Financial performance of U.S. forest products firms on the event of their timberland divestiture and REIT-conversion

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Abstract

In the last two decades, most big firms in the U.S. forest products industry have either divested their timberlands or changed their corporate structures from C-corporations into real estate investment trusts (REITs). Whether or not this large scale change in timberland ownership has altered the financial performance of these firms has not been fully assessed. This study evaluates the impacts of these firms' timberland ownership change on their financial performance using event analysis. The findings of this study reveal that the capital market responded to divestiture events with the improvement of buying firms' market value significantly. In 3-day, 19-day, 25-day, 31-day event windows, the average cumulative abnormal returns for buying firms were 1.52%, 5.31%, 7.56% and 7.61% respectively. The announcement of REIT-conversion did not significantly impact the performance of the timber REITs as a group. The study suggests that timberland divestiture could be preferable to changing corporate structures to REITs.

Keywords: Abnormal Return; C-corporation; Equity Market; Event Analysis; Risk;

1. Introduction

The forest industry of the United States owns about 71 million acres of timberland representing 10% of U.S. timberland [1]. In 2007, wood product manufacturing (North American Industrial Classification System, NAICS 321), paper manufacturing (NAICS 322) and furniture manufacturing (NAICS 337) sectors of the United States produced shipments that valued close to $101.88 billion, $175.81 billion and $84.97 billion respectively [2] totaling $362.66 billion. About 1.45 million employees were rendering their service in this industry with the annual payroll of about $55.9 billion [2]. But in 2002, the total shipment value of the industry was $319 billion and the number of employees was 1.63 million [3]. It suggests, from 2002 to 2007, the size of shipment of the industry increased by $43.66 billion while the number of employees declined by 0.18 million. Due to restructuring activities through mergers and acquisitions and sale of timberlands and conversion into REITs, the extent of the industry had greatly reduced with a cut of this 0.18 million jobs in just five years.

Best and Wayburn [4] reported that an estimated 28% of timberland changed hands in the 1990s with much of it going entirely out of ownership by vertically integrated forest products companies. An increasingly important role is being played by real estate investment trusts (REITs). According to Mendell et al. [5], four publicly traded timber REITs namely Plum Creek Timber Company (PCL), Rayonier International (RYN), Longview Fiber (LFB) and Potlatch Corporation (PCH) converted over 12 million acres of timberland into REITs between 1999 and 2006. The driving factors behind the sale-off and REIT-conversion were consolidation within the industry, strategic restructuring to focus on production manufacturing due to higher tax burden, and shifting of capital towards foreign timberland purchases. Beginning in the 1990s, this ownership structure enjoyed much lower tax rates than the traditional forest products firms [6,7]. Thus, REIT-conversion became a favorite option for forest product firms like traditional paper companies that are classified as C-corporations [8]. Investments in real estate provided investors with income and appreciation. The Tax Reform Act of 1986 allowed REITs to manage their properties directly, and in 1993 REIT investment barriers to pension funds were eliminated. This trend of reforms continued to increase the interest in and value of REIT investment. Today, there are more than 193 publicly traded REITs operating in the United States; their assets total over $500 billion [9].

Li and Zhang [10] examined the acreages of industrial timberlands owned by major public forest products firms from 1988 and 2003 and concluded that timberland holdings have been positively related to the financial performance of these firms. Greene [11] and Rinehart [12]

investigated that, a double tax burden had compelled big forest product firms to divest their timberlands. Yin [13] and Diamond [14] gave a comprehensive compilation of timberland divestiture events. Very recently, Mei and Sun [15] conducted a traditional event study on the financial performance of U.S. forest product industry due to mergers and acquisitions. Choi and Russell [16] reported that, in mergers and acquisitions, target firms' financial performance was improved. On the contrary, Pesendorfer [17] reported that the financial efficiency of most acquiring firms improved after an acquisition. Mendell et al. [5] compared the financial data of the publicly traded Timber REITs and C-corporations. Mendell et al. [18] further conducted an event study and discussed the investors' responses to the timberlands structure as REITs. NAREIT [9] maintains a comprehensive directory that contains ample information about REITs. Udpa [19] broadly explained why and how firms switched from C-corporations to REITs. Deweese [20] reported the emerging history of Timber REITs, problems of paper manufacturers and their fighting to boost up their share price in the equity markets.

