The significance of sell-off profitability in explaining the market reaction to divestiture announcements

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Abstract

Previous research on asset sales has emphasized the divestment motivation and the use of the proceeds from the sale as determinants of selling firm value gains. In contrast, this paper explores the extent to which the relevant information necessary to evaluate sell-offs is embodied in the profitability of the sale, i.e. the price received by the seller over the value-in-use of the divested assets, where the latter is a function of past operating earnings and book value. Our empirical results show that sell-off profitability is substantially more significant in explaining the market reaction to divestiture announcements than the previous literature has suggested. We provide strong evidence of a positive relation between selling firm abnormal returns during sell-off announcements and profit on the sale, which remains significant after controlling for the motivation behind the sell-off, the use of the proceeds from the sale and the presence of agency costs of managerial discretion. We conclude that sell-off profitability explains a major portion of selling firm abnormal returns and is one of the most significant determinants of the market reaction to divestiture announcements. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

Asset sell-offs involve the disposal by the selling firm of subsidiaries, divisions or other combinations of fixed assets in exchange for some form of consideration. Voluntary sell-offs are on average associated with a positive stock market reaction for the seller at the announcement of the transaction (e.g. Alexander et al., 1984; Rosenfeld, 1984; Jain, 1985; Klein, 1986; Hite et al., 1987). The literature has mainly proposed explanations that are related to the implications of the sell-off for the management and future performance of the selling firm.

The main motivation behind sell-offs is reversing value-destroying diversification. On average, diversified firms trade at a discount to break-up value (Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996; Lins and Servaes, 1999), creating opportunities for bust-up takeovers (Boot, 1992; Berger and Ofek, 1996). Focus increasing voluntary sell-offs can lead to operating performance improvements for the selling firm, leading to a positive stock market reaction at the sell-off announcement (John and Ofek, 1995).

A second motivation behind sell-offs is divesting assets in order to reduce leverage with the proceeds from the sale during periods of financial distress. Firms in distress experience on average a positive market reaction when divesting assets (Afshar et al., 1992) and the abnormal returns are also positively related to the selling firm's ratio of total debt to total capital employed (Lasfer et al., 1996).

The use of the proceeds from the sale can also serve as an indicator of the presence of agency costs of managerial discretion. Paying out the proceeds from asset sales is associated with positive abnormal returns for the selling firm around the sell-off announcement, whereas reinvesting the proceeds for expansion is associated with a negative market reaction (Lang et al., 1995). Shareholders anticipate that management may be using funds not subject to the controls of the financial markets in order to invest in wasteful projects.

Finally, the divestiture of under-performing assets can be associated with value enhancement for the selling firm. It eliminates the costs of influence activities within companies (the private sector analog of rent-seeking behaviour), as under-performing divisions attempt to extract subsidies from the remaining firm (Meyer et al., 1992).

In addition to the strategic and agency related considerations examined in the previous literature, the market reaction to sell-offs should also depend on

the profitability of the sale, i.e. the price received by the seller relative to the value-in-use of the divested assets. [1] In contrast to previous work, the aim of our paper is to focus on the profitability of the sale (i.e. the *difference* between selling price and value-in-use of the assets) as a determinant of selling firm abnormal returns. We examine the extent to which selling firm abnormal returns can be explained as a market reaction to the profitable disposal of a combination of assets as opposed to a change in market expectations regarding the future strategic effectiveness of the seller in its continuing activities. Alternatively stated, we are interested in the following question: to what extent do the financial details of the deal embody the relevant information that market participants need to know in order to evaluate the sell-off?

Since the divested assets in sell-offs are not public companies and have no observable market value, our analysis draws on recent research which suggests that earnings and book values serve as important determinants of the economic value of a firm's assets (Ohlson, 1995; Hayn, 1995; Berger et al., 1996; Burgstahler and Dichev, 1997). More specifically, we use a methodology which assumes that the value-in-use of the divested assets to the seller is related to their accounting book value and past operating earnings, allowing different weights for positive and negative operating earnings.

Our hypothesis is that selling firm abnormal returns at the initial sell-off announcement are positively related to the difference between the price received and the value-in-use of the divested assets to the seller. Our results provide strong support for this hypothesis and are robust to a number of alternative specifications. The profit on the sale has significant explanatory power for selling firm abnormal returns after controlling for the strategic considerations behind sell-offs previously addressed in the literature. We also find that sell-off profitability has a more significant impact on selling firm abnormal returns when shareholders are expected to capture the benefits from the transaction, that is, in the absence of agency costs of managerial discretion.

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[1] The ratio of selling price of the assets to seller size, used in previous work as an explanatory variable for seller abnormal returns (Hearth and Zaima, 1984; Zaima and Hearth, 1985; Klein, 1986; Afshar et al., 1992; Lasfer et al., 1996), can potentially capture the effect of sell-off profitability, if the percentage premium received by the seller for the divested assets over their value-in-use is constant cross-sectionally (Lang et al., 1995). However, previous research casts doubt on the assumption of a constant premium. The premium is related to the financial condition of the selling firm, financial constraints, general economic conditions (Pulvino, 1998), and to the fit between the divested assets and the acquirer's operations (John and Ofek, 1995). Furthermore, the relationship between relative size of divested assets and seller abnormal returns may stem from the former proxying for strategic factors, since it holds only for financially healthy firms, which are more likely to be pursuing the divestment for motivations such as increasing focus (Lasfer et al., 1996).

