



The evolution of ownership structure of corporate spin-offs ☆

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ABSTRACT

Spin-offs inherit the ownership structure of their parents. The change from the monitoring requirements of the parent to those of an often smaller and higher risk firm constitutes a shock to this inherited ownership structure. This paper examines how block ownership changes in response to this shock and the performance and survival consequences of these changes. Block ownership increases from an average inherited level of 20.34% to 27.35% in three years. Comparison with size and industry-matched firms shows that this is not due to secular trends. Block ownership increases more when the inherited block ownership is smaller, when the spin-offs are smaller, have poorer performance and fewer growth opportunities relative to the parent, and when they operate in industries that are less related to the parents' industries. The results suggest that block ownership changes in response to the monitoring needs of spin-offs. This interpretation is supported by the positive association between changes in block ownership and subsequent firm performance and survival.

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1. Introduction

This paper examines the evolution of the ownership structure of corporate spin-offs i.e. firms that existed as divisions of a parent company before becoming independent legal entities. At inception spin-offs inherit the ownership structure of the parent because the issuance of spin-off shares takes place in the form of a pro-rata stock distribution to the stockholders of the parent company. However, the assets and operations of spin-offs are usually quite different from those of their parents. This creates an opportune experimental setting for testing hypotheses on how changes in firm characteristics and thus monitoring requirements influence ownership structure, and the consequences of changes in ownership structure for firm performance and survival.

Most previous analysis of ownership structure is of mature or large firms. The ownership structure of such firms changes slowly (see for example, Barclay and Holderness, 1989; Denis and Sarin, 1999; Zhou, 2001) thereby impeding direct analyses of its causes and consequences (Zhou, 2001; Core and Larcker, 2002). Unlike mature firms, spin-offs are likely to experience significant changes in ownership structure. Specifically, if monitoring requirements influence ownership structure, the ownership structure inherited by spin-offs will change in response to changes in monitoring needs arising from differences between parent companies and spin-offs in attributes such as firm size, risk, growth options and industry mix. For example, consider the ownership structure of Corn

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Products, the corn-refining division contributing 20% of firm sales, spun off by parent Bestfoods, a diversified packaged-foods company. Bestfoods had no block holder listed in the proxy statements prior to the spin-off or in the subsequent years. In contrast, in its first proxy statement, Corn Products had one block holder holding 8% of the shares. Total block holdings then increased to 25% in year 2, decreased to 17% in year 3, 12% in year 4 and finally increased to 22% in year 5.

Using a sample of 117 spin-offs from 1981 through 2000, I document changes in block ownership (the total holdings of owners who each hold at least five percent of the voting shares) and test predictions regarding their determinants, and performance and survival consequences. The salient findings are below.

Regarding the changes in block ownership:

- In the three years after inception the block ownership of spin-offs increases from a mean inherited level of 20.34% to a mean of 27.35%. The increase in block ownership is mainly from outside block holdings i.e. where the beneficial owner is unaffiliated to the management of the firm.
- By contrast, a sample of mature matching firms chosen on the basis of size and industry shows insignificant changes in block ownership suggesting that ownership changes in spin-offs are not due to industry or secular trends.

Regarding the determinants of changes in block ownership:

- The changes in block ownership are systematically related to changes in monitoring needs captured by the industry relatedness of spin-offs and parents, and by their differences in size, performance and growth opportunities. A significant negative association between the inherited block ownership and subsequent changes in block ownership also supports the monitoring-needs argument. Reflecting a greater need for incremental monitoring, spin-offs with lower inherited block ownership experience larger increases in block ownership.

Regarding the survival and performance of spin-offs:

- The survival of spin-offs is positively related to the changes in block ownership that occur in the first three years of their independent existence.
- Changes in the stock valuation of spin-offs are similarly positively related to past changes in block ownership.
- Pair wise differences in the stock valuation of spin-offs and matching firms are positively associated with the corresponding differences in block ownership.
- In a simultaneous estimation of Q and block ownership, the relation between the market-to-book ratio and block ownership of spin-offs becomes less significant over time and more similar to the corresponding relation in the sample of matching firms.

Overall, the results show that changes in block ownership occur in response to changes in monitoring needs and are positively associated with enhancements in the stock valuations of spin-offs and the probability of their survival. Thus the results help to explicitly demonstrate the adaptive nature and value relevance of the block ownership of firms — a widely prevalent feature in US corporations that is also often used to examine corporate finance and governance issues in the academic literature (Dlugosz et al., 2006).

The experimental setting employed in this paper helps to alleviate problems arising from the endogenous formation of ownership structure (Demsetz and Villalonga, 2001). However, such problems can persist if the parent's decision to spin-off a unit is an outcome of its existing block ownership. To address these concerns I examine press articles relating to the motivation for the spin-off deal. Detailed examinations reveal no evidence that the parent's ownership structure or the sub-optimality thereof is a motivation for the spin-off transaction. Consistent with this lack of evidence, examination of the parent firm's block ownership reveals insignificant changes subsequent to the spin-off. Further, what changes occur in block ownership show no systematic association with changes in the monitoring needs of the parent that arise due to the spin-off. These results provide empirical support for the argument that the spin-off transaction is not endogenous to the ownership structure of the parent at the time of the spin-off.

The rest of this paper is organized as follows. In the next section I discuss the choice of spin-offs for a study of ownership structure and develop hypotheses. Section 3 details sample formation and present descriptive statistics. Section 4 documents changes in the ownership structure of the spin-offs and compares them to those of the matching mature firms. Section 5 examines the determinants of changes in block ownership and relates the changes to firm performance and survival. Section 6 tests the potential endogeneity of the spin-off decision and reports robustness checks. Section 7 concludes.

2. Spin-offs and ownership structure

2.1. Using spin-offs to study changes in ownership structure

Much of the empirical literature on ownership structure examines the determinants of the level of different types of ownership (managerial, block, institutional, etc.) and their relation to firm performance in a cross-section or panel of firms (see for example — Demsetz and Lehn, 1985; Agrawal and Knoeber, 1996; Cho, 1998; Denis and Sarin, 1999; Himmelberg et al., 1999; Demsetz and Villalonga, 2001). Studies of changes in ownership structure around restructuring events are relatively rare. Gilson (1990) studies changes in the block ownership of firms that default on their debt obligations. Parrino et al. (2003) examine changes in institutional ownership around forced CEO turnover. Kole and Lehn (1999) document the evolution of inside and block ownership in the airline industry around its deregulation. Wruck (1989) and Barclay et al. (2007) examine changes in block ownership brought about by

private placements of equity. [Franks et al. \(in press\)](#) study the evolution of ownership structure in a small sample of UK firms incorporated in the early 1900s.

In a study related to spin-offs, [Abarbanell et al. \(2003\)](#) examine changes in the institutional ownership of spin-offs and parent firms around the announcement and effective dates of the spin-off transaction. Different from this paper, their motivation is to examine institutional investor preferences and the impact of institutional trading on stock returns around the distribution.

A key aspect of ownership structure that discourages studies of its changes is that it usually changes slowly over time. [Core and Larcker \(2002\)](#) argue that the slow pace of change of ownership structure is due to the significant costs of such changes.¹ Until the marginal loss due to a departure from the first-best ownership structure exceeds the marginal cost of changing it, the ownership structure of a firm need not change. Spin-offs provide a fitting example of alterations in the marginal cost-benefit trade-off of changes in ownership structure. In a corporate spin-off the ownership structure of the firm is held constant while the nature of the firm is fundamentally changed. Compared to their parents, spin-offs usually operate in a different industry, are of a different size, have significantly different growth opportunities and often require distinctly different management styles. All these factors affect the monitoring task and therefore the marginal cost-benefit trade-off of changes in ownership structure.

A second advantage of using spin-offs is that, unlike IPO firms, the ownership structure at inception is more likely inappropriate for spin-offs. [Jensen and Meckling \(1976\)](#) argue that as long as public investors are rational, the costs and benefits of the chosen ownership structure will be reflected in the offer price of a firm's IPO and thus internalized by the entrepreneurs who decide the initial ownership structure. This is less likely the case in spin-offs because the chosen ownership structure for the spin-off is simply the ownership structure of the parent on the record date. A related advantage of using spin-offs is that ownership structure is rarely cited as a motive for spin-offs. This alleviates potential problems of endogeneity. Specifically, if ownership-structure related motivations for spin-offs existed, an examination of changes in ownership structure would first need to account for those motivations. However, press articles shows no evidence that this is the case. A priori, therefore, spin-offs present a relatively clean experimental setting in terms of the endogeneity of the parent's decision to spin-off.²

The final advantage of using spin-offs for a study of ownership structure is that a host of other firm and governance characteristics such as firm leverage, board structure and executive compensation contracts are chosen in an efficient manner. These firm and governance characteristics are systematically related to the ownership structure of firms and efficient choices of these monitoring mechanisms increase the likelihood that changes in ownership structure occur in relative isolation and are therefore more observable and testable.³

2.2. Hypotheses

2.2.1. Changes in ownership structure

Prior empirical studies document an average market value of spin-offs of approximately 30% ([Krishnaswami and Subramaniam, 1999](#)) and an average standard deviation of monthly returns of 130% ([Abarbanell et al., 2003](#)) relative to their parents. The relatively smaller size and the benefits of greater monitoring of higher risk firms imply greater net benefits of an increase in block ownership ([Demsetz, 1983; Demsetz and Lehn, 1985](#)). Therefore, I hypothesize an increase in the block ownership of spin-offs on average. Because it is not clear how long it takes for a new equilibrium ownership structure to be attained, I use 3–5 year windows from inception. If the increase in block ownership of spin-offs is due to the shock created by the significantly different nature of the firm it should get progressively smaller as the impact of the shock decreases over time. I also expect the cross-sectional correlation between the block ownership of the spin-off and its inherited block ownership to decrease over time. This expectation is consistent with the argument that the new ownership structure of spin-offs is not a trivial conversion of the inherited ownership structure but rather represents a significant departure from it.