There is a great dearth of investigations that have rigorously addressed the after-effects of industrial timberland sale-off sand REIT conversions on the specific firms in U.S. forest product industry. No specific investigation had been made on whether sale-off or REIT-conversion of timberlands could be a better option for forest products firms to boost up their financial performance in the capital market. Thus a research need related to the prediction of the impact of industrial timberland sale-off and forest product firms' conversion from C-corporations into REITs on their financial performance was obvious. The objective of this study was to evaluate the impact of U.S. forest products firms' timberland divestitures from 1986 to 2007 and some forest products firms' conversion into REITs on their financial performance. The reason behind choosing this period is that, most timberland divestiture events took place in this period

2. Empirical methods

2.1. Event and event window
An event study includes several generic stages; defining an event of interest and identifying the period over which the impact of the event is examined constitute the first stage. The events of interest in this study were the major divestitures of the industrial timberlands of the U.S. forest product industries over a period from 1986 to 2007. There are debates in the thoughts to the length of event window. A number of studies [15,21-27] debated on how broad an event window could be to explain the impact of an event. However, the length of the event

window should be long enough to capture the significance of the event, but short enough to exclude the confounding effects. In this study, seven different event windows were selected to investigate the extent and persistence of abnormal return over different windows.

$$(t_1, t_2) = (-1, +1), (-3, +3), (-6+6), (-9, +9), (-12, +12), (-15, +15). \text{ The length of the}$$

event window was defined as $T = t_2 - t_1 + 1$ and thus the lengths of the event windows were 3, 7, 13, 19, 25 and 31 days respectively. Time before the event windows is termed as estimation window while the days after the window constitute the post event window. For each event, the estimation window covered 250 trading days before the event window. Following MacKinlay (1997) and Mei and Sun (2008), four lengths were employed for post event risk analysis: 50, 100, 150 and 200 days.

2.2. Abnormal return for individual firm

Abnormal return on the security of a firm is the difference between its actual return and predicted return of the firm over an event window. In this study, market model is used to obtain the predicted return.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{1}$$

Where, $t \in [1, T]$ and T is the length of the event window; R_{it} is the return of firm i on day t; R_{mt} is the return of a market portfolio of day t; α_i and β_i are the parameters to be estimated; ε_{it} is the error term assumed $i.i.d \sim N(0, \sigma^2)$. In this study, S&P 500 index was chosen as the proxy of the market portfolio.

After estimating α_i and β_i through ordinary least square, the abnormal return, A_{it} of firm i on day t over an event window can be calculated using equation (2).

$$A_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \tag{2}$$

Under the null hypothesis that the event has no impact on the returns of the security of the firm, A_{it} does possess a normal distribution (MacKinlay, 1997). In actual estimation, A_{it} is just the predicted residual of the market model on an out-of-sample basis (Mei and Sun, 2008).

Average cumulative abnormal return, C_{iT} for firm i can be obtained by aggregating the abnormal return, A_{it} over T day event window using equation (3).

$$C_{iT} = \sum_{t=1}^{T} A_{it}$$ (3)

According to Medeiros and Matsumoto [28], when the estimation window is sufficiently large, the variance of C_{iT} can be asymptotically measured using equation (4), given the central limit theorem.

$$Var(C_{iT}) = T\sigma_{\varepsilon_{it}}^2$$ (4)

Where, T is the length of the event window and $\sigma_{\varepsilon_{it}}^2$ is the variance of the disturbance term in the market model. C_{iT} has a normal distribution and the null hypothesis of C_{iT} being zero can be examined following MacKinlay (1997).