The remainder of the paper is organised as follows. Section 2 focuses on the research hypothesis and the research methodology. Section 3 describes the data and the measurement of the variables. Section 4 discusses the empirical findings. Section 5 concludes.

2. Research hypothesis and methodology

2.1. Research hypothesis and value-in-use of divested assets

We examine the hypothesis that there is a positive relationship between the profit on a sell-off and the abnormal stock returns of the selling firm during the initial sell-off announcement, after controlling for the impact on market expectations of the broader implications of the sell-off for the selling firm's future strategic performance (where profit on the sale is defined as the difference between the consideration received for the divested assets and the value-in-use of those assets to the seller based on accounting fundamentals). [2]

Testing the hypothesis of this study requires a model of the value-in-use of the divested assets. Following Copeland et al. (1994) and Ohlson (1995), Appendix A provides a rationale based on neoclassical valuation theory for approximating the value-in-use of the sell-off's operating assets as a linear function of current operating earnings and book value. The derived linear valuation function expresses the value of operating assets as a weighted average of book value of operating assets and capitalised operating earnings, where the weights are a function of the persistence of operating earnings and the cost of capital. This suggests that the value-in-use of a divested division can be written as

$$V_i = f(B_i, E_i),$$

where subscript i denotes sell-off i, $f(\cdot)$ denotes a linear valuation function where the coefficients are identical for all sell-offs, B denotes the book value of operating assets of the divested division and E denotes the operating earnings generated by the divested division.

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[2] Subsidiary performance may be related to strategic factors: i.e. poor financial results may result from the subsidiary operating in a non-core area. Hence, sell-off profitability, where the value-in-use of the subsidiary is estimated using past accounting performance, may be related to strategic considerations. The main point addressed by our hypothesis is the extent to which seller abnormal returns can be explained as a market reaction to the profitable disposal of a combination of assets (whose value-in-use to the seller may have been affected by strategic considerations) as opposed to a change in market expectations regarding the future strategic effectiveness of the seller in its continuing activities.

A disadvantage of this valuation function is the assumption of homogeneity in relation to earnings and book value coefficients across our sample of sell-offs. We therefore also utilise insights from Hayn (1995), Berger et al. (1996) and Burgstahler and Dichev (1997), which suggest that the marginal impact of earnings on economic asset valuation is positively related to the size of earnings, due to the existence of an abandonment option which reduces the valuation relevance of small positive earnings and losses (and correspondingly increases the valuation relevance of book value). This view – that losses are less informative about firm value compared to positive earnings because if losses are expected to persist, the owners can exercise their abandonment option and liquidate the firm, thus recovering approximately the book value of the assets – suggests the following alternative valuation function:

$$V_i = f(B_i, E_i, D_{Li}B_i, (1 - D_{Li})E_i),$$

where all previous notation applies and D_L denotes a dummy variable where $D_L = 1$ if $E \leqslant 0$ and $D_L = 0$ if $E > 0$.

As expected, empirical results from the extended valuation function were much stronger than those from the first valuation function, although not all variables in the extended valuation function were statistically significant. For this reason, the reported models for testing our main hypothesis are based on the following, more parsimonious, valuation functions:

$$V_i = f(D_{Li}B_i, (1 - D_{Li})E_i) \quad \text{or}$$
$$V_i = f(B_i, (1 - D_{Li})E_i).$$

2.2. Empirical models

The empirical results reported in this paper are based on two cross-sectional regression models used to test the hypothesis of the study:

$$\text{Model 1}: \quad \text{AR}_i = \alpha_0 + \alpha_1 P_i + \alpha_2 D_{Li}B_i + \alpha_3(1 - D_{Li})E_i + \alpha_4 D_{FOi}P_i$$
$$+ \alpha_5 D_{DRi}G_i + \alpha_6 R_i + \alpha_7 S_i + \varepsilon_i,$$

$$\text{Model 2}: \quad \text{AR}_i = \alpha_0 + \alpha_1 \pi_i + \alpha_2 D_{FOi}P_i + \alpha_3 D_{DRi}G_i$$
$$+ \alpha_4 R_i + \alpha_5 S_i + \varepsilon_i,$$

where subscript i denotes sell-off i; AR denotes selling firm abnormal returns at initial announcement of the sell-off; P denotes total consideration for operating assets of divested division scaled by the market capitalisation of the selling firm; B, E and D_L are as previously defined (and B and E are scaled by the market capitalisation of the selling firm); $D_{FO} = 1$ if the selling firm announced increasing focus as the reason for the sell-off and $D_{FO} = 0$ otherwise; $D_{DR} = 1$ if the selling firm announced reducing leverage as the intended use of the proceeds from the sale and $D_{DR} = 0$ otherwise; G denotes the debt to equity ratio

of the selling firm prior to the sell-off; R is the divested division's return on assets during the year preceding the sell-off; S is the selling firm's size based on market equity capitalisation, and π_i, a proxy for the profit on the sell-off, is the residual in one of the following first-step regressions:

