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## **Analysis of Business Week Hot-Growth Stocks: Momentum and Fundamental Investment Approaches**

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## Original Article

# Analysis of *Business Week* hot-growth stocks: Momentum and fundamental investment approaches

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**ABSTRACT** This paper extends Bauman *et al*'s (2002) study, and investigates the risk-adjusted returns for the first-timers and repeaters of the *Business Week* hot-growth stocks. Chan *et al*'s (1996) short-term 6-month momentum model provides significant returns for the first-timers as well as for stocks that had already appeared on the list at least once, the 'repeaters'. On the other hand, Mohanram's (2005) fundamental model provides significant returns for the repeaters only. A portfolio formed by purchasing the repeaters and short selling the first-timers generates significant returns in 10 out of 12 months after publication. We conclude that profitable long/short portfolios can be implemented on these growth stocks in addition to the short-only strategy as implied in Bauman *et al* (2002).

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**Keywords:** market efficiency; momentum; fundamental analysis

## INTRODUCTION

Bauman *et al* (2002) suggest that significant return reversals after publication are so prevalent on *Business Week* (*BW*) hot-growth stocks that it may be possible to develop profitable long-only or long/short trading strategies. This belief is consistent with Fama and French's (1992) finding that lower book-to-market ratios are associated with lower stock returns. On the other hand, Mohanram (2005) uses fundamental information (such as return on asset, sales

variability and intensity of capital expenditure) to develop a robust long/short strategy for low book-to-market stocks (also referred to as growth stocks). This long/short strategy executes well in small-, mid- and large-cap sub-groups. Owing to the sluggishness in the market in responding to past news, Chan *et al* (1996) find short-run price and earnings momentum in their sample. With these conflicting insights in mind, *BW*'s annual publication of a list of 100 'Hot-Growth Companies' is a perfect

candidate to test the validity of the momentum and fundamental models.

This study extends Bauman *et al* (2002) in three ways. First, it covers a subset of the *BW* hot-growth stocks that are excluded from their study: the repeat *BW* hot-growth stocks.<sup>1</sup> These are stocks that *BW* includes in its list more than once. In this paper, we refer to these as 'repeat' stocks, and to those that make the list the first-time as 'first-timers.' Second, we show that by forecasting which current *BW* hot-growth stocks will be retained in the next year's issue, a successful long-only strategy can be developed from the *BW* hot-growth stock list.<sup>2</sup> Finally, we test the return performance on long/short trading strategies based on Chan *et al* (1996) momentum strategies and Mohanram's fundamental GSCORE system. We find that the former approach performs better for first-time *BW* hot-growth stocks, whereas the latter approach performs better for repeat stocks. In addition, both approaches indicate that returns in the short portfolios are higher than those in the long portfolios. This observation confirms the existence of a strong return reversal pattern on *BW* hot-growth stocks after publication.

This paper is organized as follows. Related literature is reviewed in the next section. The data and methodology are described in the subsequent section. The penultimate section provides the results. The final section concludes our study.

## RELATED LITERATURE

Clendenin and Van Cleave (1954) define a growth firm as one that is able to earn a large profit margin and reward its investors significantly because of its superior management, successful R&D or other competitive advantages. As the prices at which investors purchase these firms' stocks may not correctly reflect their underlying growth potential, Clendenin and Van Cleave (1954) and Durand (1957) state that profitable growth stock investments are only

possible if the investment is purchased at a reasonable price.

This finding is further supported by Bauman *et al* (2002), who examine 100 growth companies selected by *BW* magazine annually between 1985 and 1995. They conclude that a strong reversal in stock returns in the 3-year post-publication period appears to be caused by the downturn in operating performance.<sup>3</sup>

Focusing on low book-to-market firms, Mohanram (2005) ranks stocks relative to their industries' medians on the basis of several fundamental values: return on assets, net cash flows on assets, earnings and growth stability, intensity of R&D, capital expenditure, and advertising. From these ranks, he forms an overall score, called the 'GSCORE.' He finds that firms with the highest (lowest) GSCORE values earned excess returns of 3.1 per cent (−17.5 per cent) in the first year after portfolio formation.

Chan *et al* (1996) conclude that there is little evidence of subsequent reversals in the returns of stocks with high price and earnings momentum. They find that past earnings surprises and analysts' earnings forecasts predict large drifts in future returns after controlling the size effect, book-to-market effect and market risk. Hence, they conclude that the market responds only gradually to new information.

## DATA AND METHODOLOGY

### Data selection

Using the Standard and Poor's Compustat database, *BW* has gradually modified the universe from which it selects the hot-growth stocks. In the 27 May 1985 issue, only non-financial companies and non-utilities with sales less than US\$150 million and share price no less than \$1 are considered. In the issue of 6 June 2006, 21 years later, *BW* only includes non-financial and non-utility companies with annual sales between \$50 million and \$1.5 billion,

current market value greater than \$25 millions, current stock price greater than \$5/share, and be actively traded.

A composite rank is assigned to each qualified company. This rank consists of the sum of 0.5 times its rank based on return on total capital, 0.25 times its rank based on sales growth and 0.25 times its rank based on earnings growth (growth rate in net income).<sup>4</sup> *BW* then selects the 100 companies with the highest composite ranks each year and publishes the list in a late May or early June issue.<sup>5</sup>

Our data span the years from 1985 to 2004. The sample includes a total of 2000 companies, of which 1275 are first-time *BW*

hot-growth stocks and 725 are repeat hot-growth stocks. Descriptive statistics for the entire set of *BW* hot-growth companies and the two sub-groups, first-timers and repeaters, are presented in Table 1. The source of these data is *BW*.