2.3. Abnormal return across all firms

Following Mei and Sun [15], the average cumulative abnormal returns across the firms can be measured using equation (5).

$$C_{NT} = \frac{1}{N} \sum_{i=1}^{N} C_{iT}$$ (5)

Here, C_{NT} is the average cumulative abnormal return for N firms as a group over T-day event window. Substituting equation (3) into (5) yields,

$$C_{NT} = \frac{1}{N} \sum_{i=1}^{N} \left(\sum_{t=1}^{T} A_{it} \right)$$ (6)

Equation (6) can be splitted as follows:

$$C_{NT} = H_{N\delta} + \sum_{t=\delta+1}^{T} \left(\frac{1}{N} \sum_{i=1}^{N} A_{it} \right)$$ (7)

Where, $H_{N\delta}$ is the average cumulative abnormal return for N firms up to δ day over the event window and $\delta \in [1,T]$. $H_{N\delta}$ has an estimate for each specific day in the event window and $H_{N\delta}$ equals C_{NT} when δ approaches T.

With the assumption of asymptotically normal distribution, the variance of the average cumulative abnormal return for the sample firm can be calculated and its statistical significance can be examined by z-statistic.

$$Var(C_{NT}) = \frac{1}{N^2} \sum_{i=1}^{N} Var(C_{iT}) \tag{8}$$

$$z = \frac{C_{NT}}{\sqrt{Var(C_{NT})}} \sim N(0,1) \tag{9}$$

2.4. Cross sectional regression

When comparing a firm's financial ratios to industry ratios, it may not be suitable using the average industry value when there is wide non-symmetric dispersion of individual firm ratios within the industry. In this situation, a cross sectional analysis may be appropriate, where an individual firm can be compared to a subset of firms within the industry that are comparable in size and characteristics [29].

In this study, cumulative abnormal returns were explained by different criteria of the firms involved in the events of interest.

$$C_{iT} = \beta_0 + \beta_1(ALL_i) + \beta_2(TIME_i) + \beta_3(ROA_i) + \beta_4(SIZE_i) + \beta_5(PARTY_i) + \beta_6(TRAN_i) + \mu_i \tag{10}$$

Where, C_{iT} is the average cumulative abnormal return for firm i over T day event window; β s are the regression coefficients. In this study, we have defined six variables that explain the response variable, average cumulative abnormal return. Three dummy variables were defined to differentiate the events under investigation- ALL, $PARTY$ and $TRAN$. The variable ALL equaled one when the forest product firm sold all its timberlands and zero otherwise. $PARTY$ equaled one for a buying firm and zero for a selling firm. One was assigned to $TRAN$ when the transaction money was one billion or above and zero otherwise. The time trend variable $TIME$ was weighted as the integer value of the difference between the year 2006 and the year of divestiture announcement in the Wall Street Journal or in the New York Times. ROA was the

return on asset of firm i, *SIZE* was defined as the ration of the transaction size of the event in million U.S. dollars to the total asset of firm in million dollars and μ_i is the mean zero error term with constant variance.

2.5. Risk analysis

The security of any firm is a risky asset and thus risk assessment is an integral part of any event study. A comparison of the statistical estimates of systematic risk before and after the divestiture event of interest can be supplementary to the analysis of abnormal return. Jensen [30] employed the capital asset pricing model (CAPM) to measure the systematic risk associated with the events with the following statistical specification.

$$R_{it} - R_{ft} = \alpha_i + \beta_i \left(R_{mt} - R_{ft} \right) + \psi_i \tag{11}$$

Where, R_{it} is the realized return at time t on asset i, R_{mt} is the realized return at time t of the market portfolio m and R_{ft} is the return on the three-month T-bills (a risk free asset) at time t.

The parameter β_i is termed as asset i's beta and can be viewed as a standardized measure of systematic risk [31]. ψ_i is the error term having a normal distribution with mean zero, constant variance and serial independence.