Because the ownership structure of spin-offs may change due to external reasons such as industry factors, I compare them to a set of matching firms chosen on the basis of size, industry and maturity. Using mature firms makes it possible to compare ownership structures that are likely to be in equilibrium to those that are unlikely to be in equilibrium. I expect the changes in the block ownership of spin-offs to be significantly larger than those of the matching firms. Also, the differences in the ownership structure of the spin-offs and the matching firms should decrease and the cross-sectional correlation should increase over time. The last two expectations are based on the assumption that a mature, size and industry-matched firm serves as an appropriate benchmark for a spin-off and that the ownership structure of the spin-off should resemble its benchmark more closely over time. However, given the limited evidence on the intra-industry and inter-industry variation in block ownership of firms, there exists a joint hypothesis problem in tests that use benchmark firms.

¹ Documented block premiums ranging from 5.5% ([Mikkelson and Regassa, 1991](#)) to 16% ([Barclay and Holderness, 1989](#)) are indicative of the costs of concentrating ownership.

² A possible motivation for a spin-off may be the desire of a controlling family to reduce their stake in a part of the business. Empirical tests do not support the existence of such divestiture motives. Section 6 examines the endogeneity issue in detail.

³ Specifically, [Dittmar \(2004\)](#) finds that the leverage ratio of spin-offs is set similar to comparable non-spin-offs. [Schipper and Smith \(1983\)](#) and [Miles and Woolridge \(1999\)](#) document that improved incentive alignment is frequently cited as a motivating factor for spin-offs by parent firm management. [Seward and Walsh \(1996\)](#) examine compensation contracts of 78 CEOs of spin-offs and find these contracts to be ex-ante efficient. Regarding board structure, casual examination of sample transactions shows that spin-off boards are formed with deliberation. The board is typically formed several months prior to the distribution with a plan of transition for it to become independent around the time of the distribution. See [Wruck and Wruck \(2002\)](#) for a study of the top management teams of spin-offs.

2.2.2. Determinants of changes in block ownership

Because I test the response of block ownership to changes in monitoring requirements, I measure the change in block ownership of the spin-off using the inherited level as the base. Similarly, I measure the dimensions of monitoring of the spin-off relative to the pre-spin-off parent. The various dimensions of monitoring used in the tests are discussed below.

2.2.2.1. Size and control potential. The well-documented negative relation between firm size and block ownership suggests that spin-offs of larger relative size will have smaller increases in block ownership, *ceteris paribus*. Similarly, greater relative control potential of the spin-off should lead to a larger increase in block ownership. Following [Demsetz and Lehn \(1985\)](#) who define control potential as the wealth gain achievable through more effective monitoring of managers by a firm's owners, I use the standard error of estimate from fitting the market model as a proxy. Similar to [Jin \(2002\)](#) I use 36 observations of monthly returns beginning with the spin-offs' independent existence. To estimate the parents' control potential I use the 36 months preceding the first firm announcement of the spin-off.

2.2.2.2. Industry relatedness. Given the significance of industry as a factor in explaining corporate governance characteristics of firms ([Gillan et al., 2003](#)) I examine the effect of industry relatedness on the evolution of the block ownership of the spin-offs. Because a greater difference in industry mix creates a newer monitoring task I expect lower industry relatedness to be associated with greater increases in block ownership.

I measure industry relatedness using SIC codes, vertical relatedness, industry complementarity ([Fan and Lang, 1998](#)) and the correlation in monthly stock returns of the spin-off and the post-spin-off parent (in the 3 years subsequent to the spin-off). [Fan and Lang's \(1998\)](#) vertical relatedness measure captures the extent to which the spin-off industry and the parent industry are dependent on each other for inputs. Industry complementarity captures the extent to which the parent and spin-off industry depend on the same other industries i.e. non-spin-off and non-parent industries, for inputs and outputs. The construction of these measures is described in Appendix A.

2.2.2.3. Extent of growth opportunities. The impact of growth opportunities on the ownership structure of firms is well-documented ([Demsetz and Villalonga, 2001](#)). Differences in growth rates of the spin-off division and the rest of the parent firm are often cited as motivating spin-offs. To capture this important aspect of both ownership structure and spin-off transactions I rely on a variety of measures. The first measure is the ratio of research and development expenditure to assets (R&D intensity). The R&D intensity of the spin-off *relative* to the parent serves as a proxy for the changes in monitoring requirements due to changes in the extent of growth opportunities. Consistent with [Himmelberg et al. \(1999\)](#), the expectation is that higher values of relative R&D intensity will be associated with larger increases in the block ownership of the spin-off. Similarly, I use sales growth and the ratio of property, plant and equipment to assets (an inverse measure of growth) to capture the extent of growth opportunities.

Finally, consistent with [Smith and Watts \(1992\)](#) and [Gertner et al. \(2002\)](#) I use the market-to-book ratio of assets (Q) as a fourth proxy for growth. To the extent that Q captures growth options (and therefore control potential), higher relative Q will lead to a greater increase in block ownership. However, this ratio is also often used to measure firm performance (e.g. [Morck et al., 1988](#); [Himmelberg et al., 1999](#)). To the extent that Q captures performance, lower relative Q will lead to a greater increase in block ownership because there are greater benefits to monitoring poorly performing firms. This argument is consistent with [Bethel et al. \(1998\)](#) who find that all three types of block investors they study target poorly performing firms. Further, [Holderness and Sheehan \(1985\)](#), [Mikkelsen and Ruback \(1985\)](#) and [Bethel et al. \(1998\)](#) document improvements in firm performance after the formation of blocks. In order to distinguish between these two conflicting effects of Q, I use the industry-adjusted Q in addition to the raw Q. Specifically, industry-adjusting the Q, by reducing the variation in Q due to industry factors will make it less of a proxy for growth and more a proxy for performance.⁴ To make the industry adjustment I use the contemporaneous median Q of all firms with the same 3-digit SIC code.

2.2.2.4. Inherited block ownership. Assuming that there are smaller increases in monitoring benefits as block ownership increases (i.e. a concave relationship between block ownership and its monitoring rewards), prior block ownership should be negatively related to subsequent changes in block ownership. Prior studies (for example, [Morck et al., 1988](#)) make similar arguments about the ownership structure of firms. However, the potential problem in making such an argument in a general sample is that it fails to recognize that ownership in such samples could be optimally determined. Departures from an optimally determined ownership structure, either via increases or decreases in concentration, are not likely to be marginally beneficial and therefore it is difficult to prescribe a directional change in ownership structure (for example that increases are incrementally cost-beneficial). However, in the current setting it is possible to prescribe a directional change because the inherited ownership structure is “exogenously” imposed on the spin-off firm and is unlikely to be first-best or optimal.

2.2.3. Differences in block ownership of spin-offs and matching firms

As the ownership structure of spin-offs gets better suited to firm characteristics over time, differences in block ownership of spin-offs and matching firms are more likely to reflect the corresponding differences in firm characteristics. Year-by-year regressions of the pair wise difference in the block ownership of spin-offs and matching firms on corresponding pair wise differences in firm characteristics test this hypothesis.

⁴ I thank the referee for pointing out this distinguishing test.

2.2.4. Block ownership, firm performance and survival

Unlike existing cross-sectional examinations of the relationship between firm performance and ownership structure (Berle and Means, 1932; Morck et al., 1988; Stulz, 1988; Wruck, 1989; McConnell and Servaes, 1990; Loderer and Martin, 1997; Cho, 1998), the spin-off setting makes it simpler to relate the variation in changes in block ownership to firm performance and survival. Core and Larcker (2002) argue that in the presence of significant costs, adjustments in ownership structure will not take place unless the counterbalancing benefits are comparable. This suggests the choice of firm survival as an appropriately significant metric. I expect that increases in block ownership of spin-offs will increase the probability of survival as a stand-alone entity. However, survival could also stem simply from larger firm size and greater difficulty in taking over spin-offs with more concentrated ownership and therefore need not necessarily be consistent with firm value maximization. Therefore I also examine the spin-offs' performance as measured by stock valuation.

The first measure of stock valuation is the change in the market-to-book ratio of the spin-off. Because I expect the changes in block ownership to be value-enhancing I hypothesize a positive relation between changes in the market-to-book ratio and changes in block ownerships of spin-offs. I expect a similar positive relation when the change in the market-to-book ratio is measured relative to the matching mature firm instead of the spin-off's past market-to-book ratio.

The second measure is the market-to-book ratio itself. It is now well-documented that after accounting for the endogeneity of ownership structure there is no systematic relationship between the equilibrium ownership concentration of firms and their performance as measured by *Q* (Himmelberg et al., 1999; Demsetz and Villalonga, 2001).⁵ To the extent that the ownership structure of spin-offs has adjusted to its new equilibrium I should find a similar result for these firms.

2.2.5. Endogeneity of the spin-off decision

Section 2.1 argues that the ownership structure of the parent is likely not endogenous to its decision to spin-off. However, if the parent's decision to spin-off is indeed endogenous then it leads to two possibilities. First, the parent's ownership structure changes subsequently thus bringing it closer to its optimum. Second, the change in scope of the parent's business induced by the spin-off makes the ownership structure of the parent more optimal.⁶

To examine the first possibility I examine changes in the parent's block ownership in the post-spin-off period — significant changes would be consistent with the endogeneity of the spin-off decision. To examine the second possibility I collect news stories on the stated motivations for the spin-off because these motivations are likely to capture variation in the change in scope brought about by the spin-off transaction. I then relate the motivations to the changes in the block ownership of the parent. Finally, as a joint test of both possibilities I relate the changes in the block ownership of the parent to the changes in the monitoring needs that occur as a result of the spin-off. All these tests rely on observing some changes in the block ownership of the parent. The possibility that the block ownership of the parent, while remaining unchanged, becomes more appropriate to the post-spin-off business of the parent remains untested. To the extent that this is likely the endogeneity issue remains less than fully resolved.

