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# **The Analysis of Equity Carve-Outs**

## **The second year project (2/3)**

### **Abstract**

Previous research suggests a positive announcement effect for parent firms in carveouts. Two hypotheses, divestiture gain and information asymmetry, have been proposed in the literature. However, the existing empirical studies do not provide a conclusive result regarding the value creation in equity carveouts. In this paper, we examine the operating performance of both parents and subsidiaries to test two hypotheses. We find that the results are not completely consistent with information asymmetry hypothesis. The divestiture gain hypothesis seems to partially explain why firms choose carveouts rather than SEOs to issue equity. However, other factors, such as the window of opportunities to take advantage of overvaluation of parents, may play an important role in carveouts.

## **I. Introduction**

In the last decade, there has been a significant increase in carveout activity. While the equity carveout is one kind of equity offerings, however, most IPO papers exclude the carveouts from their samples and there are surprisingly few studies examining the stock performance of carveouts. Therefore, the objective of this paper is to provide some analysis on the operating performance of equity carveouts.

Schipper and Smith (1986) is the first study to examine this interesting issue and find that the announcement-period abnormal return is about 2% for the parent firm. They argue that equity carveouts appear to represent the only form of new public equity financing which results in an increase in shareholder wealth. Schipper and Smith (1986) propose a divestiture gain hypothesis to account for the difference in market reactions to carveouts and SEOs. Specifically, the carveouts increase the disclosure of subsidiary, which in turns improve the transparency of the parent and subsidiary. Investors may be also attracted to subsidiary's higher growth opportunity which is hidden in the parent firm prior to carveouts. Moreover, the restructuring of assets through carveouts and the initiation of public trading of subsidiary shares may align managerial incentives to improve the operating efficiency. All these are gains due to the parent's divestiture of subsidiary firm. Schipper and Smith (1986) provide some empirical evidence to support their divestiture gain hypothesis. Although Schipper and Smith (1986) examine short-run market reactions only on parent firms, their divestiture gain hypothesis seems to imply that subsidiaries may also perform well if the parent firm fully divests its subsidiary.

Nanda (1991) offers another reason to explain the carveout performance based on information asymmetry. He extends Myers and Majluf (1984) and shows that firms will issue subsidiary equity only when the parent assets are undervalued and the subsidiary assets are overvalued. The stock price increases around carveouts is because the positive information of larger parent assets dominates the negative information of smaller subsidiary assets. Solvin, Sushka and Ferraro (1995) provide an indirect support for this asymmetric information hypothesis. They show that rivals of the subsidiary suffer an abnormal return of -1%, suggesting that subsidiary's industry is overvalued.

However, the subsequent empirical studies do not seem to reach a conclusion about which hypothesis is correct. For example, Vijh (2002) documents that announcement period returns increase with the ratio of subsidiary to non-subsidiary assets, a finding consistent with divestiture gain hypothesis but against asymmetric information hypothesis. On the contrary, Powers (2003) finds that carveout operating performance peaks at the issue but declines significantly thereafter, a result which is more consistent with asymmetric information hypothesis. Accordingly, the previous literature provides a mixed understanding regarding the value creation in equity carveouts.

In this paper, we examine the operating performance of both parents and subsidiaries to test two hypotheses proposed in the literature. In particular, parent firms generally maintain more than 80% of carveout ownership for tax purpose when they sell subsidiary shares to the public the first time. Some parents go on to deliver all remaining shares to the shareholders of parent firms in a subsequent distribution. This is the so-called “two-stage spinoff.” In such case, the subsidiary will become completely independent since the parent does not have any ownership on the subsidiary. In some other cases, however, parents do not make subsequent distributions, and thus keep the full control on subsidiaries. Sometimes, the parent firm may even re-acquire the subsidiary back. If divestiture gain hypothesis is true, the value creation should come from the transparency, efficiency, or access to the high growth opportunity which are due to the separation of parents and subsidiaries. Therefore, we expect that parent firms which make subsidiaries completely independent will outperform those still control subsidiaries after carveouts.

As for asymmetric information hypothesis, it suggests that subsidiaries should underperform while parents should outperform. The future underperformance of subsidiaries is expected to be more severe if the market valuation in subsidiary industry is high at the time of carveout announcement. Similarly, the outperformance of parents should be more evident when the market multiplier in parent industry is low.

The focus of long-run performance in this project provides a powerful test to examine the theory in equity carveouts. First, most of previous equity carveout papers investigate the stock price changes around the announcement. However, the general corporate finance literature suggests that managers may time the market, leading to long-run abnormal performance following important corporate decisions (e.g., Ikenberry, Lakonishok and

Vermaelen (1995) for repurchases, and Loughran and Vijh (1997) for stock mergers). Therefore, the examination of short-run market response may not be able to paint a whole picture for managerial behavior. Second, Klein, Rosenfeld and Beranek (1991) document that about 85% of their sample firms have second events following carveouts (such as spinoffs or re-acquisitions) but only about 10% of these second events happen within one year of carveouts. If carveouts are just a temporary form of asset restructuring, looking at long-term performance is more appropriate because these returns may incorporate the subsequent managerial actions following carveouts. Finally, examining operating performance has the advantage of being a non-stock-return related measure and therefore can greatly mitigate the concerns of bad model problems (Fama (1998) and Mitchell and Stafford (2000)) in detecting abnormal performance in stock returns.