Following Mei and Sun [15], we have incorporated a dummy variable, D_i to determine the difference in beta values for an individual firm before and after the divestiture events. D_i equaled one on and after the day of announcement of the event and zero for the days before. γ_i was the coefficient of the interaction term and captured the state of change in the firm i's systematic risk after the event had taken place.

$$R_{it} - R_{ft} = \alpha_i + \beta_i \left(R_{mt} - R_{ft} \right) + \gamma_i D_i (R_{mt} - R_{ft}) + \psi_i \tag{12}$$

3. Data sources

Three online databases namely LexisNexis Academic, Newspaper Source and Academic Search Premier were searched to collect the timberland divestiture data. All issues of the Wall Street Journal and the New York Times from 1986 to 2007 were rigorously searched for any

announcement of timberland divestiture in them. Some transaction records were also collected from Yin et al.[13] and Diamond et al. [14]. In this study, a total of 33 timberland sales were recorded from 1986 to 2007. In every sale, the money transacted was not less than $50 million.

Daily security returns of the firms were collected directly from the database of Center for Research in Security Prices (CRSP). As the proxy of the market portfolio, we used the value-weighted S&P 500 Composite Index. The daily returns of this Index from 01 January 1985 to 31 December 2008 were also collected from CRSP database. For cross sectional analysis, we collected information regarding a firm's return on assets, total assets and net income. These were collected from the COMPUSTAT database. These were the fiscal year end data preceding the announcement of the divestiture event. For a risk assessment of the firms involved in the timberland divestitures, we used the rate of risk free returns as the market rate of the 3 month U.S. T-bills [32]. Data related to REITs were collected from National Association of Real Estate Investment Trust [9] and the annual reports of the companies on the form 10-K of the Securities and Exchange Commission (SEC) for the years 2006 and 2008.

4. Empirical results

4.1. Abnormal returns

The average cumulative abnormal returns, H_δ on specific days in a 31-day event window for all the 33 firms involved in timberland transactions are presented in Figure 1. H_δ Values were calculated for 15 days prior to and after the sale-off announcement was made and on the last day of the event window H_δ approached C_{NT}. Figure 1 depicts how buying and selling firms behaved immediately after the event took place. Average cumulative abnormal return sharply rose for the buying firm and less sharply fell for the selling firms. The combined H_δ line ran in between the selling and buying lines.
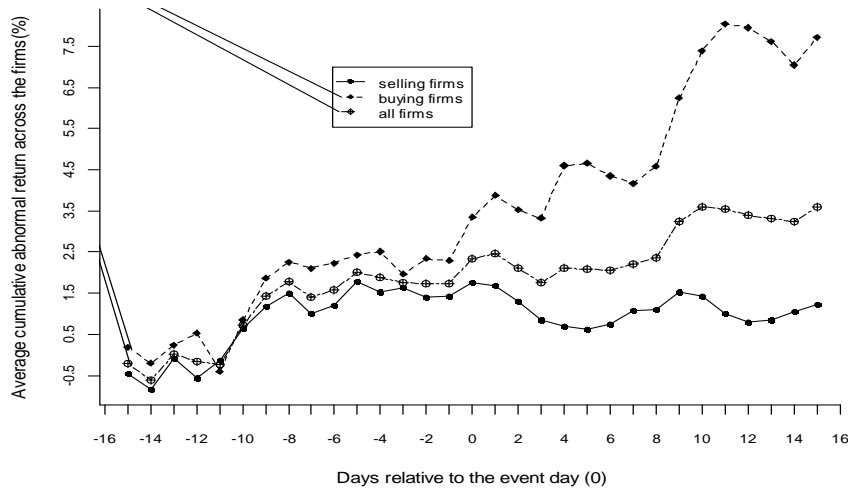
Figure 1. Average cumulative abnormal returns   up to a specific day over the 31-day event window obtained in OLS model for 33 forest products firms involved in timberland divestitures from 1986 to 2007