Based on the median values in Panel A, a typical *BW* hot-growth stock has a 3-year average increase in sales as high as 39 per cent, a 70 per cent increase in profits and a 22 per cent return on capital in the 3 years before publication. In terms of size, this median company has \$72 million in sales (latest 12 months), \$7 million in profits and \$148 million in market value. Its current price is 18 per cent below the 52-week

**Table 1:** Descriptive statistics for business week's hot growth firms between 1985 and 2004

Variable	Min.	1st Pct.**	25th Pct.	50th Pct.	75th Pct.	99th Pct.	Max.	Mean
<i>Panel A. Summary statistics on the key variables for the entire sample (2,000** hot growth stocks)</i>								
3-Yr. avg increase (%) in Sales	4	8	24	39	63	228	721	52
3-Yr. avg. increase (%) in profits	1	10	43	70	123	532	1728	104
3-Yr. avg. return (%) on capital	6	8	16	22	29	68	88	25
12-Month Sales (in \$ million)	2	5	35	72	137	1238	1471	158
12 Month earnings (in \$ million)	0	0	3	7	17	167	431	18
Market value (in \$ million)	2	8	60	148	452	7198	29469	536
P-E ratio	1	5	14	21	31	134	1016	28
Recent price	1	3	11	18	28	80	250	22
% Off 52-week high	-80	-65	-32	-18	-8	0	0	-21
% Off 52-week low	0	0	36	67	117	500	1550	96
<i>Panel B. Summary statistics on the key variables for the first-timers (1,275*** hot growth stocks)</i>								
3-Yr. Avg increase (%) in sales	4	7	25	40	69	255	721	56
3-Yr. avg. increase (%) in profits	2	11	48	80	140	669	1728	117
3-Yr. avg. return (%) on capital	6	8	16	21	31	70	88	26
12-Month sales (in \$ million)	2	5	30	60	116	1188	1448	130
12 Month earnings (in \$ million)	0	0	3	5	13	151	307	14
Market value (in \$ million)	2	6	50	116	311	5366	29469	421
P-E Ratio	1	5	14	20	30	140	1016	28
Recent Price	1	2	10	16	25	83	250	20
% Off 52-week High	-80	-65	-32	-18	-8	0	0	-21
% Off 52-week low	0	0	36	69	122	544	1550	101
<i>Panel C. Summary statistics on the key variables for the non-first timers (725 hot growth stocks)</i>								
3-Yr. avg Increase (%) in sales	7	10	24	37	56	175	412	46
3-Yr. avg. increase (%) in profits	1	9	35	59	99	428	1620	81
3-Yr. avg. return (%) On capital	7	9	17	22	27	50	60	23
12-Month sales (in \$ million)	3	10	48	98	242	1312	1471	208
12 Month earnings (in \$ million)	0	1	5	11	27	201	431	24
Market value (in \$ million)	5	13	94	258	717	7582	21282	734
P-E ratio	4	6	16	23	31	92	399	27
Recent price	2	4	14	22	32	76	124	25
% off 52-week high	-77	-65	-33	-18	-8	0	0	-22
% Off 52-week low	0	0	38	67	110	400	600	88

All data are derived from the original tables in *Business Week*. Per cent Off 52-Week High (Low) is computed from the recent price. 52-week High (Low) are reported from *BW*. Among the 2,000 stocks covered in this study, 1,275 stocks are first-timers and 725 stocks are repeaters\*.

\*The frequency for the non-first timers is as follows: 1 firm appeared on the list for 8 times, 3 firms for 7 times, 11 firms for 6 times, 26 firms for 5 times, 67 firms for 4 times, 151 firms for 3 times, and 466 firms for 2 times.

\*\*Percentile is denoted as Pct.

\*\*\*We are unable to identify 5 stocks from the CRSP database. 4 of the stocks are listed in 1985 issue and 1 for the 1993 issue.

highest price and 67 per cent above the 52-week lowest price. The median price–earnings (12 months) ratio is 21. The lowest 3-year averages for sales increase, profit increase and return on capital are 4 per cent, 1 per cent and 6 per cent, respectively. The means are higher than the medians in all rows except for the ‘per cent off 52-week high’ variable.<sup>6</sup>

Based on the medians in both Panels B (first-timers) and C (repeaters), first-time hot-growth companies have outperformed the repeaters in terms of 3-year averages of sales increase (40 per cent versus 37 per cent) and profit increase (80 per cent versus 59 per cent). On the other hand, the repeat hot-growth companies have higher recent 12-month sales and earnings, market value, and share prices than the first-timers, in both medians and means. Clearly, there are very significant performance and size differences between these two groups of companies. For this reason, a comparative analysis of these two sub-samples is warranted.

Monthly return data from the Center for Research in Security Prices (CRSP) are used to measure stock performance in the 36 months before the *BW* publication. The distributions of various sub-periods of stock returns are studied for both first-timers and repeaters. To be included, the stock must have at least 24 months of data in the 36 months before the publication month. The results include both absolute and market-adjusted returns, relative to the S&P 500 and the Russell 2000 Indexes. A binomial test is used to determine whether the percentage of growth stocks with positive prior returns is significantly different from 50 per cent.

### Regression analysis

By using Eventus Software, the returns of the first-time and repeat growth stock portfolios are examined within the framework of the market model and a two-step Fama–French model. The CRSP equally weighted index is used as the proxy for the market in the

market model. The two-step Fama and French (1993) model is expressed as follows:

$$r_{pt} - r_{ft} = \alpha_p + \beta_p MKTRF_t + \lambda_p SMB_t + \theta_p HML_t + \varepsilon_{pt} \quad (1)$$

Here  $r_{pt}$  is the return on the hot-growth stock portfolio in month  $t$ ;  $MKTRF_t$  is the excess return of the CRSP value-weighted index over the Treasury bill rate,  $SMB_t$  is the return on the mimicking portfolio for size (Small minus Big) and  $HML_t$  is the return on the mimicking portfolio for book-to-market (High minus Low).