(a) $P_i = \beta_0 + \beta_1 B_i + \beta_2 (1 - D_L)E_i + \pi_i$ or

(b) $P_i = \beta_0 + \beta_1 B_i + \beta_2 D_{FIN} B_i + \beta_3 D_{RE} B_i + \beta_4 (1 - D_L)E_i$
$\quad\quad + \beta_5 (1 - D_L)D_{FIN}E_i + \beta_6 (1 - D_L)D_{RE}E_i + \pi_i,$

where $D_{FIN} = 1$ if the divested division is a financial firm and $D_{FIN} = 0$ otherwise; $D_{RE} = 1$ for divested assets with predominantly real estate value: property portfolios, shopping centers, pubs, individual hotels (excluding hotel chains), and $D_{RE} = 0$ otherwise, and all other variables are as previously defined.

Support for our hypothesis in model 1 requires a positive coefficient for P and negative coefficients for B and E which represent determinants of the value-in-use of divested assets. Support for our hypothesis in model 2 (which involves estimating a single measure of the profit from the sell-off as a residual from a first step regression of selling price on book value and operating earnings of divested assets) requires a positive coefficient for the profit residual π in the second step regression. Specification (b) of the first step regression used to estimate π is motivated by Barth et al. (1998) who find significantly higher book-to-market ratios (close to one) for real estate based and financial enterprises, which suggests that book value may be a more important valuation variable than earnings in these companies.

The remaining variables capture the effect of strategic factors examined in previous research. The relative size of divested assets of refocusing firms $D_{FO}P$ (selling price scaled by the market capitalisation of the selling firm) is used as a measure of the degree of refocusing and should be positively related to seller abnormal returns. [3] The debt–equity ratio of selling firms using the proceeds to reduce leverage $D_{DR}G$ should also be positively related to seller abnormal returns. The divested division's return on assets R is included to capture the possible effect of managerial influence activities. A negative sign for its coefficient offers support to the Meyer et al. (1992) argument, that there are additional benefits to the selling firm from divesting under-performing assets, due to the elimination of the costs associated with influence activities by managers of under-performing divisions. Finally, selling firm size S may be negatively related to the magnitude of the market's response during the announcement because more information is available to market participants about large firms

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[3] We use this specification for the extent of refocusing (as opposed to changes in SIC codes or Herfindahl indexes of sales concentration) because it is the one most likely to challenge the significance of P as a component of the profit function.

and the sell-off announcement may represent only a small portion of this information. For smaller firms the same announcement may represent very significant news. Alternatively, firm size may be positively correlated with the presence of agency costs of managerial discretion.

3. Data and measurement of the variables

Our sample of sell-offs by UK parents was collected by searching the *Thomson Financial Securities Data* database for sell-offs announced during 1984–1994 of a selling price higher than £5 million. We deleted from the sample transactions for which either there was no reference in the *Annual Index to the Financial Times* or there were confounding news reported during the calendar week preceding and the three days following the initial sell-off announcement day $t = 0$. Stock price data were collected from DATASTREAM. Stock prices are not adjusted for dividend payments but this should not matter because our sample is evenly spread throughout the year. We deleted from the sample firms without stock returns data for 300 trading days preceding the event and firms whose stock traded only infrequently during the estimation and event period. We calculated selling firm abnormal returns using a market model residuals approach (Brown and Warner, 1985), with estimation period for the parameters of the market model trading days $[-300, -61]$ relative to the event day, and the value-weighted *FT-All Share Index* for the London stock market. Selling prices were obtained from the *Thomson Financial Securities Data* transaction reports. Book values, operating earnings for the divested assets and selling firm debt–equity ratios were obtained from company Annual Reports or the *Financial Times* newspaper if unavailable in the report. The reason behind the sell-off and the intended use of the proceeds from the sale were obtained from the *Financial Times* articles.

P is the total consideration received by the selling firm for the operating assets of the divested division (including the assumption of liabilities), B is the current book value of the divested assets at the date of the completion of the sell-off, E are the operating earnings of the divested division during the last full financial year they were in operation as part of the activities of the selling firm,

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[4] During the period under study, UK firms were allowed to write off goodwill paid during acquisitions against reserves. When these acquisitions were subsequently divested, the exceptional profit on the sale is reported after adding back to the book value any goodwill previously written off (Davies et al., 1994, pp. 338–342). The book value including goodwill reported in the financial statements incorporates information related to the value of the assets at the time they were acquired but is not the best proxy for their value at the time of the sell-off announcement. For this reason our book value measure excludes goodwill written back.