Our sample consists of 166 carveouts in the period of 1991-2002. We find that the information asymmetry hypothesis is not the major reason why parent firms carve out subsidiaries. Both parents and subsidiaries underperform but this underperformance is not significant. This is not consistent with the information asymmetry hypothesis. Yet, parents with poor prior returns perform significantly better than those with high past returns. This result suggests that parents depressed by the market choose to raise capital by issuing shares of subsidiaries to avoid dilution, a finding supporting information asymmetry theory.

In testing the divestiture gain hypothesis, we get some support when conditioning on the status of “two-stage spinoff” for carveouts. The parent firms which control subsidiaries after three post-issue years significantly underperform while parents with independent subsidiaries do not show any underperformance. These results suggest that the divestiture gain is an important determinant to explain the managerial decision of carveouts. Other factor, such as taking advantage of window of opportunities to enjoy overvaluation of parents may play some role here.

This paper will contribute to the literature in two ways. First, it documents the cross-sectional differences in post-issue performance for equity carveouts, and thus explain why firms choose to conduct carveouts. Second, it sheds light on why carveouts behave differently from IPOs and parents perform differently from SEOs.

The remainder of the paper is organized as follows. Section II introduces the data and methodology we use in the paper. The empirical results are presented in section III. Section IV concludes.

## **II. Data and Methodology**

### *1. Data*

We select the carveout sample from Securities Data Company (SDC) for the period of 1991-2002. We consider domestic, primary stocks only in this study. Therefore, closed-end funds, Real Estate Investment Trusts (REITs), Global Depository Receipts (GDRs), and foreign stocks are excluded. We check the proxy statement immediately after the offering date of carveouts, and the one three years later to verify the independence status of subsidiaries. All carveouts are required to be covered in both Compustat and CRSP to obtain the accounting data and stock returns, respectively. There are 266 carveouts meeting our data requirement during the period of 1991-2000. However, we have 111 carveouts with no available returns for the parent firms. Since we will examine the post-issue performance of both subsidiaries and parents, these 111 observations are excluded from the sample. We further add 11 observations during 2001-2002. The final sample consists of 166 carveouts over 12 years, with 133 parent companies involved.

Table 1 presents the year distribution for the sample. It is clear that no single year comprises more than 16% of the sample, and suggests that sample distribution is quite even over different years.

### *2. Methodology*

This paper examines the abnormal operating performance of both parent and subsidiary firms in the post-issue period of subsidiary IPOs. Abnormal operating performance has the advantage of being a non-stock-return related measure and therefore independent of any asset pricing model employed to measure the abnormal long-run stock returns. So, examining operating performance greatly mitigates the concerns of bad model problems (Fama (1998)) in detecting abnormal performance in stock returns.

We define the operating performance as EBITDA (operating income before depreciation, Compustat item 13) scaled by total assets. EBITDA is recommended by Barber and Lyon (1996) to detect abnormal operating performance because it is not affected by a change in capital structure or affected by special items and income taxes which influence other measures of earnings. EBITDA is also the most popular measure in the literature examining the operating performance (e.g., Jain and Kini (1994) for IPOs, and Grullon and Michaely (2004) for repurchases).

We measure abnormal operating performance by using a pre-event matched control firm benchmark in the same industry as of the sample firm. The choice of this performance-matched control firm is motivated by findings that accounting performance measures tend to be mean-reverting (e.g., Penman (1991)) and also IPOs tend to underperform in the post-issue period (e.g. Jain and Kini (1994)). Barber and Lyon (1996) further show that controlling for industry and pre-event performance will generate well-specified test-statistics in detecting abnormal operating performance.

We identify one matching firm for each of our sample firms by using a procedure similar to Grullon and Michaely (2004). We first exclude all IPOs from the corresponding industries until three years after the offering date of subsidiaries. We require that the matching firm's pre-event earnings are within the range (80%, 120%) of the sample firm. We first go to the same 4-digit SIC industry as that of the sample firm to find a matching firm with the closest pre-event earnings performance. If there is no matching firm meeting the performance filter, we relax one less SIC digit until a match is found. If a matching firm is still not found, we release the industry requirement. If all else fails, we lift the earnings filter constraint and search for a firm with the closest earnings as that of the sample firm.

In this paper, we look at both levels and changes in abnormal operating performance for parent and child firms. We will pay our attention to the changes in abnormal operating performance since Barber and Lyon (1996) argue that test statistics based on changes in abnormal operating performance are more powerful than those based on levels.

### **III. Empirical Results**

#### *1. Testing information asymmetry hypothesis*

Table 2 presents the median abnormal operating performance for both subsidiaries and parents based on the full sample. Parents underperform with -0.6% of change in operating performance over three years after the offerings of subsidiaries. However, this change is not significant. The earnings of subsidiaries also deteriorate but again not significant.

This result is not consistent of what information asymmetry hypothesis predicts. Nanda (1991) argues that parents choose to carve out subsidiaries rather than issue SEOs by their own because parents are undervalued and subsidiaries are overvalued. So, we will expect that parents will outperform while subsidiaries underperform if this information asymmetry hypothesis is correct. However, Table 2 provides no evidence supporting information asymmetry hypothesis.