The event month ( $t=0$ ) is defined as the month when *BW* publishes its hot-growth company list. The parameters of the market and the Fama–French models are estimated before the event month, with a minimum of 24 months and a maximum 36 months of returns data. Excess returns of various post-publication periods are evaluated. Excess returns significantly different from zero would signify the impact of the *BW*'s publication of the hot-growth list, and they would suggest that profitable trading strategies may be possible.

### The momentum and fundamental approaches, and the logit model

To test whether a similar Chan *et al* (1996) portfolio based on short-term price momentum can be applied to the universe of two groups of growth stocks (first-timers versus repeaters), prior 6-month and 12-month returns are used to rank each group into quartiles. The top quartile of stocks includes the stocks with highest prior 6-month (or 12-month) returns. A two-tailed  $t$ -test is performed on the differences between the post-publication returns in the top and bottom quartiles.

Mohanram's (2005) fundamental score system is applied to the overall *BW* hot-growth stocks, the first-timers, and the repeat *BW* hot-growth stocks. In particular, the returns of portfolios of stocks with strong

fundamentals ( $6 \leq \text{GSCORE} \leq 8$ ) are compared to those with weak fundamentals ( $0 \leq \text{GSCORE} \leq 4$ ). The significance of the return difference would indicate the success of the long/short trading strategies.

Last but not least, we determine whether the first-timers react similarly as the repeaters. We investigate whether it is beneficial for financial analysts to forecast which *BW* hot-growth stocks in a given year have the highest likelihood of being chosen again the following year. As a result, the 12-month post-publication performances of two portfolios (next year's repeaters and next year's first-timers) are examined. These results would shed light on the usefulness of the yearly publication of hot-growth stocks by *BW*. In addition, we also estimate a logit model to predict the probability of being selected as *BW* hot-growth stocks in two consecutive years.

## EMPIRICAL RESULTS

### Returns before publication in the *BW* list of hot-growth companies

In this section, returns in the 36 months before the publication month are studied. Table 2 presents the distribution of various sub-periods of the returns for the first-time *BW* hot-growth stocks. Similar to the results of Bauman *et al* (2002), first-time *BW* hot-growth stocks usually experience significant value appreciation before publication. Take the median (50 percentile) as an example. There is a 171 per cent increase in prior absolute cumulative returns (Panel A), 108 per cent increase when the prior cumulative excess returns are compared to the S&P 500 index (Panel B) and 102 per cent increase when the prior cumulative excess returns are compared to the Russell 2000 index (Panel C).

The market does not award all high growth stocks equally in the 36-month

period before the publication month. Negative relative returns are found in the bottom quartile portfolio in these sub-periods:  $(-36, -25)$ ,  $(-24, -13)$ ,  $(-12, -1)$  and  $(-6, -1)$  (Panels B and C). For example, among the 1256 first-timers with enough returns in the  $(-6, -1)$  period, the portfolio return in the 1 percentile is  $-56$  per cent and  $-11$  per cent for the portfolio in the 25 percentile (Panel B). On the other hand, positive relative 12-month returns in the same sub-periods are found in the top quartile portfolio. The percentage of stocks with positive returns ranges from 38 to 83 per cent (Panel B) and 33 to 78 per cent (Panel C).

Table 3 presents the distribution of various sub-periods of returns for the repeat *BW* hot-growth stocks. Repeaters perform slightly better than first-timers (Table 2) in terms of percentages of positive returns and for the 50-percentile portfolio in most sub-periods (Panels B and C). Except for the sub-periods  $(-12, -1)$  and  $(-6, -1)$ , repeaters outperform the first-timers in terms of the percentages of positive returns and for the 50-percentile portfolio (Panel B). Similar observations are also found for four sub-periods in Panel C.

Two important conjectures can be drawn from Table 3. First, mean relative returns of 34 per cent (Panel B) and 31 per cent (Panel C) are found in the  $(-12, -1)$  period. These results indicate that it is worthwhile for the investors to forecast the firms in the current *BW* hot-growth companies that are most likely to be chosen again in the next issue. Second, the annualized (mean) relative return is greater in the  $(-36, -1)$  period than the  $(-24, -1)$  and  $(-12, -1)$  periods. The reward for forecasting correctly in the earlier period is greater if we can forecast earlier which stocks will be included in the *BW* hot-growth list, as evidenced by the declining annualized (mean) relative return of 45 per cent  $(-36$  to  $-1)$ , 40 per cent  $(-24$  to  $-1)$  and 31 per cent  $(-12$  to  $-1)$  in Panel C.



