. Over this period standard demergers outperformed the market by approximately 2%, albeit not statistically significant. The median value for this period was 5%. Disentangling the data further shows a very different picture. Over the 100 trading day period between day 300 and day 201 prior to the demerger, the firms underperformed the market by 6% and in the following 100-day period by another 5%.[16,17]. The decline in share price was on average reversed over the last 100-day period before the demerger announcement. Looking at the various subgroups, it becomes apparent that in most cases, future demerger candidates significantly underperformed the market up to one year before the demerger announcement. Large firms fared better than small ones. The firms whose demerger was later cancelled did perform particularly poorly, significantly underperforming the market by about 45% over the entire 400-day period.

Table 2 depicts a brief summary of the mean values over this period for some main and sub-categories, while the more extensive tables and figures can be found in Appendix 1 and 4 respectively. The term 'all demergers' includes all standard demergers, technical demergers and aborted demergers. Standard demergers are defined as executed demergers. The corresponding mean value for all standard demergers is plotted in Figure 1.

The positive abnormal returns over the 100 trading days prior to the demerger announcement are a phenomenon that is difficult to explain. By definition, the demerger announcement reaches the market at day zero. The positive abnormal returns leading up to the demerger announcement might be due to market inefficiencies; for example, chief executives may inadvertently advertise possible restructuring activities to institutions well ahead of the public announcement. Another possible explanation is that the market anticipated some corporate restructuring activities.

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16 These results are statistically significant at the 5% and 10% levels respectively.

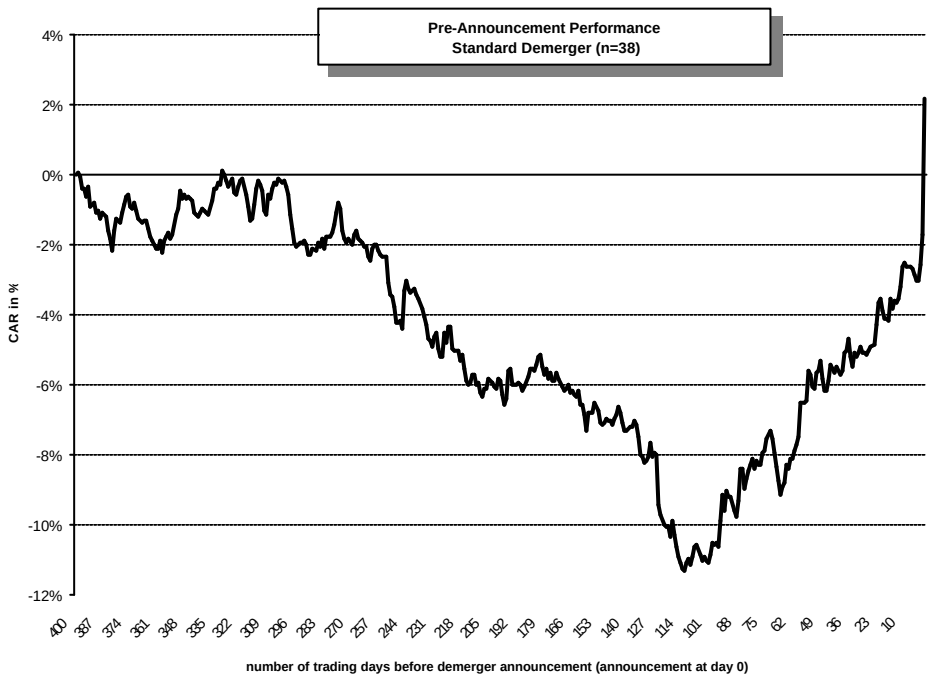
17 In the following, 'statistically significant' denotes the statistical significance at the 5% level unless otherwise stated.

**Table 2: Pre-Announcement Performance**

| mean | All Demergers | Standard Demerger | Large Executed Demerger | Small Executed Demerger | Technical Demerger | Aborted Demerger | Fixed sample Standard demerger |
|---|---|---|---|---|---|---|---|
| N | 48 | 38 | 19 | 19 | 5 | 5 | 21 |
| Total | -1.4% | 2.2% | -1.6% | 5.9% | 14.8% | -44.6% ** | 14.1% |
| 400 - 301 | -1.3% | -0.3% | 2.6% | -3.3% | -0.2% | -9.7% * | -1.3% |
| 300 - 201 | -6.3% *** | -5.5% *** | -3.9% * | -7.1% ** | -3.4% | -15.0% * | -4.2% * |
| 200 - 101 | -4.7% ** | -5.0% * | -4.9% ** | -5.1% | 5.6% | -12.9% * | -1.3% |
| 100 - 51 | 3.1% | 5.2% ** | 5.0% * | 5.4% | 0.9% | -10.8% | 8.8% ** |
| 50 - 11 | 1.6% | 2.5% | -3.0% | 8.0% | 0.7% | -4.7% | 4.7% |
| 10 - 1 | 6.3% *** | 5.3% *** | 2.7% * | 8.0% *** | 11.2% ** | 8.6% | 7.5% *** |

abnormal returns for selected time windows before announcement date (announcement at day 0)
*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Figure 1: Pre-Announcement Performance: Standard Demerger**

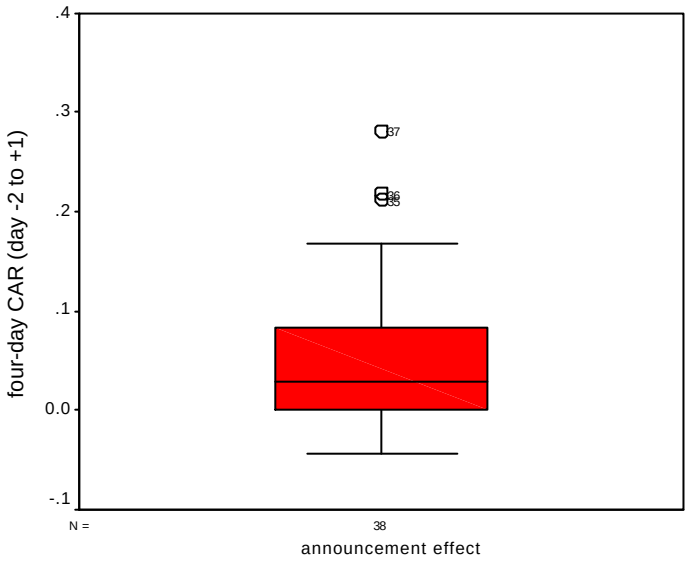



## 5.2. Announcement effect

A time window of 21 days ranging from 10 days before and after the announcement date is used to estimate the effect of demerger announcements on shareholder wealth. It was established that, for standard demergers, the announcement effect is +4% for the two-day

period (day 0 to day +1), and +5% for the four-day period (day –2 through to day +1)[18]. The respective median values are +2% and +3%. Over the longest time span under investigation (day –10 to day +10), the average return of the demerger announcement is +5% for the unadjusted and +4% for the market-adjusted model[19]. About 23% of all demerger announcements are in negative territory, indicating that not all demergers necessarily guarantee success. The box-plot (Figure 2) depicts the positively skewed distribution of results for the time window from day –2 through to day +1.

**Figure 2: Distribution of Annoucement Effects for 4-Day Time Window**




Looking at the various strata, small firms that decided to demerge appear to create more value than larger ones. The announcement effect for small firms is with +6.8% (median +5.1%) about 3% higher than for large firms with a positive announcement effect of +3.8% (median +1.9%). This is in line with the above-discussed research that established similar results for the US. Technical demergers resulted in a statistically significant return of about +7.6%, the fixed sample returned +6.3% (median +6.5%) for the same time window. Table 3 again summarises the results and Figure 3 illustrates them.

[18] Both results are statistically significant at the 1% level, and are very similar for both raw and market adjusted returns.

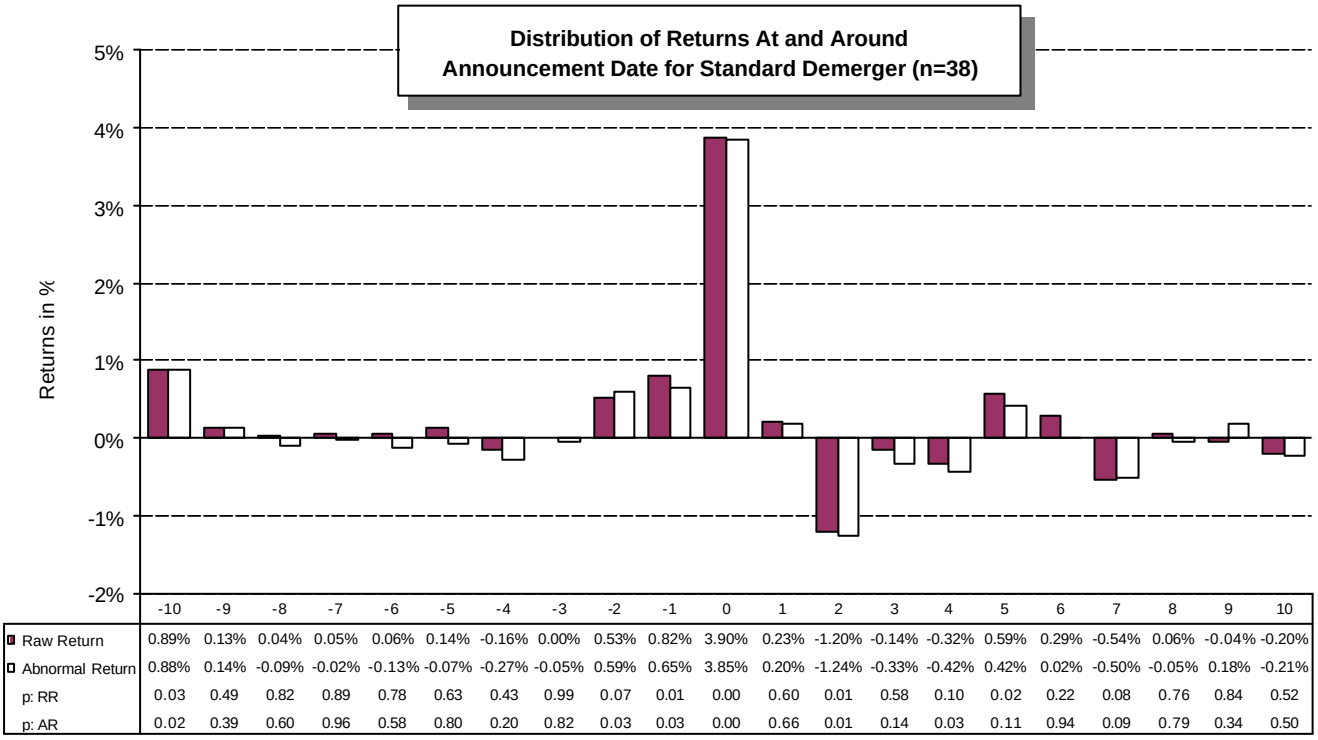
[19] The results are statistically significant at the 1% and 5% levels respectively.