Table 1 represents the average cumulative abnormal returns (C_{NT}) for different event windows. The impact of the timberland divestiture on the return of the security of the firm was immediate. The 3-day event window was selected just to examine what happened the previous and the next day of the event. The C_{NT} values for selling firms did not change significantly in any of the event windows and thus the null hypothesis that C_{NT} was zero could not be rejected at 5% level for those firms. On the other hand, the buying firms continuously kept on accumulating positive abnormal returns. In 3-day, 19-day, 25-day, 31-day event windows, the C_{NT} values for buying firms were 1.52%, 5.31%, 7.56% and 7.61% respectively all of which were significant. It suggests that the performance of the selling firms was relatively poor and the buying firms' market value was significantly improved. When all firms were considered as a group, the C_{NT} values were significant only in 25-day (3.32%) and 31-day (3.64%) event windows.

Table 1. Average cumulative abnormal return (C_{NT}) by different event windows

Event Windows	Selling firms		Buying firms		All firms		REITs	
	C_{NT} (%)	z-stat	C_{NT} (%)	z-stat	C_{NT} (%)	z-stat	C_{NT} (%)	z-stat
3 days	0.27	0.32	1.52	1.67[c]	0.72	1.14	1.88	1.39
7 days	-0.67	-0.52	0.74	0.54	-0.16	-0.16	1.03	0.50
13 days	-0.35	-0.20	2.18	1.15	0.57	0.43	2.36	0.84
19 days	0.79	0.37	5.31	2.33[b]	2.43	1.54	0.21	0.06
25 days	0.90	0.37	7.56	2.92[a]	3.32	1.83[c]	0.15	0.04
31 days	1.38	0.51	7.61	2.67[a]	3.64	1.81[c]	-0.36	-0.08

[a] Significant at 1% level   [b] Significant at 5% level   [c] Significant at 10% level

Figure 2 represents the varying reaction of the equity market to the announcement of REIT-conversion of four publicly owned timber REITs (PCL, RYN, LFB and PCH) from C-corporations. The most dramatic change was showed by RYN. Just on the next day of the announcement, it earned an abnormal return of 12.3% and retained the trend till the last day of the 31-day event window when the average cumulative abnormal return reached 11.2%. On the other hand, PCL's performance in the equity market was exactly the opposite. On the next day of the event announcement, it earned a -3.6% average cumulative abnormal return. It showed the lowest average cumulative abnormal return of -16.6% on the 11th day after announcement and on the closing day of the window, the rate was -13.1%. The reaction of equity market to PCH's and LFB's REIT-conversion announcement was mild. When all these REITs were considered together as a group, the C_{NT} values were not significant in any of the event windows (Table 1). That is, the reaction of the equity market to the REIT-conversion was not drastic as a whole.
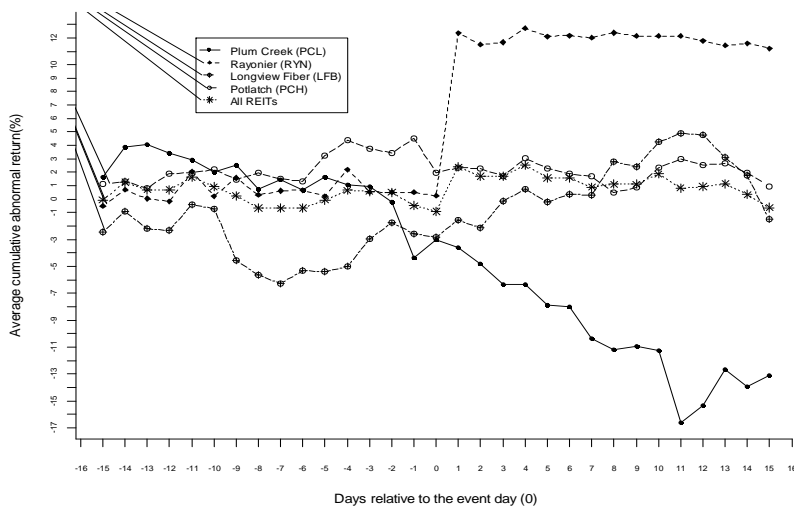
Figure 2. Cumulative abnormal returns   up to a specific day over the 31-day event window obtained in OLS model for four timber REITs.