**Table 2:** Descriptive statistics on the past returns (in per cent) for the first-timers between 1985 and 2004

Prior Period	Count	% Pos	Min.	1st Pct.	25th Pct.	50th Pct.	75th Pct.	99th Pct.	Max.	Mean
<i>Panel A. Summary of prior absolute cumulative returns</i>										
Month (-36 to -1)	653	93.0***	-81	-46	68	171	350	1607	3082	276
Month (-36 to -13)	586	86.2***	-74	-54	34	109	221	1011	1958	167
Month (-36 to -25)	539	78.5***	-80	-59	5	41	115	474	743	75
Month (-24 to -13)	732	73.2***	-82	-58	-3	35	96	409	1085	61
Month (-12 to -1)	1,116	75.4***	-78	-58	1	33	76	384	758	56
Month (-6 to -1)	1,256	71.2***	-74	-51	-4	20	49	225	523	30
<i>Panel B. Summary of prior cumulative excess returns (benchmark=S&amp;P 500)</i>										
Month (-36 to -1)	653	83.8***	-89	-68	30	108	253	1242	3207	196
Month (-36 to -13)	586	80.0***	-82	-65	14	69	168	953	2384	126
Month (-36 to -25)	539	71.4***	-82	-59	-6	30	83	406	626	54
Month (-24 to -13)	732	70.2***	-81	-59	-7	28	75	370	973	50
Month (-12 to -1)	1,116	67.5***	-82	-65	-8	21	64	386	696	42
Month (-6 to -1)	1,256	63.3***	-79	-56	-11	11	38	197	500	20
<i>Panel C. Summary of prior cumulative excess returns (benchmark=Russll 2000)</i>										
Month (-36 to -1)	653	85.1***	-81	-64	25	102	251	1136	2800	185
Month (-36 to -13)	586	79.9***	-76	-64	10	69	153	818	1899	119
Month (-36 to -25)	539	70.9***	-77	-60	-3	26	78	402	551	50
Month (-24 to -13)	732	69.8***	-81	-57	-6	27	73	360	999	49
Month (-12 to -1)	1,116	68.4***	-77	-61	-8	20	59	352	681	40
Month (-6 to -1)	1,256	58.7***	-75	-57	-13	8	33	179	473	16

Event month is determined by the issue date of the *BW*'s hot growth list.

Only firms with at least 2/3 of monthly returns in a given period are included.

Binomial test ( $p=0.5$ ) is used in testing whether 50 per cent of stocks have positive prior returns.

\*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

## Post-publication performance of two hypothetical portfolios

Table 4 compares the 12-month post-publication returns of two hypothetical portfolios: one made of next-year's repeaters and the other of next-year's first-timers. Although the monthly excess returns of the first-timers are generally negative, the monthly excess returns of the repeaters are usually positive in this period. A combined portfolio formed by purchasing the repeaters and short selling the first-timers would have generated an average of 19.17 per cent (33.59 per cent) in the 6-month (12-month) periods after portfolio formation. The average monthly performance of this combined portfolio is also significantly different from zero in 10 out of the 12 post-publication months.

Overall, the results in Table 4 reinforce the findings of Table 3. These observations provide an incentive for investors to form a long/short portfolio based on the annual list of 100 *BW* hot-growth stocks. By modeling the possibility of a current *BW* hot-growth stock being selected again in *BW*'s next year's

list, it is possible for investors to capture the excess returns shown in both Tables 3 and 4.

## Excess returns after publication

The monthly returns of various post-publication months (+1, +2, ..., +12) and multiple-month periods [(+1, +6), (+7, +12), (+1, +12), (+13, +24) and (+25, +36)] are evaluated within the framework of a market model and a two-step Fama-French three-factor model. By choosing a 12-month post-publication period, we reduce any effect of having companies selected in consecutive years as growth companies. Equally weighted monthly returns are calculated across stocks that belong to the same issue year and then across years. The S&P 500 composite return is used as the benchmark. Results based on first-time and repeat *BW* hot-growth stocks are presented in Tables 5 and 6, respectively.

Average monthly excess returns for the first-timers are mostly negative and significantly different from zero in the first 12

**Table 3:** Descriptive statistics on the past returns for repeaters between 1985 and 2004

Prior period	Count	% Pos	Min.	1st Pct.	25th Pct.	50th Pct.	75th Pct.	99th Pct.	Max	Mean
<i>Panel A. Summary of prior absolute cumulative returns</i>										
Month (-36 to -1)	610	94.6***	-51	-43	71	161	322	1521	5984	263
Month (-36 to -13)	562	90.9***	-70	-47	43	105	215	975	4493	165
Month (-36 to -25)	532	82.0***	-77	-49	8	52	104	390	1085	73
Month (-24 to -13)	673	80.5***	-75	-56	6	40	86	375	612	60
Month (-12 to -1)	724	72.8***	-76	-53	-2	30	73	333	488	45
Month (-6 to -1)	725	70.1***	-65	-45	-4	13	40	186	300	23
<i>Panel B. Summary of prior cumulative excess returns (Benchmark = S&amp;P 500)</i>										
Month (-36 to -1)	610	87.4***	-68	-52	43	122	249	1184	3282	198
Month (-36 to -13)	562	86.3***	-78	-57	24	83	181	828	3197	132
Month (-36 to -25)	532	77.3***	-78	-52	4	41	92	362	973	61
Month (-24 to -13)	673	76.7***	-80	-61	3	31	74	352	541	50
Month (-12 to -1)	724	69.8***	-78	-60	-7	22	60	291	429	34
Month (-6 to -1)	725	61.4***	-67	-52	-10	9	31	147	267	15
<i>Panel C. Summary of prior cumulative excess returns (Benchmark=Russll 2000)</i>										
Month (-36 to -1)	610	87.7***	-62	-51	41	109	224	1077	3720	184
Month (-36 to -13)	562	86.1***	-74	-55	24	79	171	854	3198	125
Month (-36 to -25)	532	78.0***	-81	-54	4	36	81	356	999	58
Month (-24 to -13)	673	76.8***	-81	-59	3	29	70	324	539	49
Month (-12 to -1)	724	67.3***	-83	-58	-8	18	53	293	452	31
Month (-6 to -1)	725	57.0***	-76	-50	-13	4	26	124	275	9