## Table 3: Demerger Announcement Effects

| time window | All Demergers | Standard Demerger | Large Demerger | Small Demerger | Technical Demerger | Aborted Demerger | Fixed sample - Standard |
|---|---|---|---|---|---|---|---|
| N | **48** | **38** | **19** | **19** | **5** | **5** | **21** |
| 0 / +1 | **4.1% ***** | **4.1% ***** | **2.8% **** | **5.4% ***** | **4.9%** | **3.1%** | **5.0% ***** |
| -1 / 1 | **5.4% ***** | **4.9% ***** | **3.5% ***** | **6.4% ***** | **7.8% *** | **6.8%** | **6.0% ***** |
| -2 / 1 | **6.1% ***** | **5.5% ***** | **3.6% ***** | **7.3% ***** | **8.9% **** | **7.9%** | **6.6% ***** |
| -3 / 3 | **5.2% ***** | **4.1% ***** | **2.4% *** | **5.9% **** | **8.3% **** | **10.7%** | **6.8% ***** |
| -5 / 5 | **5.5% ***** | **4.4% ***** | **2.8% *** | **5.9% **** | **8.1% *** | **11.1%** | **7.1% ***** |
| -10 / 10 | **5.6% ***** | **5.1% ***** | **1.6%** | **8.6% ***** | **6.3%** | **8.8%** | **7.5% ***** |

abnormal returns for selected time windows **at and around** demerger announcement
*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

## Figure 3: Announcement Effect for Standard Demerger




| | -10 | -9 | -8 | -7 | -6 | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw Return | 0.89% | 0.13% | 0.04% | 0.05% | 0.06% | 0.14% | -0.16% | 0.00% | 0.53% | 0.82% | 3.90% | 0.23% | -1.20% | -0.14% | -0.32% | 0.59% | 0.29% | -0.54% | 0.06% | -0.04% | -0.20% |
| Abnormal Return | 0.88% | 0.14% | -0.09% | -0.02% | -0.13% | -0.07% | -0.27% | -0.05% | 0.59% | 0.65% | 3.85% | 0.20% | -1.24% | -0.33% | -0.42% | 0.42% | 0.02% | -0.50% | -0.05% | 0.18% | -0.21% |
| p: RR | 0.03 | 0.49 | 0.82 | 0.89 | 0.78 | 0.63 | 0.43 | 0.99 | 0.07 | 0.01 | 0.00 | 0.60 | 0.01 | 0.58 | 0.10 | 0.02 | 0.22 | 0.08 | 0.76 | 0.84 | 0.52 |
| p: AR | 0.02 | 0.39 | 0.60 | 0.96 | 0.58 | 0.80 | 0.20 | 0.82 | 0.03 | 0.03 | 0.00 | 0.66 | 0.01 | 0.14 | 0.03 | 0.11 | 0.94 | 0.09 | 0.79 | 0.34 | 0.50 |

### 5.3. Ex-date effect

A five-day period from day 0 to day +5 is used to estimate the ex-date effect of a demerger. Vijh (1994, p. 581) claims that "the spin-off ex-date return arises because the parent and subsidiary stocks attract different investors who prefer to buy the separated shares at ex-date". Vijh, amongst others, has found positive abnormal returns for the spin-off on the ex-date. Table 4 depicts the positive abnormal returns for both the parent and spin-off. In this respect, day 0 is defined as the day prior to the first trading day and reflects the exchange ratio set by the investment bank.

For both the parent firm and the spin-off firm, the results are positive but not statistically significant. In conclusion, Vijh's proposition of a significantly positive abnormal return at ex-date cannot be supported.

**Table 4: Demerger Ex-Date Effect**

| | Parent | Spin-off |
|---|---|---|
| N | **34** | **41** |
| 1 | **1.01%** | **3.54%** |
| 2 | **0.34%** | **-0.29%** |
| 3 | **0.38%** | **-0.24%** |
| 4 | **0.40%** | **0.04%** |
| 5 | **0.38%** | **-0.38%** |

abnormal returns on trading day t **after** execution da
*: significant at the 10% level (p<0.1) **: 5% level (p

### 5.4. Post-demerger transaction

A period of 780 trading days was chosen to establish possible differences in the long-run value creation characteristics of the parent and spin-off firms.

a. Overall effect

Examining Table 5, it appears that standard demergers on average outperform the market by about +4% in the three years following the break-up. This result is statistically insignificant. This must lead to the conclusion that the market has, on average, correctly anticipated the value creation of a demerger at the announcement date. The median value of +12% for this

three-year period, as shown in Appendix 3, is considerably higher than the mean indicating the existence of negative outliers. However, the picture looks noticeably different when viewed by the various subgroups. Whilst large firms[20] underperformed the market by -20%[21], small demergers outperformed the market by +26%[22].

Another feature of the post-demerger period is the underperformance of standard demergers in the first 100 trading days. This also holds true for small demergers. Although large firms consistently underperformed the market over the entire period, value creation in other sub-groups was mainly confined to the trading period of day 300-599. This period of value creation corresponds to year 2 and the first half of year 3 following the demerger.

Not all demergers create value over the post transaction period. About one third[23] of all parent and spin-off firms combined underperformed the market over the investigation period. This reiterates the point that a demerger per se does not guarantee success.

**Table 5: Long-Term Performance of Both Parent and Spin-Off Combined**

| time window | Standard Demerger | | Large Demerger (pre-demerger selection) | | Small Demerger (pre-demerger selection) | | Fixed sample - Standard demerger | |
|---|---|---|---|---|---|---|---|---|
| | mean | N | mean | N | mean | N | mean | N |
| Total | **4.2%** | 34 | **-20.0%** | 16 | **25.7%** | 18 | **-1.8%** | 21 |
| 0 - 99 | **-7.3% *** | 34 | **-2.6%** | 16 | **-11.5% *** | 18 | **-2.8%** | 21 |
| 100 - 199 | **1.3%** | 34 | **-2.2%** | 16 | **4.3%** | 18 | **0.9%** | 21 |
| 200 - 299 | **-0.3%** | 34 | **-0.6%** | 16 | **0.1%** | 18 | **-3.8%** | 21 |
| 300 - 399 | **2.6%** | 34 | **-2.2%** | 16 | **6.9%** | 18 | **-0.2%** | 21 |
| 400 - 499 | **5.5%** | 33 | **-4.4%** | 16 | **14.8% **** | 17 | **6.8%** | 21 |
| 500 - 599 | **4.1%** | 31 | **-1.0%** | 15 | **8.9%** | 16 | **1.2%** | 21 |
| 600 - 699 | **-0.3%** | 27 | **-7.0%** | 15 | **8.0%** | 12 | **-1.4%** | 21 |

Combined value creation following execution date (abnormal returns for
*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level

[20] Pre-demerger selection period.
[21] The result being very weakly significant with t=1.69.
[22] Statistically significant at the 10% level.
[23] Exactly 32.4% of all firms underperformed the market over the investigation period.

b. Parent

The level and characteristics of value creation of the parent firm and spin-off firm will now be addressed in isolation. The parent firm is defined as the constituent part of the demerger that retained the original name of the pre-demerger firm[24]; its break-up market value is, on average, about two thirds of the combined entity.

As shown in Table 6, the value creation or destruction for standard demergers over three years following the demerger is negligible. On average, the parent underperformed the market by –6%, with a median value of +7%, indicating a strong negatively skewed distribution. In the first 100 trading days, and over the period between the 200$^{th}$ and 300$^{th}$ trading day, the parent firm underperformed the market. Between the 400$^{th}$ and 600$^{th}$ day, it then performed better once compared with the market. After three years, very diverging results can be seen for the individual firms, with results ranging from a cumulative abnormal return of –246% to +171%.

Overall, the worst performing period was the 200 to 299 day period, whereas the best performing interval was between trading day 400 and 499. The detailed results for the parent firm are depicted in Table 6 and Appendix 3 respectively. Overall, demergers do not guarantee success for the parent firm, as 41% of them underperformed the market. Some of those parent firms underperformed the market substantially.

[24] In some instances, both parts of the demerger changed their name; in this case the larger part (in terms of market value) was defined as the parent firm.