Table 1
Descriptive statistics for sample of sell-offs by UK parents 1984–1994[a]

Panel A: Sample sell-off announcements

Total number of sell-off announcements by UK publicly traded firms during 1984–1994[b]	7505
Sell-off announcements of a value higher than £5 million, with stock returns data for 360 trading days around the announcement available in DATASTREAM and without other confounding news announcements during 10 trading days surrounding the sell-off announcement	600
Sell-off announcements with exceptional profit on the sale of the assets and operating profit data for the divested subsidiary available	187

	CAAR [−1,0]	CAAR- [−1,+1]	CAAR- [−3,0]	CAAR- [−3,+1]	CAAR- [−60,−4]	CAAR- [+1,+60]	Selling firm market value (£ million)	Divested assets selling price (£ million)	Divested assets book value (£ million)	Divested assets operating earnings (£ million)	P	B	E
Panel B: Descriptive statistics for final sample (187 observations)													
Mean	1.1%	0.9%	0.8%	1.0%	0.1%	0.6%	1569	81	56	5	0.1396	0.1002	0.0103
Maximum	24.2%	22.0%	36.4%	32.7%	89.4%	69.8%	17,556	1335	831	102	2.5071	1.8305	0.3148
75% Quartile	2.2%	2.4%	3.1%	2.8%	7.5%	6.8%	1919	79	55	7	0.1585	0.0960	0.0108
Median	0.5%	0.2%	0.4%	0.4%	−0.2%	−0.2%	872	25	24	2	0.0471	0.0350	0.0030
25% Quartile	−0.8%	−1.2%	−2.0%	−1.2%	−7.3%	−7.7%	238	13	11	0	0.0179	0.0139	0.000
Minimum	−20.2%	−24.3%	−30.2%	−26.2%	−52.1%	−54.7%	14	5	1	−34	0.0026	0.0004	−0.1338

[a] Cumulative average abnormal returns (CAARs) for different windows around the event day and other descriptive statistics for a sample of 187 announcements of asset sell-offs of a value higher than £5 million by UK parent firms during 1984–1994. The event day ($t = 0$) is designated as the day the sell-off announcement appeared in *The Financial Times* newspaper. CAARs were calculated using a market model residuals approach. The parameters of the market model were computed using the 240 daily stock returns, from day $t = -300$ to $t = -61$ relative to the event day. The stock market index used in the calculation of CAARs was the *FT-All Share Index* for the London stock market. Stock market returns data were obtained from DATASTREAM. *Price* is the selling price of the assets (in £ million) including assumption of liabilities. *Market value* is the market capitalization of the selling firm 30 trading days preceding the sell-off announcement (in £ million). *Book value* is the book value of the divested operating assets (in £ million). *Earnings* are the operating earnings of the subsidiaries divested during the last full accounting year the subsidiary operated as part of the selling firm (in £ million). *P* is the selling price of the assets divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. *B* is the book value of the divested operating assets divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. *E* are the operating earnings of the subsidiaries divested during the last full accounting year the subsidiary operated as part of the selling firm, divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement.

[b] *Source*: IFR Securities Data.

where each of these variables is scaled by the market capitalization of the selling firm 30 trading days before the announcement. [4] G is the long-term debt (obligations due in more than one year) over shareholders' equity ratio of the selling firm before the year of the sell-off announcement. G is the divested division's return on assets before the sell-off, calculated as E divided by B. [5] Finally, S is the natural logarithm of the selling firm's stock market capitalization 30 trading days before the sell-off announcement.

We were able to obtain complete data for 187 sell-off announcements which comprise our final sample. A summary of the selection procedure for the sample is presented in Table 1, Panel A. Selling firm cumulative average abnormal returns (CAARs) for different windows around the event day and other descriptive statistics for the sample appear in Table 1, Panel B. Sample selling firms experience CAARs of 1.1% for the window $[-1, 0]$ relative to the event day. There is no drift in the CAARs before or after the announcement. The mean selling firm market capitalization is £1.6 billion (median £872 million) and the mean selling price of the assets is £81 million (median £25 million). The mean ratio of selling price over the market capitalization of the selling firm is 14% (median 5%). The mean operating earnings of the divested divisions during the year preceding the sell-off announcement are £5 million (median £2 million).

4. Empirical results

4.1. Profit over value-in-use of the divested assets and selling firm abnormal returns

The first column of Table 2 reports the results of estimating model 1 using ordinary least-squares, with dependent variable selling firm abnormal returns over trading days $[-1, 0]$ relative to the event day. The model provides strong support for the profitability hypothesis. The coefficient of P is 0.0865 (p-value 0.001). The coefficient of the book value of loss-making divisions $D_L B$ has the predicted negative sign and is -0.2129 (p-value 0.000). The coefficient of positive operating earnings $(1 - D_L)E$ has also the predicted negative sign and takes the value -0.6011 (p-value 0.001). The adjusted R^2 of the regression is 0.33. [6] These results also confirm the relevance of balance sheet and income

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[5] Including together in the regressions B, E and R does not appear to induce multicollinearity. The partial correlation coefficients are -0.06 (between B and R) and 0.16 (between E and R). Eliminating R from the regressions does not affect the results on the profitability variables.

[6] As a comparison, when regressing selling price net of current book value of divested assets on abnormal returns, its coefficient is 0.0808 (p-value 0.079).