3. Sample formation, data and descriptive statistics

3.1. Selection of spin-offs

I form an initial sample using a combination of CRSP distributions and transactions from the SDC Platinum Database between 1981 and 2000. I exclude two-stage spin-offs because the ownership structure of the parent is not replicated exactly in such transactions. This results in overlapping samples of 372 transactions from SDC and 582 distributions from CRSP.

I use several filters on these samples. First, the transaction should have a distribution code in CRSP and adequate news stories in Factiva. I reject 32 transactions because news stories do not carry sufficient information to confirm the parent's identity and/or the completion of the deal. Next I exclude transactions if (i) less than 100% of the spin-off shares are distributed or (ii) the transaction is taxable. This ensures that any spin-offs where the distribution is not pro-rata (and therefore the existing ownership structure is not exactly replicated) are excluded from the sample.⁷ I then exclude transactions where (i) the spin-off occurs as a result of the parent merging with another firm or (ii) the ownership structure of the parent firm changes significantly due to reasons not related to the spin-off. This ensures that parent firms undertaking recapitalizations, merger-related stock issuances, private placements and other non-spin-off transactions that alter their ownership structure are excluded from the sample. I do this because measuring the inherited ownership structure would be noisy for these transactions. This reduces the sample to a total of 249 transactions.

I further require that the spin-off should survive as a stand-alone entity for at least 3 years from its inception. This allows sufficient time to observe changes in ownership structure and reduces the sample to 169 transactions. For this sample I obtain

⁵ Coles et al. (2003) use a structural model to explain the observed relation between ownership structure and firm valuation.

⁶ I thank the referee for pointing out the second possibility.

⁷ Additionally, I check that the transactions are approved by the SEC as not constituting sales of new securities, and that they are ruled tax-free by the IRS. These filters additionally ensure that the distribution is pro-rata, that the spin-offs have a valid business purpose and that the division being spun off has co-existed with the parent for at least five years.

Table 1

Spin-off sample by year and industry

Panel A: by year		
Year	Number	%
1981	3	2.6%
1982	2	1.7%
1983	0	0.0%
1984	1	0.9%
1985	3	2.6%
1986	2	1.7%
1987	4	3.4%
1988	4	3.4%
1989	7	6.0%
1990	4	3.4%
1991	1	0.9%
1992	6	5.1%
1993	4	3.4%
1994	6	5.1%
1995	7	6.0%
1996	17	14.5%
1997	17	14.5%
1998	13	11.1%
1999	14	12.0%
2000	2	1.7%
Total	117	
Panel B: by industry		
Industry name	Number	%
Utilities	7	6.0%
Financial	9	7.7%
Service industries	20	17.1%
Wholesale and retail trade	16	13.7%
Manufacturing	60	51.3%
Construction and mining	5	4.3%
Total	117	

ownership data from proxy statements in the Lexis–Nexis database.⁸ I find complete ownership data i.e. for a minimum of three years, for 117 spin-offs. The break-up of the sample by year and industry is in Table 1.

3.2. Data collection

3.2.1. Ownership data

I collect the record date, the number of outstanding shares, the number of outstanding options that could vest in the next 60 days, the identity and holdings of each block holder holding five percent or more of the total voting shares, the holdings of all the officers and directors of the firm (henceforth managerial ownership) and the holdings of the CEO.⁹ I collect ownership data for a maximum of five years. Usually the parent firm ownership structure that gets replicated (i.e. the ownership structure on the record date) is unobservable. Therefore I use the last recorded ownership structure of the parent firm before the record date as a proxy. To the extent that this ownership structure already incorporates the effect of the spin-off announcement it biases the tests away from significant findings.

3.2.2. Data on the motivation for the spin-off

To examine the endogeneity issue I read news stories with a focus on the factors motivating the spin-off. I use a period beginning 13 months prior to the first firm announcement date and ending 6 months after the declaration date. Because I find that ownership structure is generally not an explicit factor in the spin-off decision I focus on ownership-related justifications. Specifically, I record whether a) differences in growth rates b) differences in performance and c) other organizational reasons are stated factors motivating the spin-off.

3.2.3. Research and development expenditures

Because this data is missing in COMPUSTAT for a large fraction of spin-offs I manually collect it from the financial statements. Frequently this data is not reported separately for the spin-off division in the years prior to the spin-off. Therefore, I rely on the

⁸ For the transactions in the early part of the sample period I also rely on the microfilm collection of proxy statements at the Penn State Business Library.

⁹ If a firm has more than one class of voting shares I convert the shares into votes. I calculate percentages based on the total votes. I do not collect 5% holders of any one class if they are not 5% holders of the total votes. Holdings of the CEO and management include options whereas those of outside blockholders do not.

Table 2

Firm characteristics of spin-offs, parent firms and matching firms

Panel A: comparison of spin-offs and parent firms									
	Spin-off			Parent			T-stat (diff. in means)	P-value (diff. in medians)	Correlation
	Mean	Median	Std. dev.	Mean	Median	Std. dev.			
Book value of assets (\$ million)	2199.93	588.45	11,562.20	6311.89	3035.40	10,645.30	−5.06	<0.001	0.718***
Market value of equity (\$ million)	1179.26	453.72	1882.01	5578.82	2647.64	10,047.50	−4.99	<0.001	0.496***
Sales (\$ million)	1418.66	639.59	2156.19	5709.29	2920.97	8678.98	−6.00	<0.001	0.649***
Employees (thousands)	10.07	3.50	29.92	34.66	15.29	62.53	−5.86	<0.001	0.792***
Volatility	0.135	0.122	0.054	0.092	0.083	0.037	−10.29	<0.001	0.542***
Control potential	0.126	0.112	0.054	0.080	0.068	0.036	−11.07	<0.001	0.552***
R&D intensity	0.036	0.000	0.082	0.025	0.055	0.042	1.24	0.791	0.759***
Leverage	0.210	0.192	0.178	0.205	0.171	0.144	0.11	0.652	0.555***
Q	1.752	1.309	1.140	1.595	1.430	0.530	1.36	0.493	0.194**
ROA	0.115	0.132	0.127	0.142	0.140	0.063	−2.43	0.325	0.260***
Panel B: comparison of spin-offs and matching firms									
	Spin-off			Matching firm			T-stat (diff. in means)	P-value (diff. in medians)	Correlation
	Mean	Median	Std. dev.	Mean	Median	Std. dev.			
Book value of assets (\$ million)	2199.93	588.45	11,562.20	2378.11	502.82	8498.05	−0.29	0.331	0.931***
Market value of equity (\$ million)	1179.26	453.72	1882.01	1481.79	415.69	3342.51	−1.31	0.562	0.657***
Sales (\$ million)	1418.66	639.59	2156.19	1108.77	522.68	1464.25	1.72	0.110	0.525***
Employees (thousands)	10.07	3.50	29.92	6.78	2.32	9.75	1.42	0.231	0.509***
Volatility	0.135	0.122	0.054	0.142	0.121	0.072	−0.95	0.812	0.365***
Control potential	0.126	0.112	0.054	0.128	0.110	0.066	−0.22	0.154	0.392***
R&D intensity	0.036	0.000	0.082	0.051	0.000	0.095	−1.68	0.025	0.457***
Leverage	0.210	0.192	0.178	0.179	0.140	0.174	1.45	0.116	0.180**
Q	1.752	1.309	1.140	1.765	1.450	0.941	−0.11	0.094	0.249***
ROA	0.115	0.132	0.127	0.119	0.124	0.100	−0.32	0.447	0.253***

This table compares the spin-off to parent and matching firms. Spin-off (matching firm) characteristics are measured in the first year of independent existence of the spin-off. Parent firm characteristics are measured in the last year of joint existence with the spin-off. Volatility of spin-offs (matching firms) is the standard deviation of monthly stock returns in the first 36 months of the spin-off's existence. For the parents it is the standard deviation of monthly returns in the 36 months preceding the first firm announcement of the spin-off. Control potential is the standard error from a market model using the CRSP value weighted index for the same periods. R&D intensity is the ratio of R&D expenditures to assets. Leverage is the ratio of long-term debt to assets. Q denotes the market-to-book ratio of assets. Return on assets is defined as operating income before depreciation divided by book value of assets. Dollar values are in 2003 constant dollars. Pearson correlations, T-stats for differences in means and P-values for differences in medians (using the Wilcoxon signed rank test) are reported. *, ** and *** denote the 10%, 5%, and 1% significance level respectively.

post-spin-off years to measure the R&D intensity of these firms. To retain consistency I follow a similar manual data collection procedure for the parent firms and matching firms.

3.2.4. Other data

Stock returns are obtained from the CRSP database and all other financial information is obtained from the COMPUSTAT database.

3.3. Transaction timeline

The median duration between the first public information of the spin-off transaction and the actual declaration date of the deal is approximately seven months, spanning the period during which SEC approval and IRS ruling are obtained. The median duration between the dividend declaration date and the payment date is 15 days. This is similar to durations reported by Ezzell et al. (2003) for two-stage spin-offs and Choi and Strong (1983) for stock splits. During this period, beginning shortly after the declaration date, the newly formed company is traded on a when-issued basis and the parent firm is traded, both, on regular-way and when-issued bases.¹⁰

¹⁰ When-issued trading differs from regular trading (also called regular-way trading) in several aspects. Whereas regular-way trades are settled right after the trade, when-issued trades are not settled until after the issue date. Thus the purchase of when-issued shares reflects an interest free borrowing for the buyer for the duration that is incremental to a normal settlement cycle. This is reflected in the form of a price premium (Vijh, 1994). Empirical studies of the when-issued market find that when-issued shares are quoted and traded significantly less frequently than comparable regular-way traded shares. This illiquidity of when-issued shares is reflected in the form of wider bid-ask spreads. Vijh (1994) and Ezzell et al. (2003) note that financial institutions often have restrictions on investing in when-issued shares. This temporarily restricts demand for these shares. Given a downward sloping demand curve this could cause a significant positive abnormal return on spin-off stocks when they come out of the when-issued period (Abarbanell et al., 2003). For the parent, in regular-way trading, shares trade cum-dividend until the payment date and shareholders selling before the effective date will also be selling the right to receive shares of common stock in the spin-off. All such sellers, being holders of record will receive the shares of the spin-off from the company (or via their broker if they hold the shares in the "street name") and will in turn deliver these shares to the ultimate (post-record date) buyer. When-issued shares of the parent firm reflect the spin-off of the subsidiary, and buyers of such shares are not entitled to shares of the subsidiary firm. In this paper ownership structure is examined on an annual basis and therefore we abstract from these fluctuations.