**Table 6: Long-term Parent Performance**

| time window | Standard Demerger | | Large Demerger (pre-demerger selection) | | Small Demerger (pre-demerger selection) | | Large Demerger (post-demerger selection) | | Small Demerger (post-demerger selection) | | Fixed sample - Standard demerger | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mean | N | mean | N | mean | N | mean | N | mean | N | mean | N |
| Total | **-5.9%** | 34 | **-29.4%** * | 15 | **18.5%** | 18 | **-16.4%** | 16 | **9.2%** | 17 | **-12.0%** | 21 |
| 0 - 99 | **-4.9%** | 34 | **-0.7%** | 15 | **-8.0%** | 18 | **-1.7%** | 16 | **-7.5%** | 17 | **-1.1%** | 21 |
| 100 - 199 | **1.2%** | 34 | **-2.5%** | 15 | **4.5%** | 18 | **-0.1%** | 16 | **2.7%** | 17 | **1.0%** | 21 |
| 200 - 299 | **-3.2%** | 31 | **-4.1%** | 14 | **-1.4%** | 16 | **-0.4%** | 14 | **-4.6%** | 16 | **-5.7%** | 21 |
| 300 - 399 | **-0.3%** | 29 | **-0.9%** | 14 | **1.5%** | 14 | **-4.2%** | 14 | **4.8%** | 14 | **-3.0%** | 21 |
| 400 - 499 | **4.0%** | 28 | **-7.9%** | 14 | **15.9%** ** | 13 | **0.2%** | 14 | **7.2%** | 13 | **4.9%** | 21 |
| 500 - 599 | **6.4%** | 27 | **-6.6%** | 13 | **20.9%** | 13 | **-2.4%** | 13 | **16.7%** | 13 | **3.3%** | 21 |
| 600 - 699 | **-4.6%** | 25 | **-6.4%** | 13 | **1.2%** | 11 | **-8.0%** | 13 | **2.9%** | 11 | **-5.4%** | 21 |

Combined value creation following execution date (abnormal returns for various time windows)
(abnormal returns for various time windows)

c. Spin-off

The spin-off is normally the smaller of the demerged parts of the firm that did not retain the name. Its break-up market value is on average less than a third of the combined market value of the parent and spin-off. The spin-off appears to have been more successful in the three years following the break-up than the parent firm. All standard spin-offs outperformed the market[25] by +17%. Spin-offs performed better than the market in all but the first and last periods under investigation, with the strongest gain[26] of +9% from day 400 – 499. However, not all spin-offs succeeded over the period of analysis. Some spin-offs fared extremely well with a maximum cumulative abnormal return (CAR) of +139%, whereas others did very poorly with a CAR of –99%. About 31% of all spin-offs underperformed when compared to the market. A high degree of variance in the spin-off sample was detected, albeit smaller than for the parent firms.

In a similar vein to the parent firms, the spin-offs of large firms (pre-demerger selection) performed worse than those of small firms. However, the performance effects are not significantly different from zero for the 780 trading day window following the execution date. Small firms, on the other hand, outperformed the market by more than +45%, with the median value of +39%[27]. Analysing the individual time windows in more detail, it becomes apparent that these small firms' spin-offs outperformed the market in every interval, with the

25 At the 10% significance level.
26 Again at the 10% significance level.
27 This result is statistically significant at the 1% level.

exception of the first 100 trading days. Over the periods 300 – 399 and 400 – 499, the CAR is +12% and +19% for the respective intervals[28].

Large spin-offs gain on average by +7%[29], with a high median value of +22% indicating a strong negatively skewed result. Small spin-offs, in contrast, outperform the market[30] by +27%. The very best time window for small spin-offs was the period between day 400 and 499 when they outperformed the market by +19% (median +16%)[31]. The fixed sample yields a cumulative abnormal return of +25% over the same period. To summarise, spin-offs account for most of the value creation in the post-demerger period.

Figure 4 gives an overview of the post-demerger performance of standard demergers.

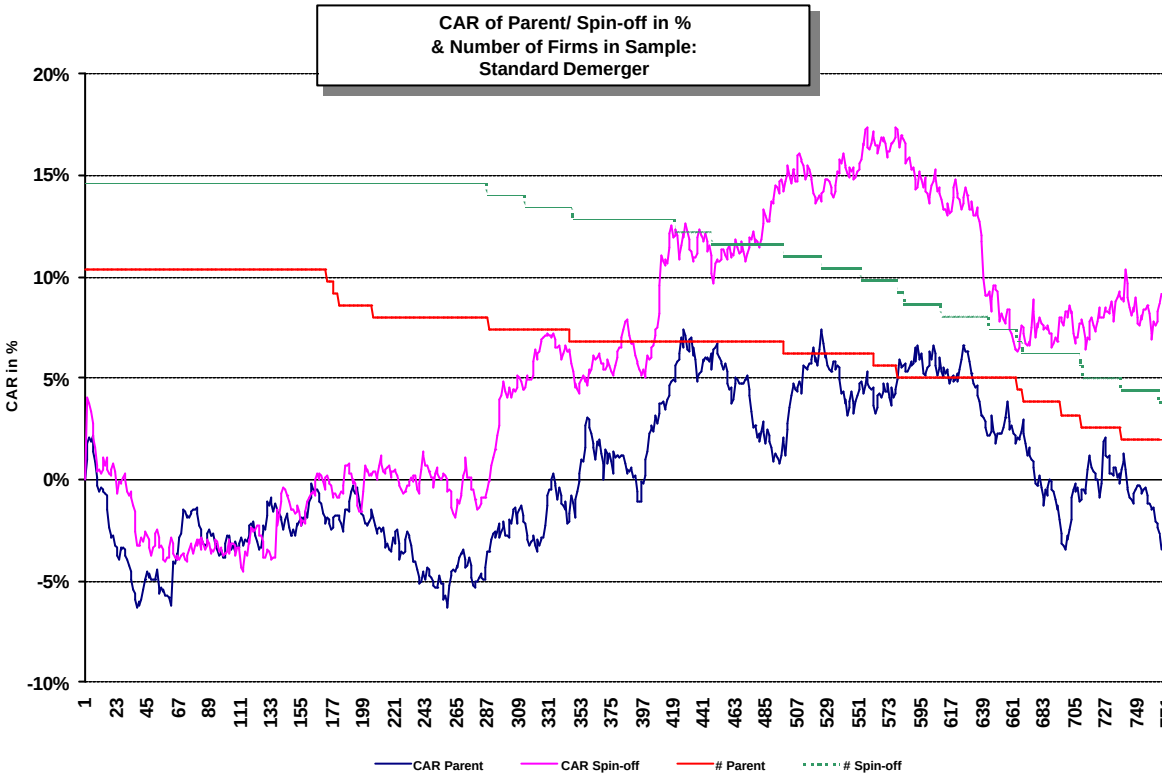
**Table 7: Long-Term Spin-Off Performance**

| time window | Standard Demergers | | Large Demerger (pre-demerger selection) | | Small Demerger (pre-demerger selection) | | Large Demerger (post-demerger selection) | | Small Demerger (post-demerger selection) | | Fixed sample - Standard demerger | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mean | N | mean | N | mean | N | mean | N | mean | N | mean | N |
| Total | **17.3% *** | 41 | **-5.9%** | 21 | **44.8% ***** | 19 | **7.5%** | 20 | **26.7% *** | 21 | **24.9% *** | 23 |
| 0 - 99 | **-4.2%** | 41 | **0.2%** | 21 | **-9.8%** | 19 | **-9.6%** | 20 | **0.9%** | 21 | **3.7%** | 23 |
| 100 - 199 | **4.2%** | 41 | **-1.0%** | 21 | **8.4%** | 19 | **3.3%** | 20 | **5.1%** | 21 | **5.9%** | 23 |
| 200 - 299 | **3.8%** | 41 | **0.0%** | 21 | **8.9%** | 19 | **3.7%** | 20 | **3.9%** | 21 | **4.7%** | 23 |
| 300 - 399 | **4.6%** | 40 | **-1.9%** | 21 | **11.8% *** | 18 | **5.9%** | 20 | **3.3%** | 20 | **4.0%** | 23 |
| 400 - 499 | **9.4% *** | 38 | **2.1%** | 20 | **18.9% **** | 17 | **-0.3%** | 19 | **19.1% ***** | 19 | **5.8%** | 23 |
| 500 - 599 | **0.2%** | 35 | **-1.6%** | 19 | **3.2%** | 15 | **2.6%** | 18 | **-2.4%** | 17 | **-2.9%** | 23 |
| 600 - 699 | **-0.6%** | 31 | **-7.4%** | 18 | **11.3%** | 12 | **-0.9%** | 16 | **-0.3%** | 15 | **-0.3%** | 23 |

Value creation and destruction by the spin-off following the execution date
(abnormal returns for various time windows)
*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

28 The returns are statistically significant at the 5% level or better.
29 Statistically insignificant.
30 Significant at the 10% level: t=1.92.
31 The results being statistically significant at the 1% level.

**Figure 4: Long-term Performance of Parent and Spin-off**




d. Size

Comparing the above data on the performance effects for both large and small demergers with size defined at the announcement date, it can be seen that demergers by small firms outperform larger ones with a considerable margin at any stage over the investigation period. Over the pre-announcement period, small demergers outperformed their larger peers on average by +7.4% (median: +10.0%); at and around the announcement date[32] by +3.0% (+3.2%). For the three years following the demerger transaction, the group of small parent firms outperformed the larger group on average by +47.9% (+34.5%), with small spin-offs outperforming larger spin-offs by +50.7% (+27.1%). In addition, the sample was divided into large and small firms by their market value on the execution date to establish whether the size of the new independent entities had an impact on the overall demerger performance. Again, size appears to be a decisive factor for the parent firm's success. Small parent firms outperformed larger ones by +25.6%, with a positive median value of +10.1%. For spin-offs, the evidence is mixed. Whereas the mean value indicates a better performance of small spin-

[32] For the three-day period from day –2 to +1.

offs compared to large ones, the median value points in the opposite direction with –6.0% over the entire period of 780 trading days after the ex-date.

e. Takeover likelihood

Cusatis, Miles and Woolridge (1993) established that most of the value gains in their sample was due to the higher takeover likelihood of spin-offs once compared to a control group. It is therefore of great interest to determine whether part, if not all, of the value creation in the demerger process stems from takeover premiums. Although it is impossible to establish the impact of takeovers on the announcement effect, it is possible to evaluate their impact on the post-demerger performance by comparing the full sample with a sample of firms that were not taken over. To this end, all those firms that were taken over in the three years after the demerger[33] were removed from the second sample, thereby creating a control group. The results can be seen in Table 8 below. They indicate that takeover activity had only a relatively small, statistically insignificant, impact on post-demerger performance. For the "post-demerger" sample, where size is defined on the ex-date, small parent firms are on average about 6.4% less successful once the influence of takeovers were excluded from the sample; spin-offs on the other hand were 1.9% more successful. Large spin-offs were even more successful improving their post-demerger performance by 3.9% to 11.4%[34]. In contrast, the results for large parent firms were positively influenced by takeover activity, improving the overall negative results by 1.6%. This implies that those spin-offs that were taken over were in fact underperforming relative to the market, with the reverse being true for parent firms. Overall, takeover activity cannot explain the full abnormal returns observed.