To further test the information asymmetry hypothesis, we sort the sample based on prior returns of parents. If parents choose to do carveouts over SEOs due to the market overvaluation of subsidiaries, it is expected to observe the subsequent underperformance of subsidiaries and this underperformance is more evident when parents are severely undervalued at the time of offerings. As a result, there should exist a negative relationship between prior returns of parents and future performance of both parents and subsidiaries. We test this prediction by classifying the carveout deals based on parents' prior abnormal return, and the results are shown in Table 3. We find that subsidiaries do not exhibit any deterioration in earnings when parents are undervalued. On the other hand, the prior returns of parents significantly affect their subsequent operating performance. Parents with high prior returns have deteriorating fundamentals over time and significantly underperform the high prior return counterparts. It is puzzling why these past winner parents raise capital through carveouts rather than issue their own shares to time the market.

One interesting finding is that parent firms with poor prior returns do not underperform. This seems to be consistent with information asymmetry hypothesis. In particular, managers in parents with poor prior returns perceive that their firms are undervalued. Therefore, they issue the shares of subsidiaries instead of parents to avoid dilution.

## *2. Testing divestiture gain hypothesis*

To test divestiture gain hypothesis, we first sort operating performance by the number of segments in the parent firms. If parents choose to carve out subsidiaries due to divestiture gain,

the gain will be stronger if the organization structure of parents is less transparent or parents need to more refocus on their core business. We use the number of segments in the parent firms to proxy for the level of transparency and need to refocus. The more segments parents have, the less transparency they are and the need to refocus is more demanding.

Table 4 presents results classified by the number of segments in parents. There is a weak evidence supporting the divestiture gain hypothesis – the more business segments parents have, the better performance for subsidiaries. However, none of groups generates significant abnormal performance and the difference between extreme groups is not significant either.

We also use Herfindahl index to test divestiture gain hypothesis. Herfindahl index value is computed by the sum of squares of the proportional sales of all business segments comprising the firm (we also use assets to compute the Herfindahl index and the results are robust). The higher the value is, the more concentrated for the firm's business. If divestiture gain hypothesis is correct, we will expect that the gain is more evident when parent firm is less concentrated and thus need to refocus. The less concentrated status of parents can be proxied by the lower value of Herfindahl index. Table 5 shows the results based on Herfindahl index. We observe no clear pattern from Table 5. The post-issue performance of subsidiaries is similar between low and high Herfindahl index groups. For parents, the long-run performance seems to be better for high Herfindahl index group but the difference between low and high Herfindahl index groups is not significant.

In Table 6, we turn our attention to the parent ownership at the time of carveouts. We classify the sample into 3 groups based on how much percentage of subsidiary shares the parent owns right after carveout offerings. The divestiture gain hypothesis seems to argue that since the gain comes from the divestiture, the less controlled by the parent the better. However, we don't find that firms perform better when parents have smaller ownership on subsidiaries.

Table 7 sorts the results based on whether subsidiaries and parents are in the same industry. We would expect that the divestiture gain is stronger if parents and subsidiaries are not in the same industry because the transparency and refocusing issues can be improved in such situation. There is no evidence suggesting that subsidiaries perform better if parents and subsidiaries are not in the same industry.

### *3. Revised divestiture gain hypothesis*

As we argue in the Introduction, a lot of carveouts are spun off from parents in a subsequent share distribution to parents' shareholders. Previous research (e.g., Schipper and Smith (1986) and Nanda (1991)) do not consider this "two-stage spinoff" situation and cannot provide accurate test on different hypotheses. Here, we classify carveouts based on whether subsidiaries become independent companies within 3 years of carveout offerings. Table 8 presents the results. It is clear that the final status of subsidiaries is an important factor for the post-issue performance of parents. In particular, parents significantly underperform the matching firms in the long-run if they still control subsidiaries after three years of carveouts. The difference in operating performance between firms which control subsidiaries and firms which allow subsidiaries to be independent is significant at 5% level. However, the subsidiary performance is not associated with whether subsidiaries are independent or not.

The results in Table 8 are partially consistent with the divestiture gain hypothesis. When subsidiaries are not independent of parents, the divestiture gain is not realized and parent firms deteriorate over time. This suggests that spinning off subsidiaries is a necessary strategy to make parent firms competitive. The result of no abnormal performance for parents which completely spin off child firms is consistent with this prediction. However, the performance of subsidiaries is not fully consistent with the divestiture gain hypothesis. If divestiture gain is the main reason that subsidiaries are spun off, we would expect to see that subsidiaries generate significant positive performance once subsidiaries are fully independent. However, the result shows no significant difference between dependent and independent subsidiaries.

In Table 9, we consider OLS cross-sectional regressions of operating performance. The dependent variable is the change in abnormal operating performance from year 0 to 3. We winsorize the dependent variable at top and bottom 5% to avoid outliers. All variables at we use previously are included here, such as parent prior returns, whether subsidiary becomes independent within 3 years of carveouts (P-control), the number of segments in the parent firm (Seg), the Herfindahl index values of the parent firm (H-sale), whether the parent and subsidiary are in the same industry (Ind), and the percentage of subsidiary shares owned by the parent at the time of carveout offerings (P-own). Panel A shows the results for parents. Consistent with Table 8, parents significantly underperform if they completely control the subsidiaries after carveouts. This holds even after controlling other variables. However, the

significance disappears when prior return variable is controlled. This is probably due to the multi-collinearity problem in the variable. We will leave this to future research. In panel B, results for subsidiaries are shown. There is no variable with statistical significance. All the abovementioned results in Table 9 are consistent with those in previous tables.

#### **IV. Conclusion**

In this paper, we examine the operating performance of both parents and subsidiaries to test two hypotheses, information asymmetry and divestiture gain hypotheses, proposed in the literature. Our results are not entirely consistent with what the information asymmetry hypothesis predicts. The earnings of both parents and subsidiaries deteriorate but none of them is significant. One supporting evidence is that when parents are severely undervalued, they do not underperform and in fact their performance is much better than those parents with high prior returns.