Event month is determined by the issue date of the *BW*'s hot growth list. Only firms with at least 2/3 of monthly returns in a given period are included. Binomial test ( $p=0.5$ ) is used in testing whether 50 per cent of stocks have positive prior returns. \*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

months after the publication month ( $t = 0$ ) (Table 5). These negative periodic average excess returns continue in the second year (+13, +24) and third year (+25, +36) after the publication. Investors who purchase these growth stocks at the end of *BW* publication month would have suffered a loss of 42 per cent in the first year, 37 per cent in the second year and 33 per cent in the third year on average. The rank tests confirm the significantly negative post-publication returns for multiple-month sub-periods. These findings closely match those of Bauman *et al* (2002). The results for the repeaters in Table 6 are similar to those in Table 5 for the first-timers. Significantly, negative excess returns in various post-publication periods are found in both the market and the two-step Fama–French models.<sup>7</sup>

### Investment performance of portfolios based on pre-publication returns

Chan *et al* (1996) state that as the market responds gradually to new information,

stocks with better short-term performance should continue to outperform stocks with poorer short-term performance. This section re-examines this hypothesis by using the 6- and 12-month pre-publication cumulative returns to separate the available return data into quartiles. In particular, we hypothesize that the stocks in the top quartile outperform the stocks in the bottom quartile in the months after the publication of the hot-growth lists.

The test results based on the two measures of price momentum are presented in Table 7. Our focus is on the return patterns of both the top and bottom quartiles in the post-publication period and the excess returns of the top quartile of stocks over the bottom quartile. While the portfolios in Panel A are formed on the basis of 12-month pre-publication returns, those in Panel B are based on 6-month pre-publication returns. Quartile portfolios are formed on either the whole *BW* hot-growth universe, first-timers only, or repeaters only.

The reversal pattern in the post-publication periods appears more frequently



**Table 4:** Average post-publication excess returns for two hypothesized portfolios (1985–2004)

<i>Period</i>	<i>Next year repeaters</i>	<i>Next year non-repeaters</i>	<i>Repeaters'–non-repeaters'</i>	<i>t-test value</i>
Month + 1	0.0242	–0.0134	0.0376	3.1819***
Month + 2	0.0264	–0.0141	0.0405	3.5380***
Month + 3	0.0150	–0.0130	0.0280	3.2305***
Month + 4	0.0370	–0.0095	0.0465	3.7100***
Month + 5	0.0183	–0.0073	0.0256	2.8625***
Month + 6	0.0193	0.0007	0.0187	2.1757**
Month + 7	0.0163	–0.0216	0.0379	3.8670***
Month + 8	0.0289	0.0010	0.0279	2.3728**
Month + 9	0.0107	–0.0180	0.0287	2.9128***
Month + 10	0.0101	–0.0136	0.0237	1.7549*
Month + 11	0.0127	–0.0086	0.0213	1.5318
Month + 12	0.0103	0.0064	0.0038	0.3153
Month (+ 1to + 6)	0.1337	–0.0581	0.1917	7.6723***
Month (+ 1to + 12)	0.2218	–0.1141	0.3359	8.8902***

*BW* Hot growth stocks in any given year are assigned to one of the two portfolios: Repeaters and Non-repeaters. All stocks are equally weighted within a portfolio. Average excess returns over Russell 2000 index are computed across years for these portfolios. Comparisons are made. Event month (Month 0) is defined as the publication month.

*Notes:* 1. Stocks are required to have at least 8 months of return data prior to the event month 2. The number of repeaters ranges from 12 (of 1985's list) to 42 (of 2003's list) and an average of 27.5 per year. 3. There are 550 repeaters and 1290 non-repeaters in the final sample.

\*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

**Table 5:** Mean (cumulative) excess returns for the first timers: based on the the market and 2-step fama-french models (1985–2004)

<i>Event month(s)</i>	<i>N</i>	<i>Market (CRSP EW index) model</i>		<i>2-Step Fama-French mode</i>	
		<i>Excess return (%)</i>	<i>Rank test Z-score</i>	<i>Excess return (%)</i>	<i>Rank test Z-score</i>
0	653	–1.12	–0.05	–1.06	–0.10
+ 1	647	–4.24***	–1.53*	–4.11***	–1.64
+ 2	645	–3.89***	–1.23	–3.94***	–1.46
+ 3	645	–4.29***	–1.94**	–4.37***	–1.93*
+ 4	645	–2.01*	–0.49	–2.57**	–0.86
+ 5	641	–2.27*	–0.48	–2.22**	–0.56
+ 6	638	–1.90	–0.36	–2.49**	–0.92
+ 7	635	–3.20***	–1.04	–3.97***	–1.54
+ 8	631	–6.79***	–3.13***	–6.00***	–2.69***
+ 9	625	–4.57***	–1.85**	–4.61***	–1.54
+ 10	624	–3.83***	–1.23	–2.40**	–0.75
+ 11	619	–2.52**	–0.73	–2.86***	–1.34
+ 12	617	–3.33***	–1.17	–3.31***	–1.31
(+ 1, + 6)	647	–18.52***	–2.46**	–19.61***	–3.01***
(+ 7, + 12)	636	–23.87***	–3.74***	–22.79***	–3.75***
(+ 1, + 12)	647	–41.99***	–4.38***	–42.01***	–4.78***
(+ 13, + 24)	615	–37.20***	–3.92***	–36.01***	–4.31***
(+ 25, + 36)	584	–32.72***	–3.74***	–33.52***	–4.36***

Only *BW*'s hot growth stocks that were selected for the first time and have at least 24 months of return data prior to the event month from CRSP are included. Parameters of the market model and the Fama-French model are estimated based on the prior event months (with a minimum of 24 and a maximum of 36 months of data). CRSP equally weighted index is used as the market proxy in the market model. Event month ( $t = 0$ ) is defined as the month when *BW* published its hot growth list.