Table 3

Changes in ownership structure of spin-offs and matching firms

		Yr 0	Yr 1	Yr 2	Yr 3	T-stats (P-values) for mean (median) differences					
						Yr1–Yr0	Yr2–Yr0	Yr3–Yr0	Yr2–Yr1	Yr3–Yr1	Yr3–Yr2
<i>Panel A: block ownership</i>											
Spin-off	Mean	0.2034	0.2422	0.2658	0.2735	2.85	3.85	4.06	2.31	2.36	0.87
	Median	0.1803	0.2187	0.2423	0.2604	<0.01	<0.01	<0.01	0.023	0.016	0.24
	Std.	0.1670	0.1496	0.1525	0.1761						
Matching Firm	Mean		0.2983	0.2997	0.2922				0.16	–0.59	–0.78
	Median		0.2584	0.2747	0.2670				0.141	0.432	0.651
	Std.		0.1993	0.2086	0.2066						
Diff. in means (T-stat)			–2.72	–1.59	–0.82						
Diff. in medians (P-value)			0.013	0.195	0.356						
<i>Panel B: insider blocks</i>											
Spin-off	Mean	0.0751	0.0670	0.0664	0.0692	–0.94	–0.92	–0.58	–0.23	0.61	0.78
	Median	0.0000	0.0000	0.0000	0.0000	0.992	0.970	0.956	0.944	0.911	0.907
	Std.	0.1316	0.1410	0.1394	0.1464						
Matching Firm	Mean		0.1495	0.1475	0.1404				–0.42	–1.03	–0.92
	Median		0.0609	0.0581	0.0591				0.338	0.445	0.291
	Std.		0.2052	0.2060	0.1997						
Diff. in means (T-stat)			–4.11	–3.87	–3.4						
Diff. in medians (P-value)			<0.01	<0.01	0.012						

Block ownership is defined as the fraction of voting rights collectively held by all holders who each hold more than 5%. An inside block holder is either an officer or director of the firm. Outstanding shares include options that can vest in the next 60 days. Dual classes are combined into a single class based on voting rights. Non-voting shares are not considered. Paired *t*-tests for means and *P*-values for median (using the Wilcoxon signed rank test) are reported. For the parent/spin-off comparison these statistics appear in the columns to the right. For the spin-off/matching firm comparison these appear in the bottom two rows of each panel.

3.4. Selection of matching firms

From a universe of Compustat matches (excluding the spin-offs and their parents) I eliminate matches meeting any of the following conditions: (i) the market value of equity is less than 0.7 or greater than 1.3 times that of the spin-off, (ii) the matching firm is younger than 5 years at the time of the spin-off, (iii) the matching firm does not exist for at least as long as the spin-off, and (iv) the matching firm undergoes significant restructuring activity. The age requirement is to ensure that the matching firm is reasonably mature. The restructuring requirement is to increase the likelihood that the ownership structures of these firms are in equilibrium. From all the matches that meet these criteria I pick the one with historical SIC codes closest to the corresponding spin-off. If there are multiple matches with identical SIC codes I pick the one closest in size. This results in 58 4-digit code matches, 19 3-digit code matches, 32 2-digit code matches and 8 1-digit code matches.

3.5. Firm characteristics

Table 2, Panel A compares the spin-off and the pre-spin-off parent. Spin-offs (parents) have a median book value of assets (in 2003 constant dollars) of \$588.45 million (\$3035.40 million). Spin-offs are also significantly smaller than parents in terms of market value of equity, sales and number of employees. Spin-offs are significantly riskier and have greater control potential. Differences in leverage, *Q*, R&D intensity and ROA are not significant.

Table 2, Panel B compares the spin-offs and the matching firms. Except for marginally higher sales ($t=1.72$) and lower R&D intensity ($t=-1.68$) of spin-offs differences in all other attributes are not significant. Further, all firm attributes are significantly correlated (at the 5% level or better) suggesting that the spin-offs and matching firms are well-matched in terms of firm characteristics.

4. Evolution of ownership structure of spin-offs

4.1. Changes in ownership structure of spin-offs and matching firms

Table 3 reports the block ownership (Panel A) and inside block ownership (Panel B) for years 0, 1, 2 and 3. Year 0 is the last year of the spin-off's joint existence with the parent and the block ownership in this year serves as the proxy for the inherited block ownership. As predicted, spin-off block ownership increases at a decreasing rate – from a mean (median) of 20.34% (18.03%) in year 0 by a mean (median) 3.88% (3.84%) in year 1, 2.36% (2.36%) in year 2 and 0.77% (1.81%) in year 3. The increases in year 1 and year 2 are significant at the 1% and 5% level ($t=2.85$, 2.31). The change in year 3 is insignificant. The total increase in block ownership over the three years has a mean (median) of 7.01% (8.01%).

Unlike the spin-offs, the block ownership of the matching firms changes insignificantly. Further, though the spin-offs start with significantly lower block ownership than the matching firms (in yr. 1, $t=-2.72$) the difference gets smaller in year 2 ($t=-1.59$) and is

Table 4

Serial correlation of ownership structure of spin-offs and matching firms

	Year 1	Year 2	Year 3
<i>Panel A: correlation of spin-off ownership structure and the parent ownership structure prior to spin-off</i>			
Block ownership	0.5706***	0.3992***	0.3789***
Insider blocks	0.7701***	0.7320***	0.7034***
<i>Panel B: correlation of the ownership structure of the matched firm and its own prior ownership structure</i>			
Block ownership	0.8924***	0.8568***	0.7938***
Insider blocks	0.9766***	0.9463***	0.9290***
<i>Panel C: correlation of the ownership structure of the matched firm and the spin-off firm</i>			
Block ownership	0.2086**	0.2156**	0.1744*
Insider blocks	0.2551***	0.1861**	0.1716*
<i>Panel D: correlation of the ownership structure of the matched firm and the parent ownership structure prior to spin-off</i>			
Block ownership	0.3064***	0.2473***	0.2493***
Insider blocks	0.3246***	0.2804***	0.2788***

Pearson correlations between ownership measures inherited by the spin-off and the spin-off/matching firm in the first 3 years of the spin-offs' existence are reported. Block ownership is defined as the fraction of voting rights collectively held by all holders who each hold more than 5%. An inside block holder is either an officer or director of the firm. Outstanding shares include options that can vest in the next 60 days. Dual classes are combined into a single class based on voting rights. Non-voting shares are not considered. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

insignificant in year 3 ($t = -0.82$). These results suggest that the increase in block ownership of spin-offs is not due to industry or secular trends.

Inside block ownership, defined as the sum of five percent blocks owned by the officers or directors of the firm, is highly stable in both spin-offs and matching firms (Panel B).¹¹ Consistent with the fact that spin-offs are usually divisions of large parents that are less frequently family-owned, they have significantly lower inside block ownership than the matching firms. The stability of the inside blocks (zero change in median ownership and insignificant changes in mean ownership) implies that outside block holders contribute to most of the increase in block ownership.¹² This also suggests that it is unlikely that the management of the parent company uses spin-offs as a means to divest their stakes in the spin-off assets.

I also examine the managerial and CEO ownership of spin-offs.¹³ In the first year managerial ownership is significantly lower than that of the pre-spin-off parent. However it increases significantly in each of the subsequent years and by year 3 is insignificantly different from that of the pre-spin-off parent. CEO ownership shows a similar trend. However in year 3, probably due to their smaller size, spin-offs have significantly higher median CEO ownership than the pre-spin-off parent.

4.2. Serial correlation of ownership structure

Table 4, Panel A reports cross-sectional correlations between ownership measures of the spin-offs and the inherited levels of the corresponding measures. Block ownership has a correlation of 57.06% in year 1 that reduces to 39.92% in year 2 and 37.89% in year 3. The same correlations for the matching firms in Panel B are 89.24%, 85.68% and 79.38%. This is consistent with the argument that the inherited block ownership of spin-offs is sub-optimal and therefore undergoes more rapid changes.

The high correlation of inside block ownership (upwards of 70%) is consistent with results in Table 3 showing zero changes in median insider block ownership. The correlations of ownership measures of spin-offs and matching firms (Table 4, Panel C) are smaller than those between the spin-off and parent with no discernible pattern over time. This is inconsistent with the hypothesis that the spin-offs' resemblance to the matching firms should increase over time. Also, the correlations in measures of ownership between the matching firm and the pre-spin-off parent (Table 4, Panel D) are mostly higher than those between the spin-offs and the matching firms. This is puzzling since the only dimension along which the matching firms are more similar to the parent firms than the spin-offs is firm age.

Table 5 reports correlations of block ownership of spin-offs and parents for sub-groups formed on the basis of industry relatedness. Panel A shows results for sub-groups formed on the basis of sameness of 2-digit SIC codes and Panels B and C show results for the sample split on the basis of median vertical relatedness and industry complementarity. The correlations are all lower and fall by greater amounts for greater differences in industry (the exception is year 1 when 2-digit SIC codes are used). This is consistent with the argument that greater differences in industry reflect greater differences in monitoring requirements and cause a larger movement away from the inherited ownership structure.

¹¹ Officers/directors of the spin-off who were officers/directors of the parent or continue in that position after the spin-off are treated as insiders.