Table 2
Regressions of selling firm abnormal returns at the initial sell-off announcement on the profitability of the transaction[a]

	Full sample ($N = 187$)			
	Model 1	Model 2(a)	Model 2(b)	Model 2(a)
Dependent variable	AR $[-1, 0]$	AR $[-1, 0]$	AR $[-1, 0]$	AR $[-1, 0]$
Adjusted R^2	0.33	0.29	0.29	0.29
Intercept	0.0397	0.0271	0.0274	0.0267
	(0.008)***	(0.159)	(0.156)	(0.095)*
P	0.0865			0.0007
	(0.001)***			(0.975)
$D_L B$	−0.2129			
	(0.000)***			
$(1 - D_L)E$	−0.6011			
	(0.001)***			
PROFIT (π)		0.1391	0.1372	0.1386
		(0.013)**	(0.015)**	(0.026)**
$D_{FO}P$	0.0477	0.0472	0.0472	0.0468
	(0.077)*	(0.045)**	(0.046)**	(0.086)*
$D_{DR}G$	0.0238	0.0228	0.0228	0.0228
	(0.021)**	(0.074)*	(0.075)*	(0.081)*
R	−0.0057	−0.0065	−0.0065	−0.0065
	(0.020)**	(0.003)***	(0.003)***	(0.003)***
S	−0.0049	−0.0030	−0.0031	−0.0030
	(0.016)**	(0.250)	(0.244)	(0.178)

[a] Results of ordinary least-squares regressions of abnormal returns for trading days $[-1, 0]$ relative to the event day $t = 0$ on profit realized on the sale of assets and strategic factors for a sample of 187 sell-off announcements by UK parent firms divesting assets of a value higher than £5 million during 1984–1994. The estimated equations are

Model 1 : $\mathrm{AR}_i = \alpha_0 + \alpha_1 P_i + \alpha_2 D_{Li}B_i + \alpha_3(1 - D_{Li}) + \alpha_4 D_{FOi}P_i + \alpha_5 D_{DRi}G_i$
$\qquad\qquad + \alpha_6 R_i + \alpha_7 S_i + \varepsilon_i,$

Model 2 : $\mathrm{AR}_i = \alpha_0 + \alpha_1\pi_i + \alpha_2 D_{FOi}P_i + \alpha_3 D_{DRi}G_i + \alpha_4 R_i + \alpha_5 S_i + \varepsilon_i,$

where π_i is the residual from the following first step cross-sectional regression (adjusted $R^2 = 0.88$, p-values in parentheses).

(a) $P_i = \underset{(0.02)}{0.02} + \underset{(0.00)}{0.87}B_i + \underset{(0.01)}{2.53}(1 - D_L)E_i + \pi_{2i},$

(b) $P_i = \underset{(0.01)}{0.02} + \underset{(0.00)}{0.87}B_i - \underset{(0.51)}{0.11}D_{FIN}B_i + \underset{(0.06)}{0.44}D_{RE}B_i + \underset{(0.01)}{2.55}(1 - D_L)E_i - \underset{(0.37)}{1.32}(1 - D_L)D_{FIN}E_i$
$\qquad - \underset{(0.23)}{2.98}(1 - D_L)D_{RE}E_i + \pi_{3i}.$

The event day is designated as the day the initial newspaper article announcing the sell-off appeared in *The Financial Times* newspaper. Abnormal returns (AR) were calculated using a market model residuals approach, with parameters of the market model computed using stock returns for days $[-300, -61]$. The stock market index used was the *FT-All Share Index* for the London stock market. P is the selling price of the assets divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. B is the book value of the divested operating assets divided by the market capitalization of the selling firm 30 trading days preceding the sell-off

Table 2 (*continued*)

announcement. E are the operating earnings of the divested assets during the last full accounting year the subsidiary operated as part of the selling firm, divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. D_L is a dummy variable taking the values $D_L = 1$ if $E \leqslant 0$ and $D_L = 0$ if $E > 0$. D_{FO} is a dummy variable whose value equals one if the motivation behind the sell-off was increasing focus and zero otherwise. D_{DR} is a dummy variable which equals one if the firm intended to reduce leverage with the proceeds from the sale. G is the selling firm's long-term debt to shareholders equity ratio at the end of the financial year preceding the sell-off announcement. The reason behind the sell-off and the use of the proceeds from the sale were obtained from *The Financial Times* articles announcing the transaction. R is the divested division's return on assets during the last financial year before the sell-off announcement. S is the natural logarithm of the selling firm's market capitalization 30 trading days preceding the sell-off announcement. Values in parentheses are *p*-values for two-tailed tests calculated from White (1980) heteroskedasticity adjusted standard errors.