In timberland divestiture events, the buying firms' financial performance in the capital market was significantly improved. When all firms, involved in divestitures, were considered as a single group, they performed well only when longer event windows (25 days and 31 days) were chosen. In contrast, the REIT-group's financial performance was not significantly altered due to the declaration of change in their corporate structure. Thus, it turns out, as far as financial performance is concerned, timberland transaction is a better option compared to changing corporate structure to REIT.

4.2. Cross-sectional analysis

Out of the 33 firms involved in timberland divestitures, six were dropped of the study as these firms did not have firm level financial data available in COMPUSTAT database. As a result, cross sectional study analyzed the financial information for the remaining 27 firms. The mean of the variable *ALL* was 0.4231 meaning 42.31% of the firms sold all their timberland. Similarly, the variables *PARTY* , *TRAN* , *SIZE* , *TIME* and *ROA* had the means 0.308, 0.8077, 1.01, 12.42 (years) and 11.96 respectively.

Table 2 represents the results of cross sectional study. Compared to other variables, *ROA* and *TRAN* were found to contribute significantly in the variation of average cumulative abnormal return in a 3-day event window only. This suggests that, these two variables might

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not contribute in accumulating cumulative abnormal return to the firms when the event windows were larger than 3 days.

Table 2. Cross sectional regression of average cumulative abnormal return (C_{NT}) on different financial characteristics of all the firms by different event window

Variables	3-day C_{NT}		7-day C_{NT}		13-day C_{NT}		19-day C_{NT}		25-day C_{NT}		31-day C_{NT}	
	β_i	t-stat	β_i	t-stat	β_i	t-stat	β_i	t-stat	β_i	t-stat	β_i	t-stat
Intercept	-16.34	-2.09[c]	-15.98	-0.87	-15.86	-0.89	-21.53	-0.65	-7.05	-0.17	-16.19	-0.36
ALL	-0.76	-0.62	-1.05	-0.37	-0.90	-0.32	-0.90	-0.17	2.52	0.38	2.18	0.30
TIME	0.05	0.25	0.19	0.42	-0.19	-0.44	-0.19	-0.24	-1.39	-1.34	-1.26	-1.12
ROA	0.19	2.64[b]	0.16	0.95	0.25	1.56	0.42	1.41	0.38	1.00	0.45	1.09
SIZE	0.07	0.34	-0.11	-0.22	-0.05	-0.11	-0.03	-0.03	-0.11	-0.10	-0.15	-0.12
PARTY	1.88	1.33	0.88	0.27	0.69	0.22	0.82	0.14	1.95	0.26	2.76	0.33
TRAN	15.91	2.48[b]	13.49	0.90	18.32	1.26	23.48	0.87	23.09	0.67	31.57	0.84

[b] Significance at 5% level   [c] Significance at 10% level

4.3. Risk analysis

For risk analysis, we selected 25 firms. The screening process was based on the availability of daily stock return. Some of the firms were merged with other firms and they are no longer listed in the stock market. Therefore, the daily data of their stock return were not available. The results of risk analysis and their statistical significance are reported in Table 3.

The standardized measure of systematic risk (β_i) were all significant except for Kimberly-Clark Corporation (1999-06-10) and U.S. Timberlands Company (1999-06-09). As a market portfolio contains all the risky assets, all the unique or unsystematic risks attributable to individual assets in the portfolio are diversified away. But systematic risks remain in the portfolio and change over time with the variation of macroeconomic variables that affect individual firms and industries. So the changes in the systematic risks in the forest product firms due to their timberland divestiture are quite reasonable.

