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Undercover Boss: Stripping Away the Disguise to Analyze the Financial Performance of Participating Firm

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Abstract: The CBS Television surprise hit "Undercover Boss" has aired for six consecutive seasons and features publicly traded firms, closely-held corporations, and in some instances not-for-profit institutions. While there has been much analysis on the ethical dilemmas faced by the undercover CEO or other executive, no practical analysis of a firm's profitability has been conducted on any of the firms featured on the show. Conventional wisdom would suggest that financial performance of a featured firm would improve after the initial airing date, as the show typically ends on a 'feel good' note and most often places the executive, as well as the firm, in a positive light. This paper analyzes the stock market price after the initial air date as well revenue and net income for all publicly traded firms that have appears on the show through the end of the sixth season.

Keywords: Investments; Event studies; Stock market.

1. Introduction

Undercover Boss was created in 2009 and has aired six consecutive seasons on CBS Television. The reality show has produced two Emmy-award winning seasons, 2012 and 2014, and also been nominated in 2010 and 2011. Viewership each week hovers between 9 million and 12 million (Andreeva, 2013) so the show is an ideal opportunity for CEOs and other executives to shine a positive light on their firms, their products, and their employees. As such, one could conclude that after an executive's appearance on the show, the public perception of that firm would improve thus improving the firm's financial position including the stock price.

Calculating abnormal returns resulting from events has become widely common in financial and economic literature (Warner *et al.*, 1988); (Fama, 1998). Most often these events are macroeconomic in nature such as interest rate changes, natural disasters, political events such as coups or war, and central bank policies. However firm-specific events can generate abnormal returns relative to a firm's Beta and standard deviation. Consequently analysis of these firm-specific events deserves attention and examination. By doing so, this paper will add to the existing literature that relates to event-study analysis, stock market performance, investment analysis, and even in effective marketing strategies. The analysis will include the following:

H_a = A firm featured on Under Cover Boss (UCB) will not experience any statistically significant return in stock price performance

This paper will involve the following procedures and methods to evaluate the alternative hypothesis. Section one will provide a brief literature review of corporate image and marketing strategies aimed at improving financial performance, event-study analysis, normal return calculation, and abnormal return calculation. The second section will outline the data collection methodology used for this study, while section three will highlight the empirical method(s) used to test the alternative hypothesis. Analysis of the findings will be reviewed and discussed in the fourth section, along with the implications for firms electing to appear on UCB, investors interested in seeking abnormal returns, and marketing strategists seeking to implement unique advertising campaigns for publicly traded companies. Finally, the last section will highlight possible avenues for future analysis and review, including new outlets for public relations/advertising methods, how the advent of new media sources for television program can approach the results from this study, and other areas to create abnormal returns.

2. Literature Review

Not surprisingly there has been some analysis of "Undercover Boss" in various media outlets, and oftentimes analysts have purchased shares of firms scheduled for the show in advance of the airing. As an example, the Wall Street Journal examined the show in April 2010 and declared "the stocks of all the public companies that have appeared on the show are up since their episodes aired, and all but one have outperformed the Standard and Poor's

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500 Index" (Wall Street Journal, 2010). Additionally consider analysis that compares featured firms from the show to competitors, and in some instances the featured firm's stock price outperformed the competition (Bullock, 2010). However, there has not been an analysis of the share price for all publicly traded firms appearing on the show as it relates purely to the appearance on the show and not inclusive of systematic influences.

2.1. Event Study

The literature as it pertains to event studies, calculating normal returns, and calculating abnormal returns is extensive and far-reaching. The literature review provided herein is not all-encompassing, but rather a brief analysis of the seminal work and primary methods used in the past fifty years by academic researchers.

Event study analysis is abundant in financial literature and has become an acceptable method to conduct empirical studies related to stock splits, special dividends, CEO changes, earnings per share (EPS), and merger announcements. Oftentimes event studies focus on the daily stock price return rather than weekly, monthly, or quarterly. One reason for this is to recognize the variance and autocorrelation associated specifically with the specific event and the corresponding return (Brown and Warner, 1985). MacKinlay (1997) provides a detailed analysis of the procedure for conducting an event-study analysis, which include identification of event of interest, definition of the event window, selection of the sample set of firms to be included in the analysis, prediction of a 'normal' return during the event window in the absence of an event, estimation of the abnormal return as defined