[*] Statistical significance at the 10% level.
[**] Statistical significance at the 5% level.
[***] Statistical significance at the 1% level.

statement information for firm valuation (Ohlson, 1995; Collins et al., 1997) and the differential information conveyed by book value and earnings in the presence of lower persistence of abnormal earnings due to losses (Hayn, 1995; Berger et al., 1996; Burgstahler and Dichev, 1997; Barth et al., 1998; Collins et al., 1999). [7]

Our results are also consistent with the previous literature on the strategic factors under-lying sell-offs. The coefficient of the relative size of the divested assets for selling firms who divest in order to increase focus $D_{FO}P$ is 0.0477 (*p*-value 0.077). Therefore, the larger the proportion of the assets of a refocusing firm divested (i.e. the larger the extent of the refocusing) the higher the abnormal returns experienced during the sell-off announcement, consistent with John and Ofek (1995). Using the proceeds from the sale for leverage reduction is consistent with a positive market reaction, which depends on the magnitude of the selling firm's debt–equity ratio prior to announcing the sell-off, a result consistent with Lang et al. (1995) and Afshar et al. (1992). The coefficient of the debt–equity ratio of firms reducing leverage with the proceeds from the sale $D_{DR}G$ is 0.0238 (*p*-value 0.021). The coefficient of the return on assets of the divested divisions R is -0.0057 (*p*-value 0.020), offering support to the Meyer et al. (1992) conjecture that there are benefits for selling firms divesting underperforming divisions. These results are consistent with previous evidence on the

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[7] In earlier versions of this paper, we have estimated expanded versions of model 1 by adding the variables B and E, thus allowing book value and earnings to play a role in the valuation of all divisions. These variables were not statistically significant and the results on the remaining variables were unchanged.

market impact of sell-offs aimed at increasing focus, using the proceeds to reduce leverage or divesting under-performing assets and also show that the results on the profitability of the deal remain robust after controlling for these strategic considerations. [8]

   The results of the estimation of model 2 are also reported in Table 2. The first step regression (a) has an adjusted R^2 of 0.88 and the estimated coefficients of book value and positive operating earnings are 0.87 and 2.53, respectively (both significant at the 1% level). In the second step regression, the coefficient of the profit residual π is 0.1391 (p-value 0.013). [9] The first step regression (b) also has an adjusted R^2 of 0.88 (of the additional variables, only the coefficient for book value of real estate based companies is statistically significant with p-value 0.060) and the coefficient of the profit residual π in the second step regression is 0.1372 (p-value 0.015). The results on the strategic variables are similar to those obtained earlier. When we include both the consideration from the sell-off (scaled by seller market capitalisation) P and the profit residual π in the same regression, P is not statistically significant whereas π is (see last column of Table 2). These results provide further support to the hypothesis that the profit on the sale is highly significant in explaining selling firm abnormal returns during sell-off announcements. [10]

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   [8] We examined the robustness of our results using alternative specifications: we analyzed three additional windows of abnormal returns, we performed the regressions using only the profitability variables, we repeated the regressions with only the increasing focus and the leverage reduction variables as controls, but the results were unchanged. We used $D_{FO}B$ as the refocusing variable. Its coefficient was more highly significant than the coefficient of $D_{FO}P$ and also enhanced the statistical significance of the remaining variables. However, the latter variable was preferred because both the numerator and the denominator are expressed in market value terms. We substituted for the selling firm's debt–equity ratio the market value of equity in the denominator of the ratio, changes in the long-term debt–equity ratio from the year before the sell-off announcement to the year following the year of the announcement, and the ratio of selling price divided by the absolute change in the amounts of long-term debt over different intervals. These had no effect on the profitability variables.

   [9] This specification may create an errors-in-variables problem, since profit on the sale may be estimated with error. We expect this to result in under-estimation of the coefficient of π, which will tend to make the rejection of the null hypothesis (i.e. the hypothesis that profitability is not significant in explaining seller abnormal returns) more difficult.

   [10] We have only two announcements by firms in financial distress in our sample, defined as firms which entered debt renegotiation within one year before or after the year of the sell-off announcement (because of our selection criteria, we excluded firms whose stock was suspended during the 361-day estimation and event period, and we required firms to report separately divested segment operating results, which may have resulted in disproportionately more firms in distress being excluded from the sample, because they were more likely to perform multiple sell-offs). We replicated the analysis substituting for the debt–equity ratio the variables $D_{DR}G \times \text{DISTRESS}$ and $D_{DR}G \times (1 - \text{DISTRESS})$, where $\text{DISTRESS} = 1$ for the two announcements by firms in financial distress. This had no effect on the sell-off profitability or strategic variables in any specification.

4.2. Analyzing different subsamples and the presence of agency costs

We examine the relative importance of profitability, strategic and agency cost considerations further by dividing the sample according to strategic motivation. We distinguish sell-offs announcing increasing focus as the reason behind the sale (62 observations), sell-offs indicating leverage reduction with the sale proceeds (51 observations) and those sell-offs indicating neither of these motivations (90 observations). The results of the estimation of model 1 for each subsample separately are reported in Table 3.