[33] Naturally, only firms that were taken over in the 780 trading days following the ex-date were excluded from the sample.

[34] Statistically significant at the 5% level.

**Table 8: Relative Performance Impact of Takeovers on Sample**

| Large Firms | delta mean |
|---|---|
| **parent** | 1.6% |
| **spin off** | -3.9% |

| Small Firms | delta mean |
|---|---|
| **parent** | 6.4% |
| **spin off** | -1.9% |

performance differences of demergers
excluding takeover influences relative to full samp
all results are statically insignificant

## 6. Conclusion

A statistically significant positive average share price reaction of +5.5% is demonstrated for the demerger announcement[35]. This is in line with similar findings, for example by Hite and Owers (1983) in a US study, which showed a +3.3% positive announcement effect.

Demerger announcements are preceded by a period of considerable underperformance relative to the market. It was shown, however, that this trend reversed approximately 100 trading days before the demerger announcement, and on average all of the value lost was in turn recovered. In contrast to Vijh (1994), no statistically significant ex-date effect for both parent and spin-off could be demonstrated.

Over the 780 trading days (or three years) after the demerger, the combined performance of parent and spin-off returned a statistically insignificant abnormal return of +4.2%. The performance of parent and spin-off was substantially different. While the spin-off outperformed the market by a statistically significant +17.3% over this period, the parent firm underperformed the market by –5.9%, albeit this latter result was statistically insignificant.

It was also demonstrated that there are important performance differences between the various demerger subgroups. Small demergers, for example, were far more successful than large ones.

[35] For the four-day period from day –2 through to day +1.

# Appendices

## Appendix 1: Pre-Announcement Performance

**All Demergers**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **-3.4%** | **-1.4%** | (0.39) | 0.81 | 48 |
| 400 - 301 | **-2.4%** | **-1.3%** | (0.15) | 0.55 | 48 |
| 300 - 201 | **-5.4%** | **-6.3%** *** | (0.11) | 0.00 | 48 |
| 200 - 101 | **-3.3%** | **-4.7%** ** | (0.15) | 0.04 | 48 |
| 100 - 51 | **3.6%** | **3.1%** | (0.16) | 0.20 | 48 |
| 50 - 11 | **-0.8%** | **1.6%** | (0.19) | 0.57 | 48 |
| 10 - 1 | **4.5%** | **6.3%** *** | (0.10) | 0.00 | 48 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Standard Demerger**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **4.9%** | **2.2%** | (0.38) | 0.73 | 38 |
| 400 - 301 | **-1.3%** | **-0.3%** | (0.16) | 0.90 | 38 |
| 300 - 201 | **-4.5%** | **-5.5%** *** | (0.11) | 0.00 | 38 |
| 200 - 101 | **-4.1%** | **-5.0%** * | (0.16) | 0.06 | 38 |
| 100 - 51 | **4.2%** | **5.2%** ** | (0.15) | 0.04 | 38 |
| 50 - 11 | **-0.2%** | **2.5%** | (0.21) | 0.46 | 38 |
| 10 - 1 | **3.6%** | **5.3%** *** | (0.09) | 0.00 | 38 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Large Demerger**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **-3.6%** | **-1.6%** | (0.20) | 0.74 | 19 |
| 400 - 301 | **2.0%** | **2.6%** | (0.12) | 0.36 | 19 |
| 300 - 201 | **-3.7%** | **-3.9%** * | (0.08) | 0.05 | 19 |
| 200 - 101 | **-5.5%** | **-4.9%** ** | (0.10) | 0.04 | 19 |
| 100 - 51 | **4.1%** | **5.0%** * | (0.13) | 0.10 | 19 |
| 50 - 11 | **-1.7%** | **-3.0%** | (0.10) | 0.20 | 19 |
| 10 - 1 | **3.1%** | **2.7%** * | (0.06) | 0.06 | 19 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Small Demerger**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **6.4%** | **5.9%** | (0.51) | 0.62 | 19 |
| 400 - 301 | **-5.5%** | **-3.3%** | (0.19) | 0.47 | 19 |
| 300 - 201 | **-6.7%** | **-7.1%** ** | (0.12) | 0.02 | 19 |
| 200 - 101 | **-3.3%** | **-5.1%** | (0.21) | 0.30 | 19 |
| 100 - 51 | **5.5%** | **5.4%** | (0.18) | 0.21 | 19 |
| 50 - 11 | **-0.1%** | **8.0%** | (0.27) | 0.21 | 19 |
| 10 - 1 | **3.7%** | **8.0%** *** | (0.12) | 0.01 | 19 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Technical Demerger**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **8.6%** | **14.8%** | (0.24) | 0.24 | 5 |
| 400 - 301 | **0.8%** | **-0.2%** | (0.05) | 0.92 | 5 |
| 300 - 201 | **-6.8%** | **-3.4%** | (0.08) | 0.40 | 5 |
| 200 - 101 | **6.5%** | **5.6%** | (0.08) | 0.19 | 5 |
| 100 - 51 | **4.7%** | **0.9%** | (0.11) | 0.86 | 5 |
| 50 - 11 | **1.9%** | **0.7%** | (0.05) | 0.78 | 5 |
| 10 - 0 | **12.0%** | **11.2%** ** | (0.08) | 0.03 | 5 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Aborted Demerger**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **-59.2%** | **-44.6%** ** | (0.34) | 0.04 | 5 |
| 400 - 301 | **-12.9%** | **-9.7%** * | (0.09) | 0.08 | 5 |
| 300 - 201 | **-8.2%** | **-15.0%** * | (0.15) | 0.09 | 5 |
| 200 - 101 | **-13.9%** | **-12.9%** * | (0.11) | 0.06 | 5 |
| 100 - 51 | **-6.0%** | **-10.8%** | (0.24) | 0.37 | 5 |
| 50 - 11 | **-6.1%** | **-4.7%** | (0.09) | 0.32 | 5 |
| 10 - 0 | **7.0%** | **8.6%** | (0.13) | 0.21 | 5 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Fixed Sample - Standard Demerger**

| time window | **median** | **mean** | stdev. | p | n |
|---|---|---|---|---|---|
| Total | **8.3%** | **14.1%** | (0.39) | 0.12 | 21 |
| 400 - 301 | **0.4%** | **-1.3%** | (0.16) | 0.71 | 21 |
| 300 - 201 | **-2.8%** | **-4.2%** * | (0.10) | 0.06 | 21 |
| 200 - 101 | **-2.3%** | **-1.3%** | (0.11) | 0.57 | 21 |
| 100 - 51 | **4.2%** | **8.8%** ** | (0.16) | 0.02 | 21 |
| 50 - 11 | **-1.7%** | **4.7%** | (0.27) | 0.43 | 21 |
| 10 - 0 | **5.1%** | **7.5%** *** | (0.11) | 0.01 | 21 |

abnormal returns for selected time windows before demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

## Appendix 2: Announcement Effects

### All Demergers

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **2.3%** | **4.1%** *** | (0.08) | -0.18 | 0.28 | 48 |
| -1 / 1 | **2.6%** | **5.4%** *** | (0.08) | -0.06 | 0.29 | 48 |
| -2 / 1 | **4.1%** | **6.1%** *** | (0.08) | -0.05 | 0.29 | 48 |
| -3 / 3 | **3.1%** | **5.2%** *** | (0.08) | -0.07 | 0.29 | 48 |
| -5 / 5 | **4.7%** | **5.5%** *** | (0.09) | -0.08 | 0.37 | 48 |
| -10 / 10 | **3.6%** | **5.6%** *** | (0.11) | -0.12 | 0.33 | 48 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

### Standard Demerger

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **2.3%** | **4.1%** *** | (0.07) | -0.05 | 0.22 | 38 |
| -1 / 1 | **2.4%** | **4.9%** *** | (0.07) | -0.06 | 0.26 | 38 |
| -2 / 1 | **2.9%** | **5.5%** *** | (0.07) | -0.05 | 0.29 | 38 |
| -3 / 3 | **1.9%** | **4.1%** *** | (0.08) | -0.07 | 0.27 | 38 |
| -5 / 5 | **2.4%** | **4.4%** *** | (0.08) | -0.08 | 0.24 | 38 |
| -10 / 10 | **3.6%** | **5.1%** *** | (0.11) | -0.12 | 0.33 | 38 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

### Large Demerger

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **2.3%** | **2.8%** ** | (0.04) | -0.05 | 0.12 | 19 |
| -1 / 1 | **2.4%** | **3.5%** *** | (0.05) | -0.06 | 0.15 | 19 |
| -2 / 1 | **2.9%** | **3.6%** *** | (0.05) | -0.05 | 0.15 | 19 |
| -3 / 3 | **1.9%** | **2.4%** * | (0.06) | -0.07 | 0.15 | 19 |
| -5 / 5 | **2.4%** | **2.8%** * | (0.07) | -0.08 | 0.19 | 19 |
| -10 / 10 | **3.6%** | **1.6%** | (0.08) | -0.12 | 0.17 | 19 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

### Small Demerger

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **2.5%** | **5.4%** *** | (0.08) | -0.04 | 0.22 | 19 |
| -1 / 1 | **2.5%** | **6.4%** *** | (0.09) | -0.03 | 0.26 | 19 |
| -2 / 1 | **6.0%** | **7.3%** *** | (0.09) | -0.02 | 0.29 | 19 |
| -3 / 3 | **4.7%** | **5.9%** ** | (0.09) | -0.06 | 0.27 | 19 |
| -5 / 5 | **6.3%** | **5.9%** ** | (0.10) | -0.06 | 0.24 | 19 |
| -10 / 10 | **9.5%** | **8.6%** *** | (0.12) | -0.12 | 0.33 | 19 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