Our results are partially consistent with the divestiture gain hypothesis. When subsidiaries are not completely independent, the parent performance is significantly poorer. However, once past return is controlled, the significance of subsidiary status disappears. This finding suggests that divestiture gain may not be the only factor to explain the performance of carveouts. The overvaluation of parents seems to play some role here.

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**Table 1**  
**Sample Distribution**

| Year  | # of Carveouts | % of the sample |
|-------|----------------|-----------------|
| 1991  | 12             | 7%              |
| 1992  | 16             | 10%             |
| 1993  | 18             | 11%             |
| 1994  | 18             | 11%             |
| 1995  | 14             | 8%              |
| 1996  | 27             | 16%             |
| 1997  | 10             | 6%              |
| 1998  | 9              | 5%              |
| 1999  | 21             | 13%             |
| 2000  | 10             | 6%              |
| 2001  | 5              | 3%              |
| 2002  | 6              | 4%              |
| Total | 166            | 100%            |

**Table 2**  
**Median Abnormal Operating Performance for Parents and Subsidiaries**

|                                   | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |          |          |          |
|-----------------------------------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------|----------|----------|
|                                   | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2 | Year 2-3 | Year 0-3 |
| Parent firm operating performance |                                          |         |         |         |                                           |          |          |          |
| N                                 | 158                                      | 157     | 153     | 149     | 155                                       | 152      | 145      | 143      |
| Median                            | 0.000                                    | -0.001  | -0.009  | -0.008  | 0.001                                     | -0.008   | 0.000    | -0.006   |
| p-value                           | (0.841)                                  | (0.906) | (0.124) | (0.149) | (0.972)                                   | (0.043)  | (0.462)  | (0.289)  |
| Subsidiary operating performance  |                                          |         |         |         |                                           |          |          |          |
| N                                 | 155                                      | 155     | 140     | 126     | 151                                       | 138      | 124      | 119      |
| Median                            | 0.000                                    | 0.001   | -0.007  | -0.015  | 0.001                                     | -0.007   | 0.000    | -0.014   |
| p-value                           | (0.624)                                  | (0.518) | (0.227) | (0.290) | (0.569)                                   | (0.098)  | (0.725)  | (0.701)  |

**Table 3**  
**Median Abnormal Operating Performance by Prior Abnormal Return of Parents**

| Parent prior ab. ret rank         |         | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |          |                |                |
|-----------------------------------|---------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------|----------------|----------------|
|                                   |         | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2 | Year 2-3       | Year 0-3       |
| Parent firm operating performance |         |                                          |         |         |         |                                           |          |                |                |
| L                                 | N       | 49                                       | 50      | 47      | 45      | 49                                        | 47       | 45             | 44             |
|                                   | Median  | 0.000                                    | -0.004  | -0.022  | -0.003  | -0.002                                    | -0.004   | 0.033          | 0.006          |
|                                   | p-value | (0.864)                                  | (0.353) | (0.044) | (0.256) | (0.403)                                   | (0.136)  | (0.000)        | (0.283)        |
| M                                 | N       | 50                                       | 49      | 47      | 47      | 48                                        | 47       | 45             | 45             |
|                                   | Median  | 0.000                                    | 0.008   | 0.013   | 0.000   | 0.014                                     | 0.000    | -0.004         | 0.000          |
|                                   | p-value | (0.205)                                  | (0.214) | (0.310) | (0.703) | (0.157)                                   | (0.722)  | (0.275)        | (0.877)        |
| H                                 | N       | 48                                       | 47      | 48      | 46      | 47                                        | 47       | 44             | 43             |
|                                   | Median  | 0.000                                    | 0.000   | -0.022  | -0.030  | 0.000                                     | -0.034   | -0.007         | -0.032         |
|                                   | p-value | (0.908)                                  | (0.957) | (0.041) | (0.000) | (0.923)                                   | (0.010)  | (0.285)        | <b>(0.001)</b> |
| p-value of L - H                  |         | (0.686)                                  | (0.491) | (0.752) | (0.003) | (0.495)                                   | (0.158)  | <b>(0.001)</b> | <b>(0.004)</b> |
| Subsidiary operating performance  |         |                                          |         |         |         |                                           |          |                |                |
| L                                 | N       | 46                                       | 49      | 42      | 38      | 45                                        | 42       | 38             | 34             |
|                                   | Median  | 0.000                                    | -0.016  | -0.005  | -0.008  | -0.018                                    | -0.005   | 0.003          | 0.011          |
|                                   | p-value | (0.449)                                  | (0.190) | (0.844) | (0.859) | (0.391)                                   | (0.494)  | (0.490)        | (0.391)        |
| M                                 | N       | 49                                       | 48      | 43      | 41      | 48                                        | 42       | 39             | 38             |
|                                   | Median  | -0.001                                   | -0.002  | -0.009  | -0.020  | 0.001                                     | -0.004   | -0.005         | -0.017         |
|                                   | p-value | (0.236)                                  | (0.793) | (0.288) | (0.170) | (0.587)                                   | (0.740)  | (0.438)        | (0.320)        |
| H                                 | N       | 49                                       | 47      | 45      | 38      | 47                                        | 44       | 38             | 38             |
|                                   | Median  | 0.000                                    | 0.014   | -0.025  | -0.015  | 0.010                                     | -0.016   | 0.002          | -0.014         |
|                                   | p-value | (0.323)                                  | (0.322) | (0.184) | (0.853) | (0.577)                                   | (0.181)  | (0.476)        | (0.738)        |
| p-value of L - H                  |         | (0.221)                                  | (0.096) | (0.505) | (0.848) | (0.341)                                   | (0.799)  | (0.897)        | (0.524)        |