For increasing focus sell-offs, the profitability variables are highly significant. The coefficient of P is 0.1354 (p-value 0.000), the coefficient of $D_L B$ is -0.2064 (p-value 0.020) and the coefficient of $(1 - D_L)E$ is -0.4396 (p-value 0.000). The adjusted R^2 of the regression is 0.53. The results for the subsample of sell-offs motivated by leverage reduction are similarly supportive for both profitability and strategic hypotheses. The results are different for the third subsample, where there was no clear strategic motivation for the sell-off, and support the conjecture that the selling firm may be subject to the presence of agency costs for two reasons. [11] First, the coefficient for size of the selling firm S (a possible proxy for the presence of agency costs), is negative and highly significant in contrast to results on the other subsamples. Second, the profit on the sale variables have lower estimated coefficients and larger p-values than in the other subsamples and the adjusted R^2 of 0.23 is lower. This may reflect the presence of agency costs of managerial discretion since shareholders may expect to capture less benefits from the divestment.

5. Conclusions

The focus of this paper is on evaluating the impact of the profit on the sale (i.e. the difference between selling price and value-in-use of the divested assets) on the abnormal stock returns experienced by selling firms during divestiture announcements. The previous empirical literature has examined the strategic motivation for the transaction and the use of the proceeds from the sale but has not emphasized profit from the sell-off over value-in-use of the assets as a major determinant of the market reaction. Our results are consistent with the hypothesis that the profit on the sale over the value-in-use of the divested assets has a very significant positive impact on the abnormal returns the selling firm

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[11] All sell-offs in this except one, fall in at least one of the following groups: they offer no reason for the sell-off, they divest in order to raise cash (which will not be used to reduce leverage), they do not announce the use of the proceeds or they announce that they will reinvest the proceeds for expansion through acquisitions.

Table 3
Regressions of selling firm abnormal returns at the initial sell-off announcement on the profitability of the transaction for different subsamples[a]

	Sell-offs increasing focus ($N = 62$)	Sell-offs reducing leverage ($N = 51$)	Remaining sell-offs ($N = 90$)
	Model 1	Model 1	Model 1
Dependent variable:	AR $[-1, 0]$	AR $[-1, 0]$	AR $[-1, 0]$
Adjusted R^2	0.53	0.42	0.23
Intercept	0.0225	0.0126	0.0685
	(0.414)	(0.736)	(0.007)***
P	0.1354	0.1006	0.0523
	(0.000)***	(0.016)**	(0.191)
$D_L B$	−0.2064	−0.4255	−0.1797
	(0.020)**	(0.002)***	(0.002)***
$(1 - D_L)E$	−0.4396	−0.6993	−0.5592
	(0.000)***	(0.011)**	(0.116)
$D_{FO}P$		0.0611	
		(0.071)*	
$D_{DR}G$	0.0095	0.0326	
	(0.080)*	(0.019)**	
R	−0.0059	0.0257	−0.0072
	(0.680)	(0.539)	(0.001)***
S	−0.0025	−0.0028	−0.0087
	(0.492)	(0.606)	(0.010)***

[a] Results of ordinary least-squares regressions of abnormal returns for trading days $[-1, 0]$ relative to the event day $t = 0$ on profit realized on the sale of assets and strategic factors for a sample of 187 sell-off announcements by UK parent firms divesting assets of a value higher than £5 million during 1984–1994. The estimated equation is

$$\text{Model 1:} \quad AR_i$$
$$= \alpha_0 + \alpha_1 P_i + \alpha_2 D_{Li} B_i + \alpha_3 (1 - D_{Li})E_i + \alpha_4 D_{FOi} P_i$$
$$+ \alpha_5 D_{DRi} G_i + \alpha_6 R_i + \alpha_7 S_i + \varepsilon_i.$$

The event day is designated as the day the initial newspaper article announcing the sell-off appeared in *The Financial Times* newspaper. Abnormal returns (AR) were calculated using a market model residuals approach, with parameters of the market model computed using stock returns for days $[-300, -61]$. The stock market index used was the *FT-All Share Index* for the London stock market. P is the selling price of the assets divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. B is the book value of the divested operating assets divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. E are the operating earnings of the divested assets during the last full accounting year the subsidiary operated as part of the selling firm, divided by the market capitalization of the selling firm 30 trading days preceding the sell-off announcement. D_L is a dummy variable taking the values $D_L = 1$ if $E \leqslant 0$ and $D_L = 0$ if $E > 0$. D_{FO} is a dummy variable whose value equals one if the motivation behind the sell-off was increasing focus and zero otherwise. D_{DR} is a dummy variable which equals one if the firm intended to reduce leverage with the proceeds from the sale. G is the selling firm's long-term debt to shareholders equity ratio at the end of the financial year preceding the sell-off announcement. The reason behind the sell-off and the use of the proceeds from the sale were obtained from *The Financial Times* articles announcing the transaction. R is the divested

Table 3 (*continued*)
division's return on assets during the last financial year before the sell-off announcement. *S* is the natural logarithm of the selling firm's market capitalization 30 trading days preceding the sell-off announcement. Values in parentheses are *p*-values for two-tailed tests calculated from White (1980) heteroskedasticity adjusted standard errors.
   [*] Statistical significance at the 10% level.
   [**] Statistical significance at the 5% level.
   [***] Statistical significance at the 1% level.

experiences during sell-off announcement, which remains significant after controlling for the strategic reason behind the sell-off and the use of the proceeds from the sale. The results are robust to a number of alternative specifications. We conclude that an assessment of the market reaction to sell-offs that does not adequately consider the profitability of the sale to the selling firm may eliminate from the analysis one of the most significant determinants of selling firm abnormal returns.