¹² The mean number of spin-off blockholders in year 1, 2 and 3 is 2.49, 2.84 and 2.96 respectively compared to 2.10 blockholders prior to the spin-off.

¹³ All results for management ownership and CEO ownership, not reported for the sake of brevity, are available upon demand from the author.

Table 5

Serial correlation of ownership structure by industry relatedness

Panel A: by 2-digit SIC code			
	Different 2 digit SIC code	Same 2 digit SIC code	Z-stat for differences in correlation
Year 1	0.5791***	0.5492***	0.23
Year 2	0.3824***	0.4457***	−0.40
Year 3	0.3692***	0.5205***	−1.00
Panel B: by vertical relatedness			
	Low vertical relatedness	High vertical relatedness	Z-stat for differences in correlation
Year 1	0.4917***	0.6785***	−1.52
Year 2	0.2770***	0.5413***	−1.69*
Year 3	0.3152***	0.7710***	−3.66**
Panel C: by industry complementarity			
	Low complementarity	High complementarity	Z-stat for differences in correlation
Year 1	0.5392***	0.6367***	−0.79
Year 2	0.3789***	0.4401***	−0.39
Year 3	0.3131***	0.4801***	−1.04

Pearson correlations between block ownership of the spin-off and its inherited block ownership are reported for groups formed on the basis of industry relatedness. This is done for each of the first three years of the spin-offs' independent existence. Block ownership is defined as the fraction of voting rights collectively held by all holders who each hold more than 5%. An inside block holder is either an officer or director of the firm. Outstanding shares include options that can vest in the next 60 days. Dual classes are combined into a single class based on voting rights. Non-voting shares are not considered. Vertical relatedness and industry complementarity (Fan and Lang, 1998) are calculated as in Appendix A. High and low vertical relatedness groups (complementarity) are based on median splits. Z-stats for differences in correlation are calculated as $(\rho_1 - \rho_2) / \sqrt{[1/(N_1 - 3) + 1/(N_2 - 3)]}$ where ρ' is calculated using Fisher's Z transform $= 0.5 * \ln[(1 + \rho)/(1 - \rho)]$. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

I also examine the correlations of management and CEO ownership. Consistent with the argument that block ownership being a market-mediated governance mechanism is subject to more rapid changes, I find that management ownership and CEO ownership are more highly correlated and show smaller decreases in correlation.

5. Changes in block ownership, firm performance and survival

5.1. Determinants of changes in block ownership of spin-offs

Table 6 reports the three-year change in the block ownership of spin-offs for terciles of relative size, relative control potential, relative sales growth, relative R&D intensity, relative Q, relative industry-adjusted Q, stock return correlation, vertical relatedness, industry complementarity and inherited ownership (Panels A–J respectively). Panel K reports results for groups based on sameness of 2-digit SIC codes. Panel L reports regression results for the log of (1 + block ownership), year 3 minus year 0.

Consistent with the hypothesis that spin-offs of larger relative size have smaller changes in block ownership, Panel A shows that the change in block ownership decreases from a mean of 13.5% in the lowest relative size tercile to 1.1% in the highest relative size tercile. In a univariate regression (Panel L), the coefficient on relative size is significantly negative ($t = -3.28$). Panel B shows that changes in block ownership increase across terciles of relative control potential. However, the coefficient on relative control potential is insignificant in a univariate regression (Panel L).

Panel C shows an increasing trend in the change in block ownership across terciles of relative sales growth. Correspondingly, Panel L shows that the univariate regression coefficient on relative sales growth is positive and significant at the 5% level. This result is consistent with the hypothesis that block ownership increases more in response to the greater monitoring requirements of higher growth firms. However, inconsistent with the growth hypothesis there is a weak decreasing trend when R&D intensity is used as the proxy for growth. In the univariate regression (Panel L) the coefficient on R&D intensity is negative and insignificant.¹⁴

Panel E shows a sharp decreasing trend across terciles of relative Q – from 13.0% in the lowest tercile to 1.7% in the highest tercile. The coefficient on relative Q is negative and significant ($t = -2.23$, Panel L), consistent with the argument that poorly performing firms offer greater benefits to increased monitoring and therefore have larger increases in block ownership. This argument is also supported by the results in Panel F where Q is industry-adjusted to make it a less noisy measure of performance. Panel L shows that the coefficient on industry-adjusted Q is more significant ($t = -2.94$) and that the adjusted R-square is higher than for raw Q.

¹⁴ This result is not unlike Himmelberg et al.'s (1999) pooled sample regression result – they find a insignificant negative association between R&D intensity and managerial ownership.

Panels G, H, I and K show that block ownership generally increases more when spin-offs are less closely related to the parent, supporting the hypothesis that greater differences in industry reflect incremental monitoring tasks. Panel G shows this result using the stock return correlation as the measure of industry similarity. Panels H and I show that spin-offs with greater vertical relatedness and industry complementarity with the parent have smaller changes in block ownership. Panel K shows that spin-offs with the same 2-digit SIC code as the parent have a mean change in block ownership of 5.6% compared to 8.5% for different 2-digit SIC codes. In Panel L these measures are all significant at the 10% level or better. Together, Panels G, H, I and K constitute new evidence on the influence of industry factors on the formation of the optimal ownership structure of firms.

Panel J shows that the three-year change in block ownership sharply decreases across terciles of inherited block ownership – from a mean of 16.4% in the lowest tercile to –4.1% in the highest. In the regressions (Panel L) I find that the coefficient on the tercile

Table 6

Determinants of changes in block ownership of spin-offs

	Panel A: relative market equity		Panel B: relative control potential	
	Mean	Median	Mean	Median
Tercile 1 (lowest)	0.135	0.111	0.044	0.077
Tercile 2	0.063	0.084	0.075	0.075
Tercile 3 (highest)	0.011	0.006	0.091	0.110
	Panel C: relative sales growth		Panel D: relative R&D intensity	
	Mean	Median	Mean	Median
Tercile 1 (lowest)	0.040	0.029	0.069	0.069
Tercile 2	0.069	0.070	0.089	0.074
Tercile 3 (highest)	0.090	0.073	0.050	0.052
	Panel E: relative Q		Panel F: relative Industry-adjusted Q	
	Mean	Median	Mean	Median
Tercile 1 (lowest)	0.130	0.063	0.119	0.083
Tercile 2	0.058	0.051	0.098	0.088
Tercile 3 (highest)	0.017	−0.005	0.001	0.013
	Panel G: stock return correlation		Panel H: vertical relatedness	
	Mean	Median	Mean	Median
Tercile 1 (lowest)	0.121	0.112	0.098	0.112
Tercile 2	0.030	0.036	0.059	0.072
Tercile 3 (highest)	0.060	0.078	0.054	0.060
	Panel I: industry complementarity		Panel J: prior block ownership	
	Mean	Median	Mean	Median
Tercile 1 (lowest)	0.118	0.103	0.164	0.147
Tercile 2	0.040	0.061	0.087	0.083
Tercile 3 (highest)	0.061	0.078	−0.041	0.005
	Panel K: 2-digit SIC code			
	Mean	Median		
Same	0.056	0.068		
Different	0.085	0.085		
Panel L: regression results				
	Univariate regressions		Multivariate model	
		Adj. R-square	Model1	Model2
Intercept			0.3061 (1.31)	0.1308 (1.69)
Relative market equity	−0.0325*** (−3.28)	8.44%	−0.107** (−2.10)	−0.0121** (−2.39)
Relative control potential	0.0317 (1.03)	0.05%	−0.0042 (−0.12)	−0.0040 (−0.11)
Relative sales growth	0.0140** (2.12)	2.91%	0.0122** (2.10)	0.0012** (2.10)
Relative R&D expenditures	−0.0106 (−1.09)	1.38%	−0.1304 (−0.54)	−0.1794 (−0.77)
Relative Q	−0.0483** (−2.23)	3.37%	−0.2468** (−2.46)	
Relative industry-adjusted Q	−0.2736*** (−2.94)	7.81%		−0.1736** (−2.17)
Stock return correlation	−0.1156* (−1.72)	1.69%	0.0770 (1.05)	0.0667 (0.90)
Vertical relatedness	−0.0717** (−2.24)	1.49%	−0.1418*** (−3.11)	−0.1412*** (−3.05)
Industry complementarity	−0.0223** (−2.29)	1.76%	0.0350 (0.73)	0.0429 (0.88)
Ownership rank	−0.0841*** (−5.95)	23.12%	−0.0796*** (−4.39)	−0.0853*** (−4.72)
SIC dummy	−0.0469* (−1.82)	2.02%	−0.0776** (−2.04)	−0.0804** (−2.09)
Adjusted R-square			31.23%	29.38%

Table 7

Determinants of differences in block ownership of spin-offs and matching firms

Year	1	2	3
Intercept	-0.1127 (-0.47)	0.1588 (0.93)	0.3286 (2.33)
Market equity	0.0090 (0.26)	-0.0359** (-2.09)	-0.0443** (-2.30)
Control potential	-0.0797 (-1.58)	-0.0844* (-1.82)	-0.1648*** (-3.11)
Q (market-to-book)	-0.0501 (-0.62)	0.0093 (0.13)	0.1425* (1.96)
Capex ratio	0.2301 (0.51)	-0.4812 (-1.24)	-0.3291 (-0.80)
PPE ratio	0.0014 (0.01)	0.0989 (0.71)	0.1745 (1.15)
Leverage	0.0952 (0.84)	0.0090 (0.08)	-0.1007 (-0.91)
Sales growth		0.0207 (0.51)	0.0315 (1.31)
R&D expenditures	-0.2223 (-0.51)	0.0037 (0.01)	-0.0987 (-0.17)
Firm age	0.0001 (0.06)	-0.019 (-1.38)	-0.0232*** (-2.62)
Adjusted R-squared	-1.10%	4.17%	14.13%

The dependent variable is $\log(1 + \text{block ownership})$ in year 1 (2, 3) for the spin-off minus $\log(1 + \text{block ownership})$ in year 1 (2, 3) of the matching firm. All independent variables are similarly measured as the difference between spin-off and matching firm. Control potential is measured as the standard error of estimate of the market model that uses the first 36 months of the spin-off firm's existence. The same calendar months are used for the matching firm. Q is measured as the market-to-book of assets. Capex ratio is the ratio of capital expenditures to assets. PPE ratio is the ratio of net property, plant and equipment to total assets. Leverage is the ratio of the book value of debt to book value of assets. Sales growth is measured as the ratio of sales in the current year to the prior year (therefore for the first year the sales growth variable is missing for the spin-off). Firm age is the difference in years in the CRSP listing date of the spin-off and matching firm. Heteroscedasticity consistent *T*-statistics are provided in parentheses below each coefficient estimate. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

rank of ownership (used in order to avoid a spurious negative correlation with the dependent variable) is significantly negative ($t = -5.95$). This result presents interesting new evidence on ownership structure because it shows that firms tend to preserve high ownership concentration if they acquire one “exogenously”. This is consistent with the argument that block formation is costly and therefore blocks are self-preserving. Also, it suggests that though diffuse ownership could be cost-beneficial, “freely available” concentrations in ownership are beneficial to the firm.