**Table 4**  
**Median Abnormal Operating Performance by Number of Segments in Parents**

| Number of Segments                |         | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |          |          |          |
|-----------------------------------|---------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------|----------|----------|
|                                   |         | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2 | Year 2-3 | Year 0-3 |
| Parent firm operating performance |         |                                          |         |         |         |                                           |          |          |          |
| 1                                 | N       | 47                                       | 46      | 44      | 41      | 46                                        | 44       | 41       | 41       |
|                                   | Median  | 0.000                                    | 0.001   | -0.025  | -0.008  | 0.002                                     | -0.025   | 0.006    | -0.003   |
|                                   | p-value | (0.377)                                  | (0.558) | (0.538) | (0.487) | (0.400)                                   | (0.113)  | (0.530)  | (0.717)  |
| 2&3                               | N       | 56                                       | 56      | 54      | 51      | 55                                        | 54       | 50       | 50       |
|                                   | Median  | 0.000                                    | -0.008  | -0.013  | -0.008  | -0.002                                    | -0.005   | 0.002    | -0.008   |
|                                   | p-value | (0.310)                                  | (0.264) | (0.239) | (0.339) | (0.184)                                   | (0.926)  | (0.502)  | (0.355)  |
| 4                                 | N       | 49                                       | 49      | 50      | 52      | 48                                        | 49       | 49       | 47       |
|                                   | Median  | 0.000                                    | 0.000   | -0.007  | -0.009  | 0.003                                     | -0.010   | -0.001   | -0.009   |
|                                   | p-value | (0.634)                                  | (0.669) | (0.498) | (0.352) | (0.450)                                   | (0.059)  | (0.971)  | (0.582)  |
| p-value of L - H                  |         | (0.941)                                  | (0.926) | (0.691) | (0.941) | (0.904)                                   | (0.764)  | (0.638)  | (0.930)  |
| Subsidiary operating performance  |         |                                          |         |         |         |                                           |          |          |          |
| 1                                 | N       | 44                                       | 45      | 40      | 35      | 42                                        | 40       | 35       | 32       |
|                                   | Median  | 0.000                                    | 0.001   | 0.004   | -0.036  | -0.018                                    | -0.001   | 0.000    | -0.022   |
|                                   | p-value | (0.750)                                  | (0.673) | (0.454) | (0.157) | (0.553)                                   | (0.396)  | (0.569)  | (0.398)  |
| 2&3                               | N       | 54                                       | 53      | 47      | 41      | 52                                        | 45       | 40       | 38       |
|                                   | Median  | 0.000                                    | 0.024   | -0.015  | -0.019  | 0.023                                     | -0.012   | -0.002   | -0.018   |
|                                   | p-value | (0.435)                                  | (0.492) | (0.173) | (0.511) | (0.482)                                   | (0.171)  | (0.606)  | (0.814)  |
| 4                                 | N       | 51                                       | 51      | 47      | 45      | 51                                        | 47       | 44       | 44       |
|                                   | Median  | 0.000                                    | -0.001  | 0.003   | 0.000   | -0.002                                    | -0.006   | 0.001    | 0.003    |
|                                   | p-value | (0.437)                                  | (0.479) | (0.942) | (0.428) | (0.579)                                   | (0.662)  | (0.887)  | (0.391)  |
| p-value of L - H                  |         | (0.575)                                  | (0.334) | (0.658) | (0.080) | (0.244)                                   | (0.902)  | (0.882)  | (0.214)  |