\*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

**Table 6:** Mean (cumulative) excess returns for repeaters: based on the market model and 2-step fama-french model (1985–2004)

Event month(s)	N	Market (CRSP EW Index) model		2-Step Fama-French model	
		Excess return (%)	Rank test Z-score	Excess return (%)	Rank test Z-score
0	610	-1.98	-0.29	-2.21*	-0.62
+1	610	-4.11**	-1.23	-3.47***	-0.98
+2	607	-3.14*	-0.72	-2.83**	-0.71
+3	606	-3.01*	-1.04	-3.47***	-1.47
+4	605	-1.95	-0.16	-2.27*	-0.39
+5	603	-1.61	-0.16	-1.88	-0.56
+6	602	-3.02*	-1.01	-3.27**	-1.36
+7	600	-1.29	-0.19	-1.73	-0.59
+8	596	-6.72***	-2.71***	-5.54***	-2.38**
+9	595	-3.83**	-1.26	-2.64**	-0.48
+10	594	-3.62**	-1.39*	-2.76**	-1.15
+11	594	-3.14*	-0.93	-2.69**	-0.92
+12	594	-2.39	-0.49	-2.87**	-1.09
(+1, +6)	610	-16.72***	-1.77**	-17.07***	-2.23**
(+7, +12)	600	-20.82***	-2.85***	-18.08***	-2.70***
(+1, +12)	610	-37.21***	-3.26***	-34.86***	-3.48***
(+13, +24)	591	-39.62***	-3.96***	-39.97***	-4.68***
(+25, +36)	566	-35.25***	-4.02***	-33.61***	-4.28***

Only BW's hot growth stocks that were selected for repeatedly and have at least 24 months of return data prior to the event month from CRSP are included. Parameters of the market model and the Fama-French model are estimated based on the prior event months (with a minimum of 24 and a maximum of 36 months of data). CRSP equally weighted index is used as the market proxy in The market model. Event month ( $t=0$ ) is defined as the month when BW published its hot growth list.

\*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

**Table 7:** Average post-publication excess returns for quartile portfolios based on pre-publication returns (1985–2004)

	Quartile #1	Quartile #2	Quartile #3	Quartile #4	Q # 1's – Q # 4's	t-test value
<i>Panel A: Quartile portfolios based on 12-month returns prior to the event month</i>						
<i>(A) Post-event 6-month (month [+1 to +6]) average excess returns</i>						
All BW hot growth stocks	0.0437	0.0251	-0.0321	-0.0392	0.0829	2.8633***
First-timers	0.0308	0.0175	-0.0134	-0.0476	0.0784	2.0461*
Repeaters	0.0432	0.0328	-0.0344	-0.0291	0.0723	1.6196
<i>(B) Post-event 12-month (month [+1 to +12]) average excess returns</i>						
All BW hot growth stocks	0.0392	-0.0081	-0.0450	-0.0313	0.0705	1.3017
First-timers	0.0315	-0.0226	-0.0442	-0.0329	0.0645	1.0580
Repeaters	0.0363	0.0102	-0.0054	-0.0257	0.0621	0.8257
<i>Panel B: Quartile portfolios based on 6-month returns prior to the event month</i>						
<i>(A) Post-event 6-month (month [+1 to +6]) average excess returns</i>						
All BW Hot growth stocks	0.0333	0.0403	-0.0203	-0.0633	0.0966	3.6918***
First-timers	0.0336	0.0284	0.0008	-0.0849	0.1185	4.3859***
Repeaters	0.0386	0.0482	-0.0386	-0.0349	0.0735	2.0783*
<i>(B) Post-event 12-month (month [+1 to +12]) average excess returns</i>						
All BW hot growth stocks	0.0391	0.0184	-0.0316	-0.0757	0.1147	2.3626**
First-timers	0.0381	0.0225	-0.0299	-0.1008	0.1389	2.4154**
Repeaters	0.0384	0.0388	-0.0368	-0.0248	0.0632	1.1240

Based on the prior 12-month or 6-month returns, BW hot growth stocks are assigned to one of the four portfolios. Quartile #1 (#4) represents the portfolios with the highest (lowest) prior returns. All stocks are equally weighted within a portfolio. Average excess returns over Russell 2000 index are computed across years. The returns in the top quartile and and bottom quartile are compared.

\*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

in the bottom quartile portfolio than in those of the other three quartile portfolios in both panels and across the overall sample, the first-timers and the repeaters. For the quartiles formed from 12-month pre-publication returns, the difference of the 6-month post-publication returns between the top quartile (Quartile no. 1) and the bottom quartile (Quartile no. 4) ranges from 7.23 per cent for the repeaters to 8.29 per cent for all hot-growth stocks. In addition, the 6-month post-publication return differences are significantly different from zero for the overall sample and the first-timers (Panel A). The results are stronger when the quartiles are formed based on the 6-month pre-publication returns. Statistical significances are found in the 6-month and 12-month post-publication return differences for portfolios that consist of either all hot-growth stocks or first-timers.

These findings support those of Chan *et al* (1996). As the market responds gradually to new information, stocks with better short-term performance continue to outperform stocks with poorer short-term performance. In addition, this positive excess return

(Quartile no.1–4) results more from the poor performance of the bottom quartile of stocks than to the good performance of the top quartile of stocks. The finding of nearly flat or negative performance in the post-publication periods in both quartiles is consistent with Bauman *et al* (2002) findings on operating performance.