The last two columns of Panel I show multivariate regression results. With the exception of industry complementarity and stock return correlation, which become insignificant, the variables generally retain their sign and significance. The adjusted *R*-square of around 30% compares favorably to the adjusted *R*-squared of around 40% reported by Himmelberg et al. (1999), in the cross-sectional specification) and 35% reported by Demsetz and Lehn (1985) for analyses of the level of block ownership. The significance of individual firm characteristics and the comparable adjusted *R*-square for changes in block ownership more directly demonstrate the endogenous formation of the ownership structure of firms.

To test the hypothesis on the difference in block ownership of spin-offs and matching firms I relate the pair wise difference in $\log(1 + \text{block ownership})$ to corresponding pair wise differences in firm characteristics. Following Himmelberg et al. (1999), Demsetz and Lehn (1985), and Demsetz and Villalonga (2001), I use proxies for firm size, control potential, extent of growth options and leverage. I also include firm age as a control variable because the two samples differ systematically on the basis of

Notes to Table 6:

Changes in block ownership of spin-offs measured as (block ownership Yr 3 minus Yr 0) are shown for various terciles. Relative market equity is the ratio of the market value of equity of the spin-off in year 1 to that of the parent in year 0. Relative control potential is measured as ratio of the standard error of estimate of the market model for the spin-off in its first 36 months of existence to that of the parent firm in the 36 months preceding the first firm announcement of the spin-off. Relative sales growth is measured using similar time periods for the spin-off and the parent. Relative R&D intensity is the ratio of the R&D expenditure to assets of the spin-off relative to that of the parent in year 0. Relative Q is measured as the ratio of market-to-book of assets in year 1 of the spin-off to that of the parent measured in year 0. Industry adjustments in Q are made using the contemporaneous median Q of the 3-digit SIC code industry for the respective parent and spin-off industries. Stock return correlation is computed as the correlation of the monthly stock return of the parent and spin-off in the first 36 months of the spin-off firm's existence. Vertical relatedness and industry complementarity are calculated as in Appendix A. Prior block ownership terciles are created on the basis of the inherited block ownership of the spin-off.

The dependent variable is $\log(1 + \text{block ownership})$ for the spin-off firm in year 3 minus $\log(1 + \text{block ownership})$ of the parent firm prior to the spin-off. Relative market equity is the ratio of the market value of equity of the spin-off in year 1 to that of the parent in year 0. Relative control potential is measured as the ratio of the standard error of estimate of the market model for the spin-off in its first 36 months of existence to that of the parent firm in the 36 months preceding the first firm announcement of the spin-off. Relative sales growth is measured using similar time periods for the spin-off and the parent. Relative R&D intensity is the ratio of the R&D expenditure to assets of the spin-off in year 1 relative to that of the parent in year 0. Relative Q is measured as the ratio of market-to-book of assets in year 1 of the spin-off to that of the parent measured in year 0. Industry adjustments in Q are made using the contemporaneous median Q of the 3-digit SIC code industry for the respective parent and spin-off industries. Stock return correlation is computed as the correlation of the monthly stock return of the parent and spin-off in the first 36 months of the spin-off firm's existence. Vertical relatedness and industry complementarity are calculated as per Appendix A. Ownership rank denotes the tercile rank of the block ownership of the parent prior to the spin-off. Except for ownership rank and the SIC dummy log transforms are used for all the variables. Slope coefficients and adjusted *R*-squares are reported for the univariate regressions. The whole model is reported for the multivariate models. Heteroscedasticity consistent *T*-statistics are provided in parentheses below each coefficient estimate. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

age.¹⁵ Table 7 shows that in the first year none of the variables are significant and the adjusted *R*-square is –1.10%. By year 3 four of the variables are significant at the 10% level or better and the adjusted *R*-squared is 14.13%. The results support the hypothesis that as spin-offs' ownership structure gets better suited to their firm characteristics, differences in block ownership between spin-offs and matching firms are better predicted by differences in these characteristics.

Finally, I examine the impact of lagged block ownership on current block ownership by regressing log of (1 + block ownership) on, in addition to the variables used above, the inherited block ownership.¹⁶ The results, not reported for the sake of brevity, show that the relationship between block ownership and lagged block ownership is insignificant for spin-offs, but significantly positive for the matching firms. For the matching firms the *T*-stats for lagged ownership are 9.78 (year 2) and 9.43 (year 3) whereas for the spin-offs they are 0.43 (year 2) and 0.59 (year 3). This suggests that the block ownership of spin-offs departs significantly from its existing state in the post-spin-off period, while that of the mature matching firms changes little in the same period, reflective of the relatively stable ownership structure of these firms.

5.2. Changes in block ownership — effect on firm performance and survival

To examine the impact of changes in block ownership on firm performance, I examine the association of past changes in block ownership with firm survival and stock valuations. For firm survival, the dependent variable takes a value of 1 if the firm's delisting code in the CRSP database as of December, 2003 is 100. I use the changes in block ownership over a 1, 2 and 3-year period to predict survival in a logistic regression model. I include firm size, control potential and the level of block ownership as control variables because, all else equal, the chances of liquidation and/or takeover are lower for larger firms, and firms with more concentrated ownership and lower control potential. I also include accounting and stock performance measures because poorly performing firms may be acquired or liquidated with greater probability.

Table 8, Panel A shows that the long-run survival of spin-offs is enhanced by increases in block ownership. The coefficient on the 1-year change in block ownership is insignificant but those on the 2-year and 3-year changes are significant (*P*-values of 0.04 and 0.01, respectively). Because all the firms are in the sample for all three years, the growing significance of the block ownership is not spuriously driven by selective survival. The increase in percentage of deviation explained from 3.20% in year 1 to 11.73% in year 3 is mainly attributable to the ownership variables.

Because survival defined as of a particular date treats earlier transactions and later transactions differently I redefine survival using a varying period of 4 (alternatively, 5 and 6) years after the effective date of the spin-off. Panel A shows that defining survival in this way yields similar results — the magnitudes of the coefficient of the change in block ownership and the significance levels are comparable.

Panel B of Table 8 reports regression results for changes in the market-to-book ratio of spin-offs. Since the market-to-book ratio is available at the end of the first year of the spin-off's existence these tests are constrained to years 2 and 3. In addition to the ownership variables used above, I include sales growth and the change in R&D intensity to absorb the growth component of the change in the market-to-book ratio. Firm size and control potential are included as control variables. The results show no significant association between the level of inherited block ownership and changes in *Q*. The change in block ownership, however, is positively associated with changes in *Q*, although with somewhat low significance. These results are consistent with Mikkelsen and Ruback (1985) who find performance improvements after the formation of blocks. Tests of the joint significance of the level of inherited block ownership and the change in block ownership show that the overall level of ownership is insignificantly associated with changes in *Q*.

In Panel C of Table 8 I examine the log of the market-to-book ratio of the spin-off minus the log of the market-to-book ratio of the matching firm. Pair wise differences in sales growth, R&D intensity, capital expenditure ratios, and the ratio of property, plant and equipment to assets are included to capture the variation in growth options. Like before, firm size and control potential are included as control variables. The difference in log of block ownership has a coefficient of 0.0514 and is insignificant in year 1.¹⁷ In year 2 (year 3) the coefficient increases to 0.2059 (0.1949) and is significant at the 5% level. These results support the argument that as the spin-offs' ownership structure gets closer to equilibrium, differences in valuation between spin-offs and matching firms are more significantly related to differences in block ownership.

Finally, I use a simultaneous equation framework to jointly estimate *Q* and the level of ownership. For the log of block ownership, the independent variables include the log values of *Q*, the market value of equity, the ratio of capital expenditure to assets, the PPE ratio and book leverage. This equation closely resembles the model used by Demsetz and Villalonga (2001).¹⁸ I exclude R&D intensity and control potential in this equation because these variables are not significant in the ownership models. To account for abnormally high levels of inside ownership in the inherited ownership structure I include a dummy variable (management dummy) set to 1 if management ownership is greater than 25%, 0 otherwise. For the *Q* equation in addition to block ownership I include the log of sales (as an alternative measure of firm size), control potential, R&D intensity and sales growth as explanatory variables. R&D intensity and sales growth are included to explain the growth component of *Q*.

Table 9 shows that the coefficient of block ownership in the *Q* equation for the spin-offs is negative in all years but significant only in year 1. The magnitude of the coefficient decreases sharply from –1.4268 in year 1 to –0.1135 in year 3. Combined with the earlier results on the changes in *Q* this shows that block ownership of spin-offs adjusts so that as *Q* improves, the relation between the level of *Q* and block ownership becomes less significant over time. For the matching firms the corresponding coefficient also shows a fall in magnitude (from

¹⁵ I thank the referee for suggesting the inclusion of this variable.