Acknowledgements

Appendix A. A linear valuation model for the value-in-use of divested operating assets

The following model is closely related to the linear valuation model developed by Ohlson (1995). The main difference between the current analysis and that of Ohlson (1995) is the focus on the valuation of the operating assets of a business rather than its equity capital. Given that the price received for the sell-offs in our sample is the total consideration (i.e. purchase price *plus* the value of any net debt assumed), we require a measure of the value-in-use of the operating assets in order to determine the profit on a particular sell-off. The analysis here suggests that operating earnings and book value are important determinants of value-in-use.

We begin with the standard neoclassical expression for the value of the operating assets of a business (Modigliani and Miller, 1958, 1961; Copeland et al., 1994):

$$V_t = \sum_{\tau=1}^{\infty} \frac{C_{t+\tau}}{(1+r)^{\tau}}, \tag{A.1}$$

where we assume that for all $\tau \geqslant 1$,

$$C_{t+\tau} \equiv O_{t+\tau} - I_{t+\tau} = E_{t+\tau} - N_{t+\tau} = E_{t+\tau} - (B_{t+\tau} - B_{t+\tau-1}), \tag{A.2}$$

where V_t denotes the value-in-use of the operating assets of the business at date t, $C_{t+\tau}$ denotes the expected free cash flow at date $t + \tau$, $O_{t+\tau}$ denotes the expected operating cash flow at date $t + \tau$, $I_{t+\tau}$ denotes expected total investment at date $t + \tau$, $E_{t+\tau}$ denotes expected operating earnings at date $t + \tau$, $N_{t+\tau}$ denotes expected net investment (i.e. net of depreciation and other accruals) at date $t + \tau$, $B_{t+\tau}$ denotes expected book value of operating assets at date $t + \tau$ and r denotes the weighted average cost of capital (assumed to be constant over time).

Next, we define expected abnormal operating earnings at date t, $E_{t+\tau}^a$, as follows:

$$E_{t+\tau}^a \equiv E_{t+\tau} - rB_{t+\tau-1} \quad \text{for all } \tau \geqslant 0. \tag{A.3}$$

Substituting (A.2) (i.e. $C_{t+\tau} = E_{t+\tau} - (B_{t+\tau} - B_{t+\tau-1})$) and (A.3) in (A.1), we obtain

$$V_t = \sum_{\tau=1}^{\infty} \frac{(E_{t+\tau}^a + rB_{t+\tau-1}) - (B_{t+\tau} - B_{t+\tau-1})}{(1+r)^{\tau}}$$

which, assuming $B_{t+\tau}/(1+r)^{\tau} \to 0$ as $\tau \to \infty$, simplifies to

$$V_t = B_t + \sum_{\tau=1}^{\infty} \frac{E_{t+\tau}^a}{(1+r)^{\tau}}. \tag{A.4}$$

Next, we assume that abnormal operating earnings follow the following time series process:

$$\tilde{E}_{t+\tau}^a = \omega \tilde{E}_{t+\tau-1}^a + \tilde{\varepsilon}_{t+\tau}, \tag{A.5}$$

where $\tilde{\varepsilon}_t$ is a mean zero disturbance term and where (to ensure finite valuation) $(\omega - 1) < r$. Taking expectations of (A.5) implies that $E_{t+\tau}^a = \omega E_{t+\tau-1}^a$ for all $\tau \geqslant 1$ and using this in (A.4) gives

$$V_t = B_t + \frac{\omega E_t^a}{r - (\omega - 1)} = B_t + \alpha E_t^a, \tag{A.6}$$

where $\alpha = \omega/(r - (\omega - 1))$.

Finally, using (A.2) and (A.3) in (A.6) gives the following valuation expression:

$$V_t = (1 - \alpha r)B_t + \alpha r \left(\frac{(1+r)}{r} E_t - C_t \right). \tag{A.7}$$

Consistent with Ohlson's equity valuation model, Eq. (A.7) indicates the value of the operating assets of an entity may be expressed as a weighted average of book value, B_t, and capitalised operating earnings, $((1+r)/r)E_t$, adjusted for net cash flow for the providers of capital, C_t. The weights for book value and adjusted capitalised earnings, $(1 - \alpha r)$ and αr, respectively, are a function of abnormal earnings persistence and the cost of capital, with (i) $1 - \alpha r = 1$ and $\alpha r = 0$ for the special case of $\omega = 0$ and (ii) $(1 - \alpha r) = 0$ and $\alpha r = 1$ for the special case of $\omega = 1$. The assumption in (A.2) that $C_{t+\tau} \equiv O_{t+\tau} - I_{t+\tau} = E_{t+\tau} - (B_{t+\tau} - B_{t+\tau-1})$ represents the crucial accounting link between the measurement of book value, operating earnings and free cash flow, equivalent to the clean surplus assumption in the Ohlson equity valuation model, which generates the valuation expressions (A.6) and (A.7).

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