**Table 5**  
**Median Abnormal Operating Performance by Herfindahl Index**

| Herfindahl index rank             |         | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |          |          |          |
|-----------------------------------|---------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------|----------|----------|
|                                   |         | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2 | Year 2-3 | Year 0-3 |
| Parent firm operating performance |         |                                          |         |         |         |                                           |          |          |          |
| L                                 | N       | 45                                       | 45      | 44      | 47      | 45                                        | 44       | 44       | 45       |
|                                   | Median  | 0.000                                    | 0.000   | -0.011  | -0.019  | 0.006                                     | -0.016   | 0.000    | -0.019   |
|                                   | p-value | (0.514)                                  | (0.735) | (0.196) | (0.105) | (0.577)                                   | (0.006)  | (0.758)  | (0.194)  |
| M                                 | N       | 47                                       | 46      | 46      | 43      | 45                                        | 45       | 42       | 40       |
|                                   | Median  | 0.000                                    | -0.003  | -0.008  | -0.004  | -0.001                                    | -0.002   | 0.007    | -0.004   |
|                                   | p-value | (0.516)                                  | (0.439) | (0.301) | (0.721) | (0.437)                                   | (0.945)  | (0.354)  | (0.717)  |
| H                                 | N       | 49                                       | 49      | 47      | 43      | 48                                        | 47       | 43       | 42       |
|                                   | Median  | 0.000                                    | 0.000   | -0.025  | -0.008  | 0.002                                     | -0.020   | 0.003    | -0.002   |
|                                   | p-value | (0.264)                                  | (0.507) | (0.620) | (0.475) | (0.338)                                   | (0.170)  | (0.731)  | (0.829)  |
| p-value of L - H                  |         | (0.964)                                  | (0.751) | (0.793) | (0.622) | (0.706)                                   | (0.546)  | (0.976)  | (0.587)  |
| Subsidiary operating performance  |         |                                          |         |         |         |                                           |          |          |          |
| L                                 | N       | 46                                       | 45      | 41      | 39      | 45                                        | 40       | 38       | 38       |
|                                   | Median  | 0.000                                    | -0.002  | 0.002   | -0.002  | -0.003                                    | 0.005    | 0.001    | -0.006   |
|                                   | p-value | (0.761)                                  | (0.881) | (0.721) | (0.882) | (0.811)                                   | (0.942)  | (0.558)  | (0.949)  |
| M                                 | N       | 46                                       | 46      | 41      | 36      | 45                                        | 40       | 36       | 34       |
|                                   | Median  | 0.000                                    | -0.002  | -0.029  | -0.005  | 0.020                                     | -0.013   | -0.004   | 0.018    |
|                                   | p-value | (0.116)                                  | (0.579) | (0.183) | (0.951) | (0.310)                                   | (0.367)  | (0.975)  | (0.586)  |
| H                                 | N       | 46                                       | 47      | 42      | 37      | 44                                        | 42       | 36       | 33       |
|                                   | Median  | -0.001                                   | 0.001   | 0.004   | -0.026  | -0.018                                    | -0.001   | 0.001    | -0.022   |
|                                   | p-value | (0.986)                                  | (0.584) | (0.388) | (0.221) | (0.483)                                   | (0.308)  | (0.557)  | (0.511)  |
| p-value of L - H                  |         | (1.000)                                  | (0.628) | (0.823) | (0.301) | (0.498)                                   | (0.676)  | (0.808)  | (0.588)  |

**Table 6**  
**Median Abnormal Operating Performance by Parent Ownership on Subsidiaries**

| Parent<br>prior ab.<br>ret rank   |         | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |          |          |          |
|-----------------------------------|---------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------|----------|----------|
|                                   |         | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2 | Year 2-3 | Year 0-3 |
| Parent firm operating performance |         |                                          |         |         |         |                                           |          |          |          |
| L                                 | N       | 46                                       | 48      | 47      | 47      | 46                                        | 46       | 45       | 43       |
|                                   | Median  | -0.002                                   | -0.005  | -0.015  | -0.004  | -0.003                                    | -0.009   | 0.014    | 0.000    |
|                                   | p-value | (0.172)                                  | (0.896) | (0.443) | (0.934) | (0.944)                                   | (0.317)  | (0.441)  | (0.868)  |
| M                                 | N       | 47                                       | 45      | 44      | 43      | 45                                        | 44       | 41       | 41       |
|                                   | Median  | 0.000                                    | 0.002   | -0.010  | -0.025  | 0.002                                     | -0.020   | -0.016   | -0.027   |
|                                   | p-value | (0.262)                                  | (0.546) | (0.569) | (0.004) | (0.574)                                   | (0.400)  | (0.042)  | (0.007)  |
| H                                 | N       | 53                                       | 52      | 50      | 47      | 52                                        | 50       | 47       | 47       |
|                                   | Median  | 0.000                                    | -0.001  | -0.011  | -0.005  | 0.003                                     | -0.008   | 0.014    | -0.003   |
|                                   | p-value | (0.823)                                  | (0.953) | (0.117) | (0.811) | (0.816)                                   | (0.060)  | (0.009)  | (0.605)  |
| p-value of<br>L - H               |         | (0.320)                                  | (0.788) | (0.715) | (0.745) | (0.915)                                   | (0.747)  | (0.365)  | (0.853)  |
| Subsidiary operating performance  |         |                                          |         |         |         |                                           |          |          |          |
| L                                 | N       | 45                                       | 45      | 42      | 34      | 43                                        | 41       | 33       | 31       |
|                                   | Median  | 0.001                                    | -0.001  | -0.013  | -0.012  | -0.006                                    | 0.001    | -0.001   | -0.014   |
|                                   | p-value | (0.868)                                  | (0.876) | (0.580) | (0.744) | (0.971)                                   | (0.914)  | (0.496)  | (0.335)  |
| M                                 | N       | 48                                       | 48      | 42      | 38      | 47                                        | 42       | 37       | 36       |
|                                   | Median  | -0.001                                   | 0.012   | -0.010  | -0.008  | 0.009                                     | -0.013   | 0.004    | 0.000    |
|                                   | p-value | (0.024)                                  | (0.828) | (0.172) | (0.283) | (0.552)                                   | (0.119)  | (0.418)  | (0.502)  |
| H                                 | N       | 51                                       | 50      | 45      | 44      | 50                                        | 44       | 44       | 43       |
|                                   | Median  | 0.000                                    | -0.011  | -0.006  | -0.019  | -0.003                                    | -0.009   | -0.004   | -0.017   |
|                                   | p-value | (0.760)                                  | (0.686) | (0.494) | (0.391) | (0.788)                                   | (0.229)  | (0.562)  | (0.513)  |
| p-value of<br>L - H               |         | (1.000)                                  | (0.712) | (0.956) | (0.321) | (0.859)                                   | (0.431)  | (0.582)  | (0.204)  |