### Investment performance of GSCORE portfolios

Mohanram (2005) uses several fundamental variables to develop a score system to distinguish between better and poorer performing stocks (with very low positive book-to-market ratios). We employ his method to assess whether it is possible to distinguish between *BW* hot-growth stocks that are most (and least) likely to produce positive excess returns in a short period after the publication month.

In order to maintain a sufficient number of stocks in the portfolios, we include stocks with GSCOREs between 6 and 8 in the portfolio with stronger fundamentals (Portfolio S), and stocks with GSCOREs

**Table 8:** Average post-publication excess returns for the portfolios: based on the GSCORE model 1985–2004

	Portfolio S	Portfolio W	Port S's – Port W's	t-test value
	Gscore >=6	Gscore <=4		
<i>Panel A: Post-event 6-month [month (+1, +6)] average excess returns</i>				
All BW hot growth stocks	0.0062	–0.0271	0.0333	1.3247
First timers	–0.0079	–0.0155	0.0077	0.2780
Repeaters	0.0278	–0.0541	0.0820	2.2620**
<i>Panel B: Post-event 12-month [month (+1, +6)] average excess returns</i>				
All BW hot growth stocks	–0.0067	–0.0318	0.0250	0.6393
First timers	–0.0306	–0.0050	–0.0256	–0.5545
Repeaters	0.0322	–0.0685	0.1007	1.8089*
<i>Note: The annual average number of stocks with Gscore</i>				
		>=6	<=4	
First timers (20 years)	–	23.8	20.2	–
Repeaters (19 years)	–	18.6	9.6	–

*BW* Hot growth stocks in each *BW* issue are grouped by their GSCORE (refer to Mohanram (2005)) with the maximum score 8 representing the strongest fundamentals and 0 for the weakest. Portfolios are formed at each of the 20 event month end for the first timers (19 for the non-first-timers). All stocks are equally weighted within a portfolio. Average excess returns over Russell 2000 index are computed across years. Strong-fundamental portfolio (Portfolio S) and weak-fundamental portfolio (Portfolio W) are compared.

\*, \*\* Significant at 10 per cent, 5 per cent confidence level (2-tailed test).

**Table 9:** Linear probability models: logit modeling the chance of being selected as bw hot growth stocks in consecutive years: overall period and two sub-periods

Constant	1985–2004	1985–1994	1995–2004
3-Yr. avg increase(%) in sales	–1.0344***	–0.9546**	–0.4117
3-Yr. avg. increase(%) in profit	0.0018*	0.0023	0.0002
3-Yr. avg. return(%) on capital	0.0005	0.0022***	–0.0005
12 Month sales (in \$ million)	0.0081***	0.0182***	0.0016
12 Month earnings (in \$ million)	0.0002	–0.0138***	0.0000
Market value (in \$ million)	–0.0045	0.0079	–0.0057
P-E ratio	0.0000	–0.0002	0.0001
Recent price	–0.0020	0.0022	–0.0045
% Off 52-week high	0.0117	–0.0361	0.0127
% Off 52-week low	0.0126**	0.0196*	0.0189**
52-Week high	0.0010	0.0007	–0.0001
52-Week low	–0.0083	0.0458	–0.0028
	0.0060	–0.0111	–0.0023
LR statistic			
Probability(LR stat)	47.4910	81.5062	33.6197
McFadden R-squared	0.0000	0.0000	0.0000
Degree of freedom	0.0197	0.0684	0.0276
Total observations	12	12	12
Observation (%) with Dep=0	1,967	970	997
Observation (%) with Dep=1	1,372 (70%)	675 (70%)	697 (70%)
	595 (30%)	295 (30%)	300 (30%)

Multivariate logit models are applied to the *Business Week's* hot growth stocks in a given year to be selected again ( $y_{t+1}=1|y_t=1$ ) or not ( $y_{t+1}=0|y_t=1$ ) in the following year.

\*, \*\*, \*\*\* Significant at 10 per cent, 5 per cent, 1 per cent confidence level (2-tailed test).

between 0 and 4 in the portfolio with weaker fundamentals (Portfolio W). The annual average number of stocks in Portfolio S is 42 (including 23 first-timers and 18 repeaters). In the meantime, the yearly average number of stocks in Portfolio W is 30 (with 20 first-timers and 10 repeaters).

Both 6-month and 12-month post-publication performances of these two portfolios are presented in Table 8. Six-month returns for the all-stock and first-timers Portfolio S (0.62 per cent and –0.79 per cent) fail to outperform Portfolio W (–2.71 per cent and –1.55 per cent). On the other hand, the repeat Portfolio S outperforms the repeat Portfolio W by 8.20 per cent on average, and this difference is statistically significant at 5 per cent level (Panel A). A similar conclusion can be drawn from Panel B. The 12-month return differences between Portfolio S and Portfolio W for all-stocks and first-timers are 2.50 per cent and –2.56 per cent, while the 12-month return difference for repeaters (10.07 per cent) is significant at 10 per cent level.

As no positive significant 6- (or 12-) monthly excess return differences between Portfolio S and Portfolio W are found for the overall sample and the first-timers, this result is consistent with Bauman *et al* (2002). The significant performance difference between Portfolio S and Portfolio W for the repeat *BW* hot-growth stocks is consistent with Mohanram. In particular, the latter result suggests that purchasing the portfolio with a high GSCORE and short selling the portfolio with a low GSCORE might produce positive returns. Furthermore, the investors will expect that the superior returns may mainly derive from the short side of the portfolio.