¹⁶ For the matching firms lagged block ownership is proxied by block ownership in year 1.

¹⁷ In year 1 the sales growth measure is not available for the spin-offs and is dropped from the model.

¹⁸ The media dummy and market risk variable used in their model are not included here.

Table 8

Firm survival, performance and block ownership

Panel A: firm survival			
	Eventual survival		
	Using 1-year change in block ownership	Using 2-year change in block ownership	Using 3-year change in block ownership
Intercept	−0.7849	−1.1763	−0.6012
Log market equity	0.5980*** (0.00)	0.6652*** (0.00)	0.7933*** (0.00)
Log Q	−0.0865 (0.84)	0.0600 (0.90)	−0.0474 (0.91)
Log control potential	1.4074*** (0.01)	1.5500*** (0.01)	2.2062*** (0.00)
ROA	0.1903 (0.92)	−0.6478 (0.71)	−0.3600 (0.80)
Change in log (1 + block ownership)	2.888 (0.19)	3.9691** (0.04)	4.3511*** (0.01)
Log (1 + inherited block ownership)	2.7979 (0.16)	3.7500* (0.08)	4.2734** (0.04)
% Deviation explained	3.20%	5.64%	11.73%
Panel B: changes in stock valuation			
	2 year change in market-to-book ratio		3 year change in market-to-book ratio
Intercept	−0.1494 (−0.80)		−0.7160 (−1.63)
Log market equity	−0.0068 (−0.58)		−0.0363 (−1.05)
Log control potential	−0.1202** (−2.20)		−0.5224* (−3.76)
Sales growth	−0.1152 (−1.45)		0.1081 (1.02)
Change in R&D intensity	1.3869*** (6.11)		1.3044*** (4.09)
Change in log (1 + block ownership)	0.1631* (1.87)		0.1304 (1.58)
Log (1 + inherited block ownership)	−0.0714 (−0.66)		−0.1652 (−0.41)
Adjusted R-square	31.90%		29.46%
Panel C: difference in stock valuation of spin-offs and matching firms			
	Year 1	Year 2	Year 3
Intercept	−0.8118 (−2.80)	−0.7125 (−3.41)	−0.4229 (−2.79)
Market equity	0.1183*** (2.84)	0.1006*** (3.39)	0.0627*** (2.86)
Control potential	0.0014 (0.02)	−0.0934 (−1.46)	−0.1092* (−1.77)
Capex ratio	0.4042 (0.74)	0.3992 (0.80)	0.1923 (0.43)
PPE ratio	−0.1571 (−0.88)	−0.0971 (−0.59)	−0.0205 (−0.13)
R&D intensity	1.7585*** (4.42)	2.1316*** (7.85)	1.8922*** (5.93)
Sales growth		−0.1914** (−2.34)	−0.0172 (−0.38)
Block ownership	0.0514 (0.29)	0.2059** (2.23)	0.1949** (2.15)
Adjusted R-square	30.75%	34.78%	36.91%

This table reports results of logistic regressions where the dependent variable takes a value of 1 if the spin-off firm is a survivor, 0 otherwise. Eventual survival is based on a listing code of 100 in CRSP as of December 2003. Survival is based on a listing code of 100 4 years after the inception of the spin-off. Control potential is measured as the standard error of estimate of the market model using the first 36 months of the spin-off firm's existence. Return on assets is defined as operating income before depreciation divided by book value of assets. Q is measured as the market-to-book ratio of assets. Block ownership is defined as the fraction of shares held by all holders who own more than 5%. The inherited block ownership is the block ownership of the parent in the last year before the spin-off transaction (year 0). *P*-values are in parentheses below the estimates. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

The dependent variable is the 2-year (3-year) change in the log market-to-book ratio computed as log market-to-book ratio at the end of year 2 (3) minus log market-to-book ratio at the end of year 1. Control potential is measured as the standard error of estimate of the market model that uses the first 36 months of the spin-off firm's existence. Sales growth and changes in R&D intensity are defined using the same time periods used to define the dependent variable. Block ownership is defined as the fraction of shares held by all holders who own more than 5%. The inherited block ownership is the block ownership of the parent in the last year before the spin-off transaction (year 0). Heteroscedasticity consistent *T*-statistics are in parentheses below each coefficient estimate. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

The dependent variable is the log difference of market-to-book ratio of assets of spin-offs and the corresponding ratio for the matching firms. All independent variables are similarly measured as the difference between spin-off and matching firm. Control potential is measured as the standard error of estimate of the market model that uses the first 36 months of the spin-off firm's existence. The same calendar months are used for the matching firm. Capex ratio is the log of the ratio of capital expenditures to assets. PPE ratio is the log of the ratio of net property, plant and equipment to total assets. R&D intensity is the ratio of R&D expenditure to assets. Sales growth is measured as the ratio of sales in the current year to the prior year (therefore this variable is missing for the spin-off firms in year 1). Block ownership is the holding of all owners who each hold at least 5% of the voting stock of the company. Heteroscedasticity consistent *T*-statistics are in parentheses below each coefficient estimate. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

0.525 in year 1 to 0.1406 in year 3) but is generally insignificant. These results are consistent with prior studies that document an insignificant association between ownership structure and firm performance (Himmelberg et al., 1999; Demsetz and Villalonga, 2001).

6. Endogeneity of the spin-off decision and robustness checks

6.1. Endogeneity of the spin-off decision

Section 2 discusses two regularities that should be observable in the data if the parent's decision to spin-off is endogenous to its ownership structure. The first is significant changes in the parent's block ownership after the spin-off and the second is a

Table 9

Simultaneous estimation of firm performance and block ownership

	Spin-offs						Matching firms					
	Year 1		Year 2		Year 3		Year 1		Year 2		Year 3	
	BlkOwn	Q	BlkOwn	Q	BlkOwn	Q	BlkOwn	Q	BlkOwn	Q	BlkOwn	Q
Intercept	0.2741 (4.46)	1.3583 (4.86)	0.3562 (5.27)	1.3227 (3.66)	0.2632 (3.97)	0.5273 (0.72)	0.2676 (2.67)	2.5153 (2.92)	0.2265 (2.32)	1.4435 (1.95)	0.2768 (3.07)	1.8816 (2.35)
Log of market equity	−0.0108** (−2.33)		−0.0135** (−2.66)		−0.0129** (−2.53)		−0.0106* (−1.82)		−0.0084 (−1.18)		−0.0125** (−1.90)	
Log of sales		−0.1872** (−2.45)		−0.1185** (−2.77)		−0.1120*** (−3.18)		−0.0094 (−1.11)		−0.0103 (−1.26)		−0.0201** (−2.32)
Log of control potential		0.3856 (1.24)		−0.1864 (−0.68)		−0.4457** (−2.52)		0.2770 (0.88)		−0.0684 (−0.24)		0.1097 (0.36)
Log of capex ratio	0.1005 (0.50)		0.1376 (0.71)		0.1084 (0.50)		0.2127 (0.73)		0.8574*** (3.06)		0.3260 (1.17)	
Log of PPE ratio	−0.0202 (−0.33)		−0.0429 (−0.71)		−0.0494 (−0.74)		−0.0564 (−0.56)		−0.2135** (−2.41)		−0.1240 (−1.27)	
Log of leverage	0.0840 (0.17)		−0.0141 (−0.29)		−0.0630** (−2.13)		0.0919 (1.13)		−0.0052 (−0.01)		0.0621 (0.75)	
Mgt. dummy	0.1856*** (12.62)		0.1558*** (9.54)		0.2134*** (12.92)		0.2074*** (8.85)		0.2309*** (10.37)		0.2288*** (10.17)	
Sales growth				0.1942** (2.59)		0.6102*** (3.44)		0.5802** (2.57)		1.0362** (2.63)		0.7226** (1.99)
R&D intensity		2.2295*** (3.07)		2.4126*** (3.21)				3.2912** (2.07)		3.7484*** (2.93)		5.0549*** (3.26)
Q	−0.0027 (−0.42)		−0.0132 (−1.43)		0.0520 (0.58)		0.0042 (0.32)		0.0098 (0.83)		−0.0033 (−0.33)	
Log of block own		−1.4268*** (−2.57)		−0.8039 (−0.89)		−0.1135 (−0.16)		0.5250 (0.61)		0.4065 (0.54)		0.1406 (0.18)
Adjusted R-squared	40.80%	28.47%	35.33%	15.20%	39.67%	22.59%	47.31%	11.91%	45.77%	16.65%	49.28%	17.22%

This table presents second stage results for dependent variables $\log(1 + \text{block ownership})$ of spin-off/matching firms and $\log$ of Q measured as the market-to-book of assets. Control potential is measured as the standard error of estimate of the market model that uses the first 36 months of the spin-off firm's existence. The same calendar months are used for the matching firm. Capex ratio is the ratio of capital expenditures to assets. PPE ratio is the ratio of net property, plant and equipment to total assets. Leverage is the ratio of the book value of debt to book value of assets. Management dummy takes a value of 1 if the officers and directors of the firms own more than 25% of the voting rights of the firm, 0 otherwise. Sales growth is measured as the log of the ratio of sales in the current year to the prior year. Therefore this variable is missing for the spin-off firms in year 1. R&D intensity is $\log(1 + \text{the ratio of R\&D to assets})$. Block ownership is the holding of all owners who each hold at least 5% of the voting stock of the company. T -statistics are in parentheses below each coefficient estimate. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

systematic relationship between changes in block ownership and the change in the scope of the parent firm's operations brought about by the spin-off. Inconsistent with the first possibility, [Table 10, Panel A](#) shows that the annual mean (median) change in block ownership of the parents is less than 1% and insignificant. Confirming this, [Panel B](#) shows high serial correlations of block ownership in year 1, year 2 and year 3 of 0.8919, 0.8618 and 0.8209 respectively.