**Table 7**  
**Abnormal Operating Performance by Industry Status of**  
**Whether Subsidiaries and Parents Are in the Same Industry**

| Same industry?                    |         | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |          |          |          |
|-----------------------------------|---------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------|----------|----------|
|                                   |         | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2 | Year 2-3 | Year 0-3 |
| Parent firm operating performance |         |                                          |         |         |         |                                           |          |          |          |
| Yes                               | N       | 43                                       | 43      | 42      | 41      | 42                                        | 42       | 40       | 39       |
|                                   | Median  | 0.000                                    | 0.003   | 0.004   | 0.000   | 0.002                                     | -0.003   | 0.003    | 0.000    |
|                                   | p-value | (0.768)                                  | (0.483) | (0.921) | (0.795) | (0.467)                                   | (0.307)  | (0.385)  | (0.762)  |
| No                                | N       | 84                                       | 82      | 78      | 76      | 82                                        | 78       | 74       | 75       |
|                                   | Median  | 0.000                                    | 0.002   | -0.010  | -0.008  | 0.007                                     | -0.011   | 0.003    | -0.004   |
|                                   | p-value | (0.569)                                  | (0.362) | (0.433) | (0.408) | (0.206)                                   | (0.162)  | (0.659)  | (0.687)  |
| p-value of Y - N                  |         | (0.980)                                  | (0.994) | (0.563) | (0.459) | (0.878)                                   | (0.956)  | (0.724)  | (0.663)  |
| Subsidiary operating performance  |         |                                          |         |         |         |                                           |          |          |          |
| Yes                               | N       | 43                                       | 42      | 38      | 34      | 41                                        | 38       | 34       | 33       |
|                                   | Median  | 0.000                                    | 0.012   | -0.008  | -0.020  | 0.012                                     | -0.005   | -0.005   | -0.017   |
|                                   | p-value | (0.573)                                  | (0.498) | (0.711) | (0.719) | (0.517)                                   | (0.480)  | (0.953)  | (0.917)  |
| No                                | N       | 81                                       | 83      | 75      | 68      | 80                                        | 74       | 68       | 64       |
|                                   | Median  | 0.000                                    | 0.010   | -0.004  | -0.012  | 0.010                                     | -0.007   | 0.001    | 0.000    |
|                                   | p-value | (0.953)                                  | (0.409) | (0.511) | (0.524) | (0.325)                                   | (0.215)  | (0.793)  | (0.971)  |
| p-value of Y - N                  |         | (0.588)                                  | (0.996) | (0.920) | (0.946) | (0.989)                                   | (0.909)  | (0.744)  | (0.985)  |

**Table 8**  
**Median Abnormal Operating Performance by**  
**Independence Status of Subsidiaries within 3 Years**

| Status of subsidiary              |                  | Abnormal levels of operating performance |         |         |         | Abnormal changes in operating performance |                |          |                |
|-----------------------------------|------------------|------------------------------------------|---------|---------|---------|-------------------------------------------|----------------|----------|----------------|
|                                   |                  | Year 0                                   | Year 1  | Year 2  | Year 3  | Year 0-1                                  | Year 1-2       | Year 2-3 | Year 0-3       |
| Parent firm operating performance |                  |                                          |         |         |         |                                           |                |          |                |
| Parent                            | N                | 93                                       | 92      | 90      | 87      | 91                                        | 89             | 85       | 84             |
| controlled                        | Median           | 0.000                                    | 0.003   | -0.015  | -0.014  | 0.002                                     | -0.021         | -0.004   | -0.025         |
|                                   | p-value          | (0.545)                                  | (0.497) | (0.064) | (0.006) | (0.494)                                   | <b>(0.003)</b> | (0.413)  | <b>(0.016)</b> |
| Third party                       | N                | 24                                       | 24      | 23      | 21      | 23                                        | 23             | 21       | 20             |
| Controlled                        | Median           | -0.001                                   | -0.005  | -0.025  | 0.023   | 0.006                                     | 0.000          | 0.053    | 0.034          |
|                                   | p-value          | (0.154)                                  | (0.545) | (0.757) | (0.298) | (0.860)                                   | (0.975)        | (0.187)  | (0.192)        |
|                                   | N                | 41                                       | 41      | 40      | 41      | 41                                        | 40             | 39       | 39             |
| Independent                       | Median           | 0.001                                    | -0.005  | 0.001   | 0.000   | -0.001                                    | 0.000          | 0.006    | 0.000          |
|                                   | p-value          | (0.222)                                  | (0.409) | (0.983) | (0.583) | (0.305)                                   | (0.526)        | (0.168)  | (0.529)        |
|                                   | p-value of P - I | (0.073)                                  | (0.300) | (0.206) | (0.028) | (0.296)                                   | <b>(0.015)</b> | (0.124)  | <b>(0.041)</b> |
| Subsidiary operating performance  |                  |                                          |         |         |         |                                           |                |          |                |
| Parent                            | N                | 91                                       | 92      | 86      | 76      | 89                                        | 84             | 76       | 72             |
| controlled                        | Median           | 0.000                                    | 0.010   | -0.009  | -0.015  | 0.009                                     | -0.005         | 0.001    | -0.006         |
|                                   | p-value          | (0.357)                                  | (0.373) | (0.223) | (0.674) | (0.527)                                   | (0.254)        | (0.471)  | (0.756)        |
| Third party                       | N                | 23                                       | 21      | 12      | 8       | 21                                        | 12             | 7        | 7              |
| Controlled                        | Median           | -0.001                                   | -0.013  | -0.004  | -0.047  | -0.003                                    | -0.015         | 0.028    | -0.031         |
|                                   | p-value          | (0.044)                                  | (0.602) | (0.970) | (0.727) | (0.801)                                   | (0.791)        | (0.469)  | (0.688)        |
|                                   | N                | 41                                       | 42      | 42      | 42      | 41                                        | 42             | 41       | 40             |
| Independent                       | Median           | 0.000                                    | -0.006  | -0.005  | -0.013  | 0.000                                     | -0.013         | -0.008   | -0.018         |
|                                   | p-value          | (0.094)                                  | (0.820) | (0.627) | (0.367) | (0.731)                                   | (0.257)        | (0.463)  | (0.393)        |
|                                   | p-value of P - I | (0.096)                                  | (0.737) | (0.685) | (0.717) | (0.841)                                   | (0.834)        | (0.276)  | (0.383)        |