### Logit model: Probability of being selected in two consecutive years

Table 9 presents the regression results of the logit model on the 12 variables (using the data summarized in Table 1) from the overall period (1985–2004) and two sub-periods (1985–1994 and 1995–2004). The model has

the strongest predictive power in the first sub-period. The likelihood ratio (LR) statistic is 81.5062, and four of the 12 variable coefficients are significantly different from zero. Other than the variable of 'per cent off 52-week high', the logit model loses its predictive ability in the second sub-period (1995–2004). Hence, we conclude that it has become more difficult to predict which *BW* hot-growth stock will be chosen again next year based on the annual publication of the hot-growth list provided by *BW*.

## SUMMARY AND CONCLUSIONS

As repeat *BW* hot-growth stocks appear to have longer sales and profit growth data than the first-time *BW* growth stocks, it is our belief that the repeat *BW* hot-growth stocks are less likely to suffer severe return reversal. Other factors (such as capital expenditure, R&D, managerial forecasts) that are different from the ones listed in the *BW* magazine may enable one to distinguish the winning *BW* hot-growth stocks from losing ones. Hence, the objective of this paper is to extend the analysis in Bauman *et al* (2002) to two sub-samples: first-time *BW* growth stocks versus repeat *BW* growth stocks. Risk-adjusted returns are investigated within the framework of the market model and a two-step Fama–French model. In addition, two models are adopted to develop the potential profitable long/short strategies.

Overall, it is noteworthy that a combined portfolio formed by purchasing the repeaters and short selling the first-timers generates significant returns in 10 out of 12 post-publication months. Using Chan *et al* (1996) momentum model and Mohanram's fundamental GSCORE model to construct the long/short portfolios, we find that the former approach performs better for first-time *BW* hot-growth stocks, whereas the latter approach performs better for repeat

*BW* hot-growth stocks. In addition, both approaches indicate that the returns in the short portfolios are higher than those in the long portfolios. This observation confirms the existence of a strong return reversal pattern on *BW* hot-growth stocks after publication.

## NOTES

1. As repeat *BW* stocks have longer sales and profit growth data than the first-time *BW* hot-growth stocks, it is less likely that the repeat stocks will suffer severe return reversals.
2. Using the fundamental and pricing data provided in the *BW* issues, the logit model is able to produce a predictive model in the overall period from 1985 to 2004 and the first sub-period from 1985 to 1994, but a lesser degree in the second sub-period.
3. Positive excessive returns coincide with strong growth in the 3-year pre-publication period. These findings are consistent with Clayman (1987): identifying superior historical performances does not ensure superior future stock returns or corporate earnings.
4. Latest sales and earnings are available for the most recent 12 months. Earnings include net income from continuing operations, before gains or losses from extraordinary items. Increases in sales and earnings are calculated using the least-squares method. If the results for the earlier year are negative or not available, the average of the two prior years is used. Return on capital is the earnings expressed as a percent of total debt and equity.
5. *BW* has shifted the publication of the list to an issue in early June since 2001. The only exception for the May publication cycle occurred in 1998, when *BW* published the list in its 1 June 1998 issue. A complete list of publication dates between 1985 and 2004 is documented in the Appendix.
6. Per cent off 52-week high = [(recent price – 52-week high)/52-week high] × 100 per cent. Per cent off 52-week low = [(recent price – 52-week low)/52-week low] × 100 per cent. The 52-week high and low are provided in *BW*'s original tables.
7. We also run a Fama–French three-factor regression in calendar time format. The calendar time included are: (1) the year following publication, from June to May (for example for a stock added to the hot-growth list in May 1991, this is June 1991 – May 1992); and (2) the year before publication, from May of the prior year to April of the publishing year. We find that the hot-growth stocks outperform before publication, after adjusting for the three risk factors, but do not over-perform afterward.

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## APPENDIX

See Table A1.

**Table A1:** Complete list of publication dates for *Business Week* hot-growth stocks

Year	Issue date	Immediate trading date	Event month	Last trading date of event month
1985	27 May 1985	28 May 1985	May 1985	31 May 1985
1986	26 May 1986	27 May 1986	May 1986	30 May 1986
1987	25 May 1987	26 May 1987	May 1987	29 May 1987
1988	23 May 1988	23 May 1988	May 1988	31 May 1988
1989	22 May 1989	22 May 1989	May 1989	31 May 1989
1990	21 May 1990	21 May 1990	May 1990	31 May 1990
1991	27 May 1991	28 May 1991	May 1991	31 May 1991
1992	25 May 1992	26 May 1992	May 1992	29 May 1992
1993	24 May 1993	24 May 1993	May 1993	28 May 1993
1994	23 May 1994	23 May 1994	May 1994	31 May 1994
1995	22 May 1995	22 May 1995	May 1995	31 May 1995
1996	27 May 1996	28 May 1996	May 1996	31 May 1996
1997	26 May 1997	27 May 1997	May 1997	30 May 1997
1998	1 June 1998	1 June 1998	May 1998 <sup>a</sup>	29 May 1998
1999	31 May 1999	1 June 1999	May 1999	28 May 1999
2000	29 May 2000	30 May 2000	May 2000	31 May 2000
2001	11 June 2001	11 June 2001	June 2001	29 June 2001
2002	10 June 2002	10 June 2002	June 2002	28 June 2002
2003	9 June 2003	9 June 2003	June 2003	30 June 2003
2004	7 June 2004	7 June 2004	June 2004	30 June 2004

<sup>a</sup>Event Month is usually determined by the issue date, except for 1998.

Notes: 1. All issue dates were on Mondays. 2. Memorial days happened to be the issue dates in 9 years – 1985, 1986, 1987, 1991, 1992, 1996, 1997, 1999 and 2000.