Table 3. Comparison of risks of the firms before and after the divestiture events

Date	Firms	β_i				γ_i			
		50 days	100 days	150 days	200 days	50 days	100 days	150 days	200 days
1995-09-26	Fiber board Corporation	0.82[a]	0.75[a]	0.70[a]	0.78[a]	0.05	0.01	-0.02	-0.02
1995-11-28	Weyerhaeuser Company	0.73[a]	0.69[a]	0.85[a]	0.79[a]	-0.05	-0.05	-0.04	-0.03
1996-02-28	Hanson PLC	1.05[a]	1.09[a]	1.13[a]	1.21[a]	0.15	0.08	0.01	0.00

Date	Company								
1996-03-06	IP Timberlands Ltd	0.73[a]	0.92[a]	0.90[a]	0.86[a]	-0.06	-0.03	-0.03	-0.03
1996-03-12	Hanson PLC	1.00[a]	1.13[a]	1.15[a]	1.21[a]	0.11	0.02	-0.02	-0.01
1996-07-23	Weyerhaeuser Company	0.86[a]	0.97[a]	0.74[a]	0.79[a]	0.00	0.02	-0.01	-0.01
1996-08-07	River wood International Corporation	1.06[a]	1.07[a]	1.15[a]	1.13[a]	0.01	-0.04	0.02	-0.01
1996-12-17	Kimberly-Clark Corporation	0.58[b]	0.73[a]	0.79[a]	0.82[a]	-0.01	0.00	-0.01	-0.01
1996-12-26	Georgia-Pacific Corporation	1.31[a]	1.09[a]	1.02[a]	1.02[a]	0.09	0.04	0.02	0.01
1997-02-18	James River Corporation	0.58[ba]	0.71[a]	0.72[a]	0.72[a]	0.07	0.04	0.01	0.00
1997-08-04	International Paper Company	0.85[a]	0.70[a]	0.74[a]	0.72[a]	-0.06	0.00	0.00	0.01
1997-09-15	Trillium Corporation	1.10[a]	1.12[a]	1.09[a]	1.18[a]	-0.04	-0.03	-0.01	0.00
1998-03-10	IP Timberlands Ltd	0.90[a]	0.77[a]	0.80[a]	0.72[a]	0.03	0.00	0.00	0.02
1999-01-06	Kimberly-Clark Corporation	0.67[a]	0.61[a]	0.64[a]	0.61[a]	-0.02	-0.05	-0.07	-0.07
1999-06-10	Kimberly-Clark Corporation	0.18	0.28[c]	0.43[a]	0.50[a]	0.10	0.08	0.07	0.09
1999-07-30	Smurfit-Stone Container Corporation	0.51[a]	0.28[c]	0.45[a]	0.38[a]	0.04	0.16[b]	0.11[c]	0.08
1999-10-13	Alliance *Forest* Products International	0.57[b]	0.49[a]	0.43[a]	0.47[a]	-0.01	0.08	0.18[a]	0.10
1999-11-01	Timber Company, Georgia-Pacific	0.56[b]	0.77[a]	0.93[a]	1.05[a]	-0.14	-0.05	-0.02	-0.04
2001-10-23	Bowater International	2.27[a]	2.11[a]	2.29[a]	2.06[a]	1.04[b]	0.92[a]	1.05[a]	0.96[a]
2003-12-15	Weyerhaeuser Company	0.70[a]	0.63[a]	0.66[a]	0.50[a]	0.13	0.28[c]	0.20[c]	0.23[b]
2006-04-04	International Paper Company	1.60[a]	1.34[a]	1.50[a]	1.37[a]	-0.03	-0.05	-0.08	-0.06
1986-09-04	Louisiana-Pacific Corporation	0.71[b]	0.59[a]	0.68[a]	0.71[a]	-0.12	-0.07	-0.11[b]	-0.13[a]
1995-11-28	Roseburg Forest Products Company	0.73[a]	0.69[a]	0.85[a]	0.79[a]	-0.05	-0.05	-0.04	-0.03
1996-02-28	Weyerhaeuser Company	0.83[a]	0.93[a]	0.87[a]	0.91[a]	-0.10	-0.05	-0.04	-0.04
1996-03-12	Willamette Industries	0.73[a]	0.86[a]	0.90[a]	0.83[a]	-0.08	-0.03	-0.04	-0.04
1996-07-23	U.S. *Timberlands*	0.86[a]	0.97[a]	0.74[a]	0.79[a]	0.00	0.02	-0.01	-0.01
1997-02-18	Hancock Timber Resource Group	0.58[a]	0.71[a]	0.72[a]	0.72[a]	0.07	0.04	0.01	0.00
1998-03-10	IP *Forest* Resources Company	0.90[a]	0.77[a]	0.80[a]	0.72[a]	0.03	0.00	0.00	0.02
1998-10-06	Plum Creek Timber Company LP	0.76[a]	0.77[a]	0.70[a]	0.73[a]	-0.23[c]	-0.22[a]	-0.23[a]	-0.17[a]
1998-11-02	McDonald Investment Company	0.73[a]	0.78[a]	0.73[a]	0.74[a]	0.03	-0.09	-0.14[a]	-0.11[b]
1998-11-16	Campbell Group International	0.50[a]	0.68[a]	0.64[a]	0.63[a]	0.24[c]	0.02	-0.06	-0.05
1999-06-09	U.S. Timberlands Company	0.23	0.29[c]	0.43[a]	0.51[a]	0.08	0.07	0.06	0.08
1999-06-10	Joshua Management LLC	1.42[a]	1.37[a]	1.35[a]	1.29[a]	-0.05	-0.04	-0.04	-0.05