### Technical Demerger

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **2.7%** | **4.9%** | (0.09) | -0.06 | 0.18 | 5 |
| -1 / 1 | **8.9%** | **7.8%** * | (0.08) | 0.00 | 0.19 | 5 |
| -2 / 1 | **8.9%** | **8.9%** ** | (0.06) | 0.01 | 0.18 | 5 |
| -3 / 3 | **7.9%** | **8.3%** ** | (0.07) | 0.00 | 0.18 | 5 |
| -5 / 5 | **5.8%** | **8.1%** * | (0.07) | 0.01 | 0.18 | 5 |
| -10 / 10 | **2.8%** | **6.3%** | (0.12) | -0.03 | 0.28 | 5 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Aborted Demerger**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **0.6%** | **3.1%** | (0.17) | -0.18 | 0.28 | 5 |
| -1 / 1 | **4.1%** | **6.8%** | (0.13) | -0.05 | 0.29 | 5 |
| -2 / 1 | **5.2%** | **7.9%** | (0.13) | -0.05 | 0.28 | 5 |
| -3 / 3 | **9.9%** | **10.7%** | (0.12) | -0.03 | 0.29 | 5 |
| -5 / 5 | **8.0%** | **11.1%** | (0.16) | -0.07 | 0.37 | 5 |
| -10 / 10 | **9.1%** | **8.8%** | (0.14) | -0.07 | 0.30 | 5 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Fixed Sample - Standard Demerger**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| 0 / +1 | **2.7%** | **5.0%** *** | (0.05) | -0.04 | 0.17 | 21 |
| -1 / 1 | **4.6%** | **6.0%** *** | (0.07) | -0.03 | 0.26 | 21 |
| -2 / 1 | **6.0%** | **6.6%** *** | (0.08) | -0.03 | 0.29 | 21 |
| -3 / 3 | **5.8%** | **6.8%** *** | (0.07) | -0.02 | 0.27 | 21 |
| -5 / 5 | **6.6%** | **7.1%** *** | (0.07) | -0.03 | 0.20 | 21 |
| -10 / 10 | **5.1%** | **7.5%** *** | (0.10) | -0.07 | 0.33 | 21 |

abnormal returns for selected time windows at and around demerger announcement

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

## Appendix 3: Post-Demerger Performance

### a. Combined Effect

**Standard Demerger**

| time window | median | mean | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **11.8%** | **4.2%** | (0.60) | -1.58 | 1.34 | 34 |
| 0 - 99 | **-1.3%** | **-7.3%** * | (0.21) | -0.65 | 0.19 | 34 |
| 100 - 199 | **0.0%** | **1.3%** | (0.21) | -0.51 | 0.59 | 34 |
| 200 - 299 | **-0.1%** | **-0.3%** | (0.16) | -0.30 | 0.52 | 34 |
| 300 - 399 | **0.3%** | **2.6%** | (0.25) | -0.75 | 0.72 | 34 |
| 400 - 499 | **4.5%** | **5.5%** | (0.25) | -0.83 | 0.78 | 33 |
| 500 - 599 | **3.0%** | **4.1%** | (0.22) | -0.45 | 0.56 | 31 |
| 600 - 699 | **0.0%** | **-0.3%** | (0.29) | -0.51 | 1.16 | 27 |

Combined value creation following the execution date (abnormal returns for various time windows)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Large Demerger (pre-demerger selection)**

| time window | median | mean | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **-7.2%** | **-20.0%** | (0.47) | -1.15 | 0.41 | 16 |
| 0 - 99 | **-3.6%** | **-2.6%** | (0.13) | -0.20 | 0.19 | 16 |
| 100 - 199 | **-0.4%** | **-2.2%** | (0.12) | -0.31 | 0.14 | 16 |
| 200 - 299 | **-0.3%** | **-0.6%** | (0.09) | -0.14 | 0.19 | 16 |
| 300 - 399 | **-5.3%** | **-2.2%** | (0.14) | -0.31 | 0.22 | 16 |
| 400 - 499 | **-0.9%** | **-4.4%** | (0.23) | -0.83 | 0.18 | 16 |
| 500 - 599 | **3.0%** | **-1.0%** | (0.15) | -0.34 | 0.20 | 15 |
| 600 - 699 | **-0.1%** | **-7.0%** | (0.18) | -0.51 | 0.15 | 15 |

Combined value creation following the execution date (abnormal returns for various time windows)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Small Demerger (pre-demerger selection)**

| time window | median | mean | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **17.5%** | **25.7%** | (0.63) | -1.58 | 1.34 | 18 |
| 0 - 99 | **-0.1%** | **-11.5%** * | (0.27) | -0.65 | 0.16 | 18 |
| 100 - 199 | **0.3%** | **4.3%** | (0.26) | -0.51 | 0.59 | 18 |
| 200 - 299 | **1.3%** | **0.1%** | (0.20) | -0.30 | 0.52 | 18 |
| 300 - 399 | **6.0%** | **6.9%** | (0.31) | -0.75 | 0.72 | 18 |
| 400 - 499 | **12.4%** | **14.8%** ** | (0.24) | -0.22 | 0.78 | 17 |
| 500 - 599 | **2.9%** | **8.9%** | (0.26) | -0.45 | 0.56 | 16 |
| 600 - 699 | **2.7%** | **8.0%** | (0.38) | -0.41 | 1.16 | 12 |

Combined value creation following the execution date (abnormal returns for various time windows)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Fixed Sample - Standard Demerger**

| time window | median | mean | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **11.5%** | **-1.8%** | (0.69) | -1.58 | 1.34 | 21 |
| 0 - 99 | **4.4%** | **-2.8%** | (0.19) | -0.65 | 0.19 | 21 |
| 100 - 199 | **0.1%** | **0.9%** | (0.15) | -0.25 | 0.46 | 21 |
| 200 - 299 | **-5.2%** | **-3.8%** | (0.14) | -0.30 | 0.27 | 21 |
| 300 - 399 | **-4.1%** | **-0.2%** | (0.26) | -0.75 | 0.47 | 21 |
| 400 - 499 | **11.1%** | **6.8%** | (0.31) | -0.83 | 0.78 | 21 |
| 500 - 599 | **3.0%** | **1.2%** | (0.24) | -0.45 | 0.56 | 21 |
| 600 - 699 | **-5.2%** | **-1.4%** | (0.33) | -0.51 | 1.16 | 21 |

Combined value creation following the execution date (abnormal returns for various time windows)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**b. Parent**

**Standard Demerger**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **6.9%** | **-5.9%** | (0.79) | -2.46 | 1.71 | 34 |
| 0 - 99 | **-2.0%** | **-4.9%** | (0.20) | -0.63 | 0.28 | 34 |
| 100 - 199 | **2.8%** | **1.2%** | (0.25) | -0.51 | 0.72 | 34 |
| 200 - 299 | **-4.8%** | **-3.2%** | (0.21) | -0.46 | 0.51 | 31 |
| 300 - 399 | **-0.1%** | **-0.3%** | (0.32) | -1.13 | 0.81 | 29 |
| 400 - 499 | **6.1%** | **4.0%** | (0.28) | -1.03 | 0.47 | 28 |
| 500 - 599 | **-0.5%** | **6.4%** | (0.37) | -0.54 | 1.33 | 27 |
| 600 - 699 | **-4.8%** | **-4.6%** | (0.23) | -0.49 | 0.66 | 25 |

Value creation and destruction by the parent following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Large Demerger (pre-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **-22.0%** | **-29.4%** * | (0.60) | -1.86 | 0.55 | 15 |
| 0 - 99 | **-1.3%** | **-0.7%** | (0.16) | -0.24 | 0.28 | 15 |
| 100 - 199 | **-1.0%** | **-2.5%** | (0.17) | -0.41 | 0.19 | 15 |
| 200 - 299 | **-7.0%** | **-4.1%** | (0.14) | -0.35 | 0.21 | 14 |
| 300 - 399 | **-5.8%** | **-0.9%** | (0.21) | -0.35 | 0.34 | 14 |
| 400 - 499 | **-4.3%** | **-7.9%** | (0.29) | -1.03 | 0.15 | 14 |
| 500 - 599 | **-5.4%** | **-6.6%** | (0.23) | -0.54 | 0.23 | 13 |
| 600 - 699 | **-4.8%** | **-6.4%** | (0.17) | -0.49 | 0.14 | 13 |

Value creation and destruction by the parent following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Small Demerger (pre-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **12.5%** | **18.5%** | (0.87) | -2.46 | 1.71 | 18 |
| 0 - 99 | **-2.0%** | **-8.0%** | (0.23) | -0.63 | 0.24 | 18 |
| 100 - 199 | **3.8%** | **4.5%** | (0.31) | -0.51 | 0.72 | 18 |
| 200 - 299 | **0.1%** | **-1.4%** | (0.25) | -0.46 | 0.51 | 16 |
| 300 - 399 | **6.8%** | **1.5%** | (0.42) | -1.13 | 0.81 | 14 |
| 400 - 499 | **19.3%** | **15.9%** ** | (0.22) | -0.43 | 0.47 | 13 |
| 500 - 599 | **2.6%** | **20.9%** | (0.45) | -0.28 | 1.33 | 13 |
| 600 - 699 | **0.2%** | **1.2%** | (0.27) | -0.37 | 0.66 | 11 |

Value creation and destruction by the parent following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Large Demerger (post-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **2.7%** | **-16.4%** | (0.39) | -0.92 | 0.39 | 16 |
| 0 - 99 | **-1.4%** | **-1.7%** | (0.14) | -0.24 | 0.26 | 16 |
| 100 - 199 | **2.8%** | **-0.1%** | (0.12) | -0.24 | 0.14 | 16 |
| 200 - 299 | **-1.0%** | **-0.4%** | (0.11) | -0.16 | 0.21 | 14 |
| 300 - 399 | **-7.3%** | **-4.2%** | (0.21) | -0.35 | 0.34 | 14 |
| 400 - 499 | **-2.0%** | **0.2%** | (0.09) | -0.12 | 0.14 | 14 |
| 500 - 599 | **-0.2%** | **-2.4%** | (0.19) | -0.34 | 0.23 | 13 |
| 600 - 699 | **-7.5%** | **-8.0%** | (0.17) | -0.49 | 0.13 | 13 |