To examine the second possibility I read news articles about each spin-off deal. Although I find almost no mention of ownership structure as a direct motive for the spin-off decision, I find that scope-related differences such as differences in growth opportunities and performance between the spin-off division and the rest of the parent firm often prompt the spin-off. Therefore I collect the information in these articles and code the reasons offered for the spin-off by the parent firm. [Panel C of Table 10](#) shows that in nearly 50% (40%) of the deals the spin-off's performance (growth) is either hindering or is hindered by the performance of the parent firm.

[Panel D of Table 10](#) relates the changes in parent block ownership to spin-off motivation via three indicator variables each set to a value of 1 if the spin-off occurs as a result of differences in performance, differences in growth, and for other organizational

Table 10 Panel A

Changes in the block ownership of the parent and reasons for the spin-off

Block ownership of the parent					Tests of differences		
	Yr 0	Yr 1	Yr 2	Yr 3	Yr1 – Yr0	Yr2 – Yr0	Yr3 – Yr0
Mean	0.2034	0.2084	0.2079	0.2153	$t=0.76$	$t=0.48$	$t=0.77$
Median	0.1803	0.1856	0.1980	0.1953	0.314	0.346	$=0.203$
Std.	0.1670	0.1591	0.1693	0.1697			

This panel reports changes in the block ownership of the parent firm. Yr 0 denotes the last year of joint existence with the spin-off. Block ownership is defined as the fraction of voting rights held by all holders who each hold more than 5%. T -stats for differences in means and P -values for differences in medians (using the Wilcoxon signed rank test) are reported.

Table 10 Panel B

Correlation of parent block ownership pre-spin-off and parent block ownership post-spin-off

	Year 1	Year 2	Year 3
Block ownership	0.8919	0.8618	0.8209

This panel reports Pearson correlations for the pre-spin-off block ownership of the parent and its block ownership in the first three years after the spin-off. All the correlations are significant at the 1% level.

Table 10 Panel C

Factors affecting the decision to spin-off

<i>Performance</i>		
Poorer performance of the spin-off relative to the parent	57	48.72%
Poorer performance of the parent relative to the spin-off	15	12.82%
Performance is not a factor in the spin-off decision	45	38.46%
<i>Growth opportunities, industry cyclicality</i>		
Spin-off is high growth and/or industry in an upswing	27	23.08%
Spin-off is low growth and/or industry in a downswing	45	38.46%
No stated differences between spin-off and parent	45	38.46%
<i>Other structural/organizational changes in parent firm</i>		
Yes	42	35.90%
No	75	64.10%

This panel documents the reasons for the spin-off cited by parent management.

Table 10 Panel D

Regression results

Year	1	2	3
Intercept	0.1208 (1.99)	0.0410 (0.57)	0.0778 (0.93)
Relative market equity	0.0116 (1.13)	–0.0038 (–0.31)	–0.0017 (–0.12)
Relative control potential	0.0059 (0.22)	0.0091 (0.28)	–0.0091 (–0.25)
Relative Q	–0.0717** (–2.01)	–0.0498 (–1.17)	–0.0735 (–1.50)
Relative capital expenditure	–0.0751 (–0.39)	–0.0741 (–0.34)	–0.1081 (–0.42)
Relative PPE ratio	–0.0160 (–0.93)	–0.0274 (–1.35)	–0.0325 (–1.39)
Stock return correlation	0.0204 (0.41)	0.0396 (0.62)	0.0392 (0.55)
Vertical relatedness	0.0497 (0.26)	0.0988 (1.38)	0.1851*** (2.92)
Industry complementarity	–0.0164 (–0.53)	–0.0202 (–0.53)	–0.0242 (–0.57)
Performance reason for spin-off	–0.0179 (–0.89)	0.0015 (0.06)	–0.0107 (–0.40)
Growth reason for spin-off	–0.0067 (–0.27)	0.0191 (0.66)	–0.0020 (–0.06)
Other associated restructuring	0.0375 (0.54)	0.0292 (1.32)	0.0466* (1.85)
Adjusted R-squared	–4.23%	–4.33%	1.31%

This panel relates changes in the block ownership of the parent to changes in the monitoring requirement of the parent as a result of the spin-off. The dependent variables are $\log(1 + \text{block ownership})$ of the parent in years 1, 2, and 3 minus the $\log(1 + \text{block ownership})$ of the pre-spin-off parent firm i.e. in year 0. Relative market equity is the ratio of the market value of equity of the spin-off in year 1 to that of the parent in year 0. Relative control potential is measured as the ratio of the standard error of estimate of the market model for the spin-off in its first 36 months of existence to that of the parent firm in the 36 months preceding the first firm announcement of the spin-off. Relative sales growth is measured using similar time periods for the spin-off and the parent and the log of the ratio is used. Relative R&D intensity is the ratio of the R&D expenditure to assets of the spin-off in year 1 relative to that of the parent in year 0. Relative Q is measured as the ratio of market-to-book of assets in year 1 of the spin-off to that of the parent measured in year 0. Relative PPE ratio is measured as the ratio of property, plant and equipment to assets for the spin-off in year measured relative to that of the parent in year 0. Stock return correlation is computed as the correlation of the monthly stock return of the parent and spin-off in the first 36 months of the spin-off firm's existence. Vertical relatedness and industry complementarity are calculated as per Appendix A. Performance reason (growth reason and other associated restructuring) is a dummy variable set to 1 if parent firm management mentions firm performance as a motivating factor for the spin-off, 0 otherwise. Log transforms are used for all the variables except the dummy variables. Heteroscedasticity consistent T -statistics are provided in parentheses below each coefficient estimate. *, ** and *** denote the 10%, 5% and 1% significance level respectively.

reasons. To reflect changes in the monitoring requirements of the parent that occur as a result of the spin-off, like before, I include the relative firm characteristics used to predict changes in the block ownership of the spin-off. The results show that of the reasons stated by management only the organizational/restructuring reason is predictive of (positive) changes in block ownership. All other variables, except relative control potential and vertical relatedness, are insignificant and the adjusted *R*-square at less than 2% is quite low. These results suggest that either there are no large changes in the block ownership of the parent or there are but due to reasons other than the spin-off. Both these possibilities significantly weaken the case for the endogeneity of the spin-off transaction although they cannot completely negate it.

6.2. Survival

Because survival as a stand-alone entity is not necessarily superior to a value-enhancing merger I recode firms as survivors if they either survive as stand-alone entities or are taken over and replicate the analysis of Table 8, Panel A. Thus, non-survival denotes bankruptcy or delisting from the CRSP database due to other reasons. With survivorship re-defined in this way the change in block ownership, although positive, loses its significance. This may be due to the significantly smaller number of firms that are non-survivors under the new definition of survival (11 as compared to 35 that eventually survive).

6.3. Share turnover during the record period

Abarbanell et al. (2003) find that the largest change in the institutional ownership of the parent firm occurs in the quarter prior to the effective date of the spin-off. They argue that this is due to trading around the when-issued period (roughly, the 10 trading days immediately prior to the first day of trading of the spin-off shares). To test whether this trading explains subsequent changes in block ownership I relate the parent firm's share turnover in the when-issued period (record period turnover) to the subsequent changes in block ownership of the spin-off. Consistent with Abarbanell et al. (2003), I find that the record period turnover is significantly higher than in a control period of the same duration. In a regression analysis of the three-year change in spin-off block ownership, the record period turnover and the record period abnormal turnover (i.e. record period turnover minus turnover in a control period) are insignificant and there is no increase in the adjusted *R*-square.

6.4. Simultaneous estimation of *Q* and block ownership

Finally, for the simultaneous estimation of *Q* and block ownership I use a specification where all the variables except firm size are in raw form instead of the log transforms. The results for block ownership in the *Q* equation remain similar.

7. Conclusion

This paper studies the evolution of the ownership structure of corporate spin-offs. For a sample of 117 spin-offs, I find that block ownership changes significantly and rapidly. The changes in block ownership are associated with changes in monitoring requirements captured by the size, growth in sales and the market-to-book ratio (*Q*) of the spin-off measured relative to the parent, and the industry and stock return relatedness of the spin-off and the parent. Analyses also show that the changes in block ownership are positively associated with subsequent performance measured by changes in *Q* and the probability of survival as an independent entity. These results suggest that block holders enhance firm value via greater monitoring or possess superior stock picking abilities.

This paper contributes to the literature by providing new evidence on ownership structure. First, corporate block ownership evolves in response to changes in monitoring requirements of firms, with industry and the input–output mix of firms playing a key role in the process. Second, in the absence of significant costs more concentrated ownership structures are more efficient and are therefore more likely to be retained. Third, firms' adaptation of their ownership structure to changes in their monitoring environment plays a significant role in their future financial performance and survival.

This paper uses summary measures of block holdings and intentionally abstracts from the issue of investor type. However, a growing literature reflects the importance of investor type. This remains a topic for further research. In addition, a natural extension of this paper is to include two-stage spin-offs, equity carve-outs and tracking stocks.

Appendix A. Calculation of vertical relatedness and industry complementarity (Fan and Lang, 1998)

These measures are calculated using commodity flow data from the Benchmark Input–Output Account for the U.S. Economy.

Vertical relatedness is calculated as follows. Define a_{ij} as the dollar value of industry *i*'s output required to produce industry *j*'s total output. V_{ij} is defined as a_{ij} divided by the dollar output of industry *j*. The relatedness of spin-offs and parents is calculated as $1/2(V_{ij} + V_{ji})$ where *i* and *j* are the parent and spin-off industry respectively (Fan provides the concordance between SIC codes and the industry classification used in the input–output tables).

Industry complementarity is calculated as follows. For spin-off industry *i* calculate the fraction supplied to each other industry *k* (except the parent industry). This gives us a vector V_{ik} . Similarly, calculate B_{ik} as the fraction obtained as input from each industry (except the parent industry). Calculate corresponding vectors V_{jk} and B_{jk} where *j* is the parent industry. Complementarity is calculated as $1/2(\text{corr}(V_{ik} V_{jk}) + \text{corr}(B_{ik} B_{jk}))$.

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