[a] Significant at 1% level   [b] Significant at 5% level   [c] Significant at 10% level

For 50 days before and after the announcement of divestiture event, the standardized measure of systematic risk increased significantly for two firms and decreased for one firm. For 100 days before and after the risk increased significantly for three firms and declined for one firm. For 150 days before and after the divestiture announcement was made, systematic risk increased for three firms and decreased also for three firms. And finally, for 200 days before and after the risk increased for two firms and decreased for three firms. For all the windows, the systematic risk increased significantly for Bowater International (2001-10-23) and decreased for Plum Creek Timber Company LP (1998-10-16).

5. Conclusion

This study suggests that the capital market responded to timberland divestiture events with the improvement of buying firms' market value. The nature and extents of average cumulative abnormal return conform with Pesendorfer [17]; but contrast with Choi [16] and Mei and Sun [15]. The declaration of changing the corporate structure of forest products firms from C-corporations to REITs did not change the firms' financial performance in the equity market. Hence timberland divestiture might be a better financial decision than changing corporate structure into REITs. However, in the present study only four timber REITs were taken into consideration. So small a sample might not reflect the true financial conditions of the REITs. This may be further investigated when more timber REITs will enter in the market.

There might be more contributing reasons behind these abnormal gain or loss of the firms other than the divestiture and REIT-conversion announcements. Again, as the timberland had been sold, the control of uninterrupted supply of raw materials for the forest product firms shifted from their hand to the buyers. Thus the sellers were subject to face more risky situations while the buyer gained better ability to control input-output markets. Furthermore, the buying firms might have some better financial or managerial strategies that helped perform better. However, these questions were not addressed in this study. In cross-sectional analysis, only two variables namely *ROA* and *TRAN* were found significantly affecting the cumulative abnormal returns of the firms in a 3-day event window. The risk analysis did not show a well defined trend as to how the systematic risk changed over time. Systematic risk constantly increased for only one firm and decrease also for only one firm over time in all post event windows.

There are so many factors that are believed to have leverage on equity market. Many of those factors were beyond the specification of this study. Thus a more detailed study could be suggested to investigate the cross-sectional factors that can influence equity returns. In this study, value added S&P 500 index was used as the proxy of the market portfolio which contains only the U.S. securities and bonds. This study could be carried out more correctly using Morgan Stanley World Equity Index or Brinson Partners Global Security Market Index that contain U.S. and international stocks & bonds. Overall, this study improves our understanding on how and to what extent the forest product firms' equity return could be affected due to announcements of industrial timberland divestitures or the conversation of forest products firms' structure from traditional C-corporations into REITs.

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