Value creation and destruction by the parent following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Small Demerger (post-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **12.9%** | **9.2%** | (1.03) | -2.46 | 1.71 | 17 |
| 0 - 99 | **-2.5%** | **-7.5%** | (0.25) | -0.63 | 0.28 | 17 |
| 100 - 199 | **3.8%** | **2.7%** | (0.34) | -0.51 | 0.72 | 17 |
| 200 - 299 | **-7.7%** | **-4.6%** | (0.27) | -0.46 | 0.51 | 16 |
| 300 - 399 | **6.8%** | **4.8%** | (0.42) | -1.13 | 0.81 | 14 |
| 400 - 499 | **19.3%** | **7.2%** | (0.40) | -1.03 | 0.47 | 13 |
| 500 - 599 | **-0.5%** | **16.7%** | (0.50) | -0.54 | 1.33 | 13 |
| 600 - 699 | **0.6%** | **2.9%** | (0.27) | -0.37 | 0.66 | 11 |

Value creation and destruction by the parent following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Fixed Sample - Standard Demerger**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **6.6%** | **-12.0%** | (0.89) | -2.46 | 1.71 | 21 |
| 0 - 99 | **1.9%** | **-1.1%** | (0.19) | -0.63 | 0.28 | 21 |
| 100 - 199 | **3.8%** | **1.0%** | (0.16) | -0.41 | 0.25 | 21 |
| 200 - 299 | **-6.9%** | **-5.7%** | (0.17) | -0.46 | 0.24 | 21 |
| 300 - 399 | **-0.1%** | **-3.0%** | (0.33) | -1.13 | 0.43 | 21 |
| 400 - 499 | **6.4%** | **4.9%** | (0.29) | -1.03 | 0.47 | 21 |
| 500 - 599 | **-5.4%** | **3.3%** | (0.39) | -0.54 | 1.33 | 21 |
| 600 - 699 | **-7.5%** | **-5.4%** | (0.23) | -0.49 | 0.66 | 21 |

Value creation and destruction by the parent following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

## c. Spin-off

**Standard Demerger**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **18.6%** | **17.3%** * | (0.59) | -0.99 | 1.39 | 41 |
| 0 - 99 | **0.4%** | **-4.2%** | (0.33) | -1.06 | 0.82 | 41 |
| 100 - 199 | **6.5%** | **4.2%** | (0.27) | -0.58 | 0.89 | 41 |
| 200 - 299 | **1.9%** | **3.8%** | (0.20) | -0.35 | 0.56 | 41 |
| 300 - 399 | **2.5%** | **4.6%** | (0.21) | -0.36 | 0.61 | 40 |
| 400 - 499 | **6.0%** | **9.4%** * | (0.30) | -0.73 | 0.95 | 38 |
| 500 - 599 | **4.5%** | **0.2%** | (0.24) | -0.60 | 0.33 | 35 |
| 600 - 699 | **0.3%** | **-0.6%** | (0.36) | -0.71 | 1.37 | 31 |

Value creation and destruction by the spin-off following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Large Demerger (pre-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **11.5%** | **-5.9%** | (0.49) | -0.99 | 0.62 | 21 |
| 0 - 99 | **2.9%** | **0.2%** | (0.18) | -0.48 | 0.32 | 21 |
| 100 - 199 | **3.8%** | **-1.0%** | (0.19) | -0.58 | 0.22 | 21 |
| 200 - 299 | **1.9%** | **0.0%** | (0.11) | -0.21 | 0.18 | 21 |
| 300 - 399 | **-3.2%** | **-1.9%** | (0.16) | -0.36 | 0.24 | 21 |
| 400 - 499 | **2.8%** | **2.1%** | (0.29) | -0.73 | 0.49 | 20 |
| 500 - 599 | **1.2%** | **-1.6%** | (0.23) | -0.60 | 0.31 | 19 |
| 600 - 699 | **-2.6%** | **-7.4%** | (0.29) | -0.71 | 0.36 | 18 |

Value creation and destruction by the spin-off following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Small Demerger (pre-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total | **38.6%** | **44.8%** *** | (0.59) | -0.64 | 1.39 | 19 |
| 0 - 99 | **-8.3%** | **-9.8%** | (0.45) | -1.06 | 0.82 | 19 |
| 100 - 199 | **7.3%** | **8.4%** | (0.34) | -0.51 | 0.89 | 19 |
| 200 - 299 | **6.3%** | **8.9%** | (0.26) | -0.35 | 0.56 | 19 |
| 300 - 399 | **7.5%** | **11.8%** * | (0.24) | -0.19 | 0.61 | 18 |
| 400 - 499 | **10.5%** | **18.9%** ** | (0.29) | -0.26 | 0.95 | 17 |
| 500 - 599 | **6.2%** | **3.2%** | (0.25) | -0.55 | 0.33 | 15 |
| 600 - 699 | **2.6%** | **11.3%** | (0.46) | -0.59 | 1.37 | 12 |

Value creation and destruction by the spin-off following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Large Demerger (post-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **22.3%** | **7.5%** | (0.53) | -0.99 | 0.94 | 20 |
| 0 - 99 | **2.9%** | **-9.6%** | (0.30) | -1.06 | 0.15 | 20 |
| 100 - 199 | **4.8%** | **3.3%** | (0.19) | -0.58 | 0.35 | 20 |
| 200 - 299 | **3.3%** | **3.7%** | (0.16) | -0.25 | 0.52 | 20 |
| 300 - 399 | **3.9%** | **5.9%** | (0.20) | -0.33 | 0.61 | 20 |
| 400 - 499 | **-0.7%** | **-0.3%** | (0.30) | -0.73 | 0.49 | 19 |
| 500 - 599 | **3.7%** | **2.6%** | (0.22) | -0.60 | 0.33 | 18 |
| 600 - 699 | **3.6%** | **-0.9%** | (0.27) | -0.67 | 0.36 | 16 |

Value creation and destruction by the spin-off following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

**Small Demerger (post-demerger selection)**

| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **16.2%** | **26.7%** * | (0.63) | -0.78 | 1.39 | 21 |
| 0 - 99 | **-2.1%** | **0.9%** | (0.36) | -0.66 | 0.82 | 21 |
| 100 - 199 | **3.6%** | **5.1%** | (0.33) | -0.51 | 0.89 | 21 |
| 200 - 299 | **-5.5%** | **3.9%** | (0.23) | -0.35 | 0.56 | 21 |
| 300 - 399 | **-0.2%** | **3.3%** | (0.22) | -0.36 | 0.53 | 20 |
| 400 - 499 | **10.5%** | **19.1%** *** | (0.26) | -0.11 | 0.95 | 19 |
| 500 - 599 | **4.5%** | **-2.4%** | (0.25) | -0.55 | 0.31 | 17 |
| 600 - 699 | **-0.5%** | **-0.3%** | (0.46) | -0.71 | 1.37 | 15 |

Value creation and destruction by the spin-off following the execution date (abnormal returns)

*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

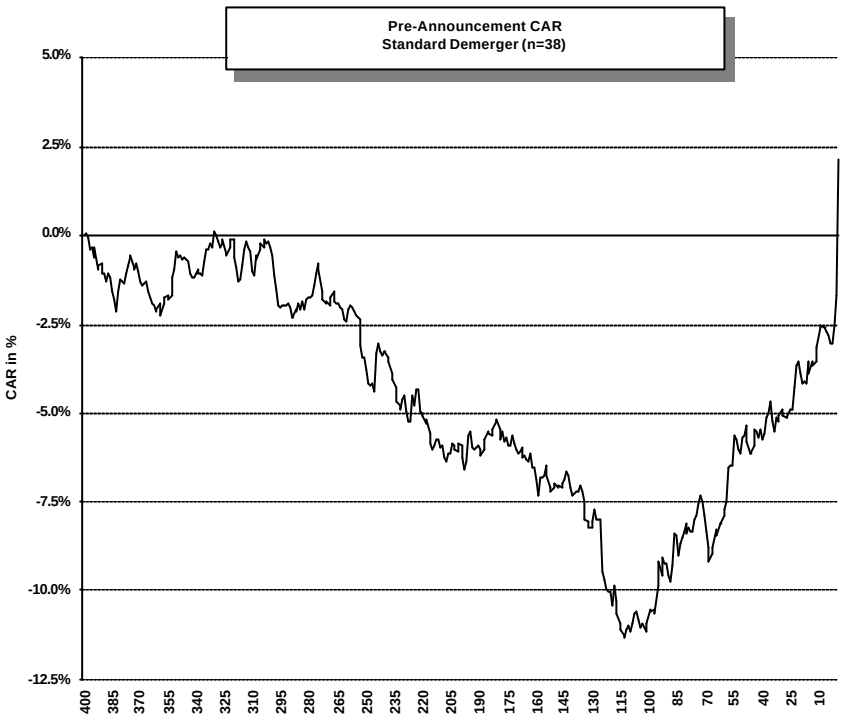
**Fixed Sample - Standard Demerger**

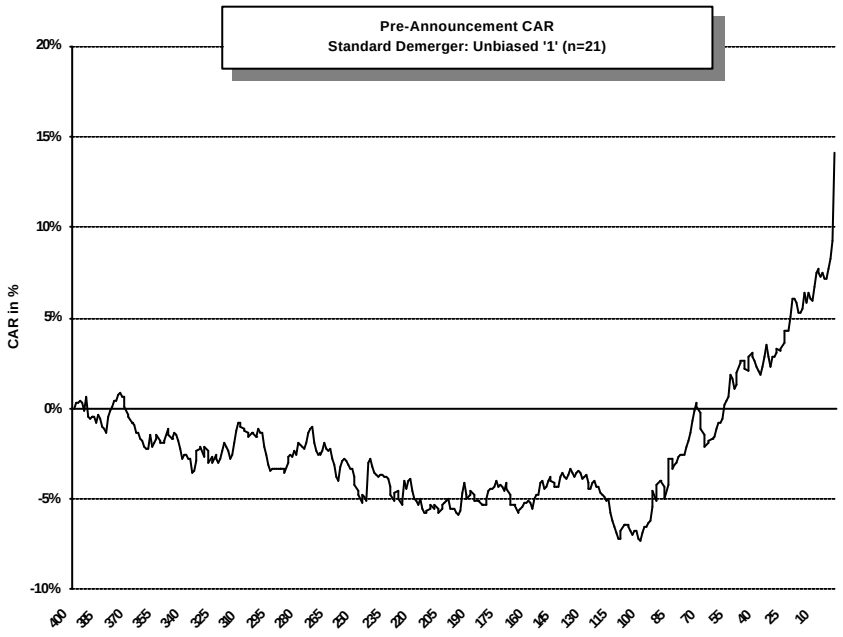
| time window | **median** | **mean** | stdev. | min | max | n |
|---|---|---|---|---|---|---|
| Total (0 - 780) | **23.7%** | **24.9%** * | (0.66) | -0.99 | 1.39 | 23 |
| 0 - 99 | **5.3%** | **3.7%** | (0.26) | -0.66 | 0.78 | 23 |
| 100 - 199 | **3.9%** | **5.9%** | (0.27) | -0.43 | 0.89 | 23 |
| 200 - 299 | **4.2%** | **4.7%** | (0.22) | -0.35 | 0.56 | 23 |
| 300 - 399 | **2.9%** | **4.0%** | (0.21) | -0.36 | 0.53 | 23 |
| 400 - 499 | **2.4%** | **5.8%** | (0.33) | -0.73 | 0.95 | 23 |
| 500 - 599 | **1.3%** | **-2.9%** | (0.26) | -0.60 | 0.31 | 23 |
| 600 - 699 | **1.9%** | **-0.3%** | (0.42) | -0.71 | 1.37 | 23 |

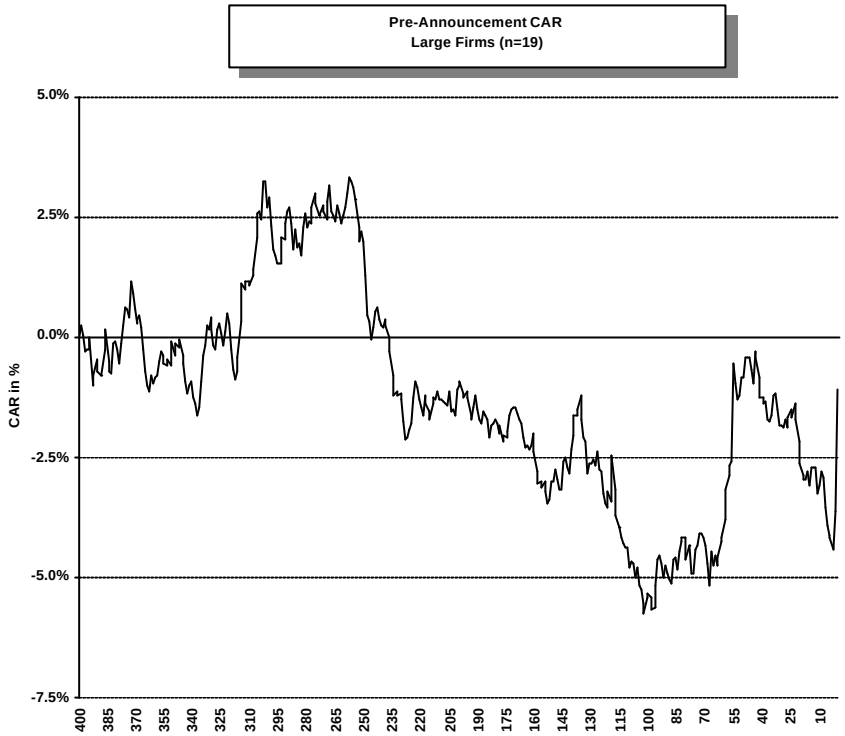
Value creation and destruction by the spin-off following the execution date (abnormal returns)

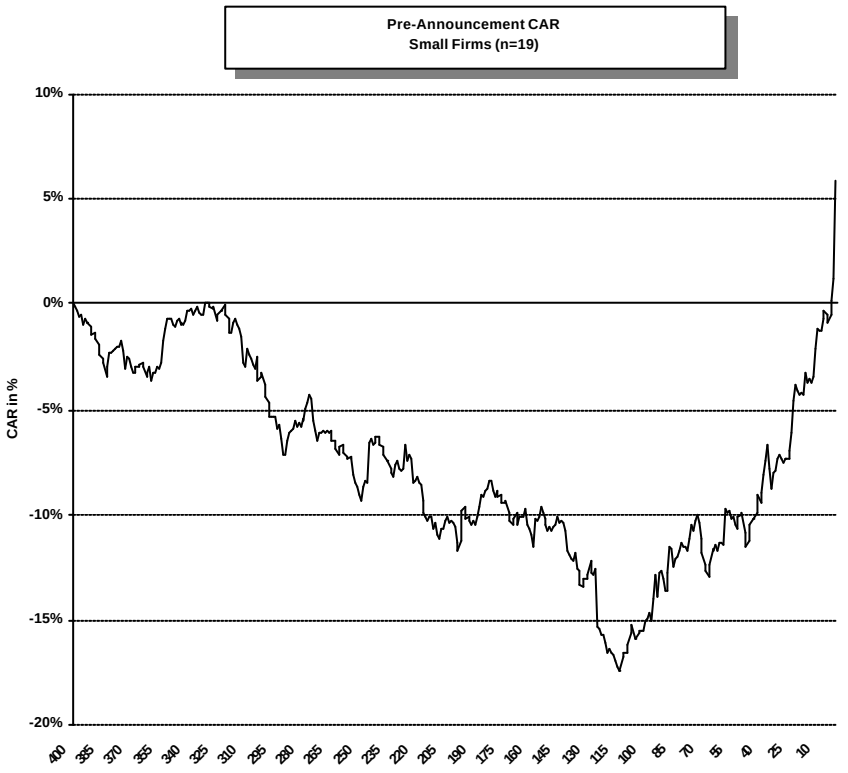
*: significant at the 10% level (p<0.1) **: 5% level (p<0.05) ***: 1% level (p<0.01)

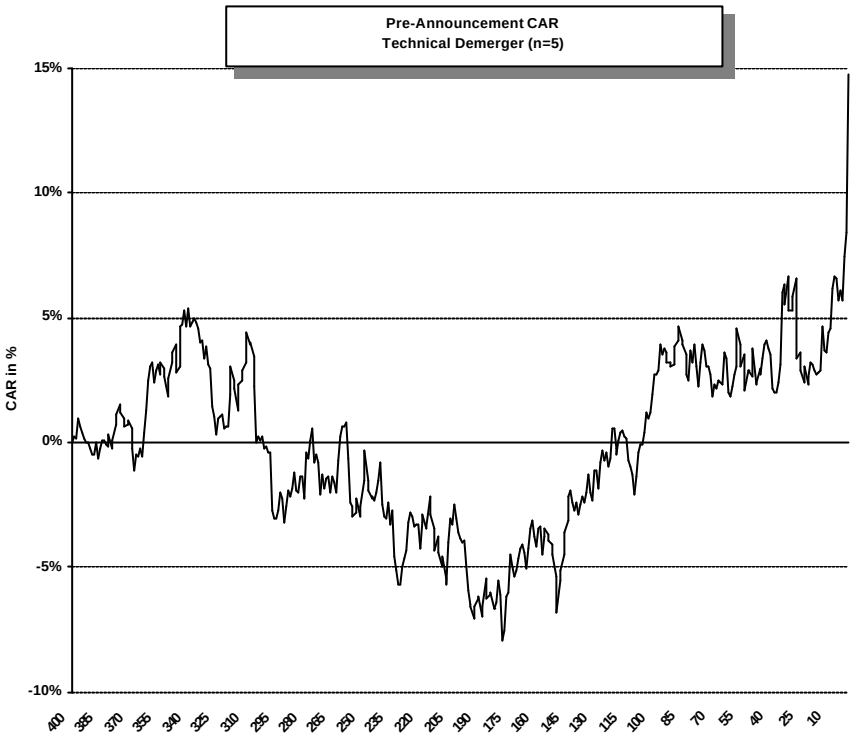
## Appendix 4: Figure for Pre-demerger Performance



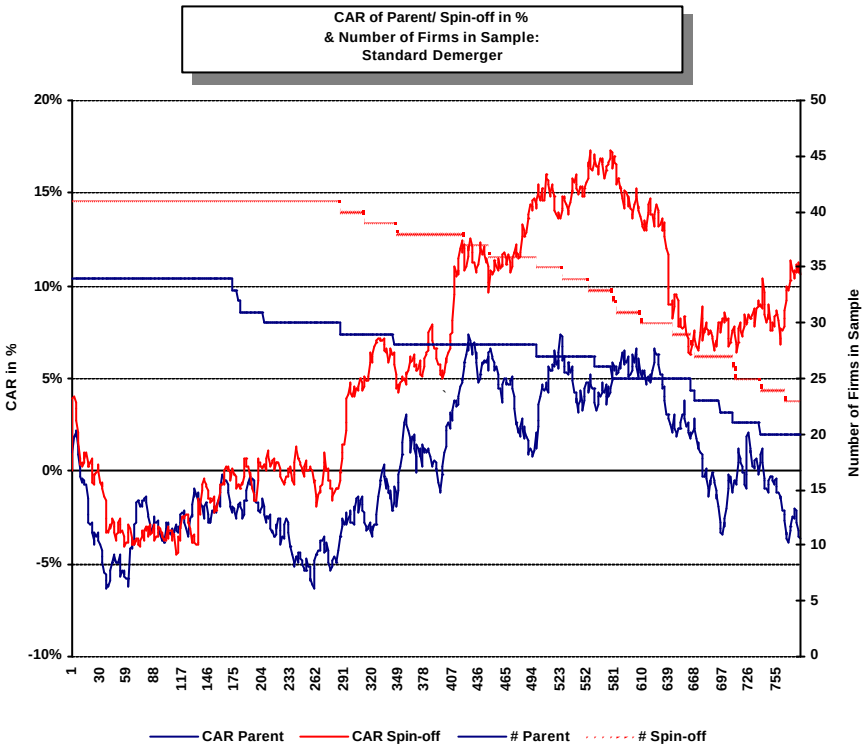

Pre-Announcement CAR
Large Firms (n=19)
5.0%
2.5%
0.0%
-2.5%
-5.0%
-7.5%
CAR in %
400 385 370 355 340 325 310 295 280 265 250 235 220 205 190 175 160 145 130 115 100 85 70 55 40 25 10

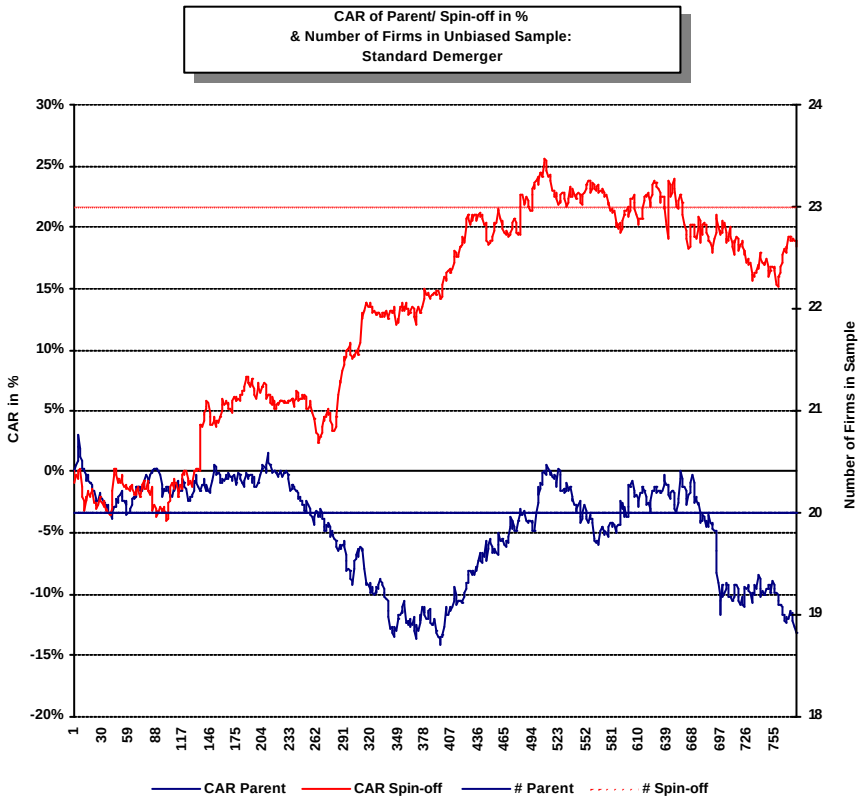

Pre-Announcement CAR
Small Firms (n=19)
10%
5%
0%
-5%
-10%
-15%
-20%
CAR in %
400 385 370 355 340 325 310 295 280 265 250 235 220 205 190 175 160 145 130 115 100 85 70 55 40 25 10

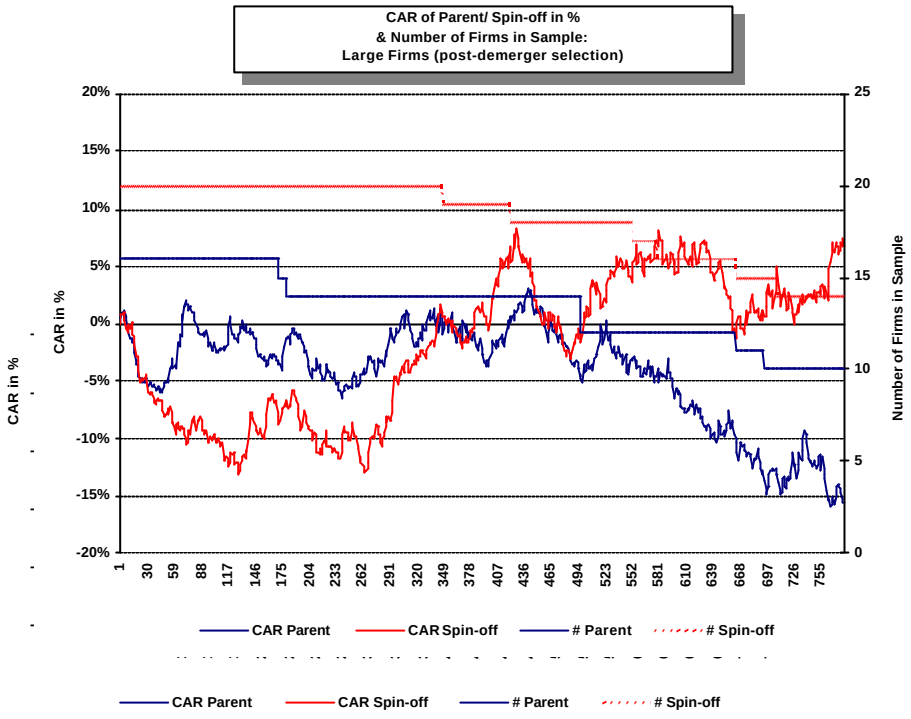

Pre-Announcement CAR
Technical Demerger (n=5)
CAR in %
15%
10%
5%
0%
-5%
-10%
400 385 370 355 340 325 310 295 280 265 250 235 220 205 190 175 160 145 130 115 100 85 70 55 40 25 10

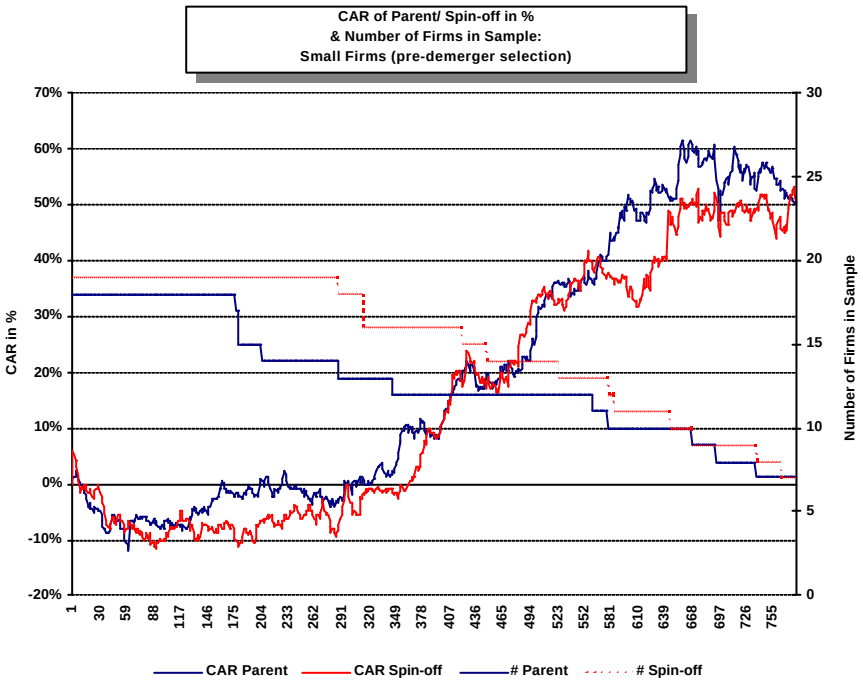

Pre-Announcement CAR
Aborted Demerger (n=5)
CAR in %
10%
0%
-10%
-20%
-30%
-40%
-50%
-60%
400 385 370 355 340 325 310 295 280 265 250 235 220 205 190 175 160 145 130 115 100 85 70 55 40 25 10

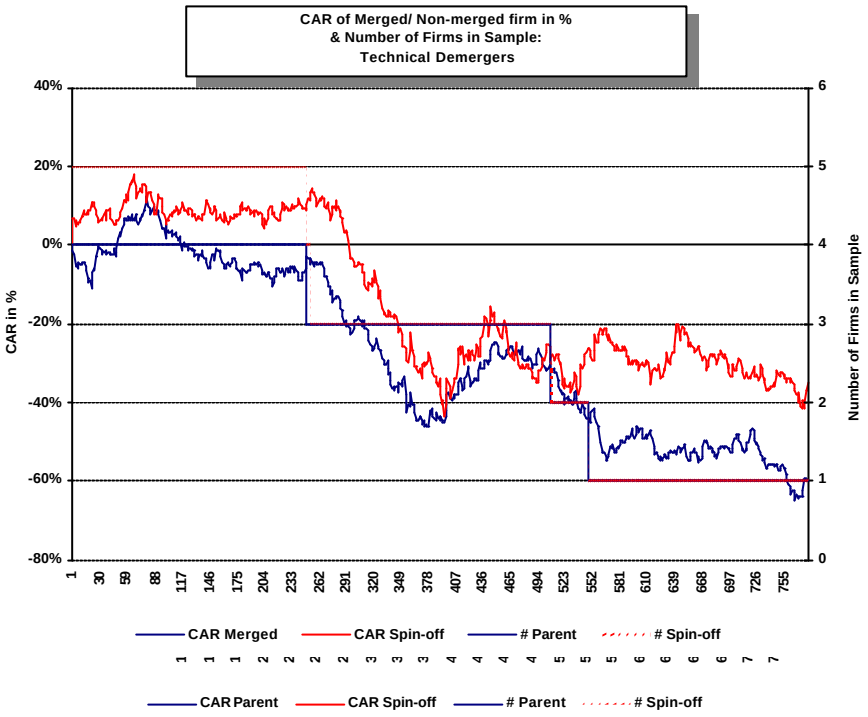
## Appendix 5: Figure for Post-Demerger Performance




CAR of Parent/ Spin-off in %
& Number of Firms in Sample:
Large Firms (post-demerger selection)
CAR in %
Number of Firms in Sample
CAR Parent
CAR Spin-off
# Parent
# Spin-off


CAR of Parent/ Spin-off in %
& Number of Firms in Sample:
Small Firms (pre-demerger selection)
CAR in %
Number of Firms in Sample
CAR Parent
CAR Spin-off
# Parent
# Spin-off


CAR of Merged/ Non-merged firm in %
& Number of Firms in Sample:
Technical Demergers
CAR in %
Number of Firms in Sample
40%
20%
0%
-20%
-40%
-60%
-80%
6
5
4
3
2
1
0
1
30
59
88
117
146
175
204
233
262
291
320
349
378
407
436
465
494
523
552
581
610
639
668
697
726
755
CAR Merged
CAR Spin-off
# Parent
# Spin-off
CAR Parent
CAR Spin-off
# Parent
# Spin-off

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