**Table 9**  
**Cross-Sectional Regressions of Changes in Abnormal Operating Performance**

This table shows the OLS regressions of changes in abnormal operating performance for both parent and subsidiary firms over the three years after the IPO of subsidiaries. The dependent variable is winsorized at top and bottom 5%. Year dummies are added but not reported. The results are robust without year dummies. P-ret is the parents' past abnormal return tercile ranking (1 being lowest). P-control is a dummy variable with a value of 1 if the subsidiary is still under the control of the parent firm after three years of subsidiary IPO. Seg has a value of 1 if number of segments is one, 2 if number of segments is either 2 or 3, and 3 if number of segments are greater than or equal to 4. H-sale is the sale-based Herfindahl index tercile ranking (1 being smallest). P-own is the parent ownership of subsidiary. Ind is a dummy variable with a value of 1 if parent and subsidiary firms are in different industries.

| Panel A: Change in abnormal operating performance of parents      |                   |                   |                   |                   |                   |                   |     |        |
|-------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|--------|
| Intercept                                                         | P-ret             | P-control         | Seg               | H-sale            | P-own             | Ind               | N   | Adj-R2 |
| -0.015<br>(0.43)                                                  | -0.032<br>(-3.13) |                   |                   |                   |                   |                   | 132 | 11.79% |
| -0.050<br>(-1.59)                                                 |                   | -0.039<br>(-2.23) |                   |                   |                   |                   | 143 | 8.04%  |
| -0.068<br>(-1.79)                                                 |                   |                   | -0.005<br>(-0.44) |                   |                   |                   | 138 | 4.53%  |
| -0.101<br>(-2.79)                                                 |                   |                   |                   | 0.012<br>(1.10)   |                   |                   | 127 | 5.55%  |
| -0.048<br>(-1.11)                                                 |                   |                   |                   |                   | -0.048<br>(-0.96) |                   | 131 | 5.34%  |
| -0.077<br>(-2.22)                                                 |                   |                   |                   |                   |                   | -0.002<br>(-0.10) | 114 | 7.11%  |
| -0.164<br>(-1.50)                                                 |                   | -0.038<br>(-2.03) | 0.033<br>(1.29)   | 0.039<br>(1.56)   | -0.046<br>(-0.85) |                   | 126 | 8.06%  |
| -0.113<br>(-1.06)                                                 | -0.032<br>(-2.93) | -0.022<br>(-1.19) | 0.035<br>(1.42)   | 0.042<br>(1.74)   | -0.060<br>(-1.14) |                   | 126 | 13.88% |
| -0.157<br>(-1.31)                                                 | -0.028<br>(-2.31) | -0.014<br>(-0.68) | 0.046<br>(1.65)   | 0.044<br>(1.64)   | -0.043<br>(-0.75) | -0.007<br>(-0.36) | 108 | 11.05% |
| Panel B: Change in abnormal operating performance of subsidiaries |                   |                   |                   |                   |                   |                   |     |        |
| Intercept                                                         | P-ret             | P-control         | Seg               | H-sale            | P-own             | Ind               | N   | Adj-R2 |
| -0.029<br>(-0.47)                                                 | -0.015<br>(-0.85) |                   |                   |                   |                   |                   | 110 | -2.02% |
| -0.085<br>(-1.54)                                                 |                   | 0.032<br>(1.05)   |                   |                   |                   |                   | 119 | -1.39% |
| -0.119<br>(-1.83)                                                 |                   |                   | 0.027<br>(1.43)   |                   |                   |                   | 114 | -0.81% |
| -0.032<br>(-0.52)                                                 |                   |                   |                   | -0.016<br>(-0.83) |                   |                   | 105 | -2.38% |
| 0.031<br>(0.41)                                                   |                   |                   |                   |                   | -0.140<br>(-1.62) |                   | 110 | -0.11% |
| -0.096<br>(-1.66)                                                 |                   |                   |                   |                   |                   | 0.036<br>(1.11)   | 97  | 6.31%  |
| -0.178<br>(-0.97)                                                 |                   | 0.035<br>(1.05)   | 0.056<br>(1.43)   |                   | 0.028<br>(0.69)   | -0.130<br>(-1.38) | 105 | 0.62%  |
| -0.137<br>(-0.73)                                                 | -0.020<br>(-1.04) | 0.042<br>(1.22)   | 0.054<br>(1.36)   | 0.028<br>(0.69)   | -0.130<br>(-1.39) |                   | 105 | 0.69%  |
| -0.308<br>(-1.60)                                                 | -0.005<br>(-0.24) | 0.044<br>(1.27)   | 0.075<br>(1.84)   | 0.044<br>(1.06)   | -0.093<br>(-1.01) | 0.037<br>(1.07)   | 92  | 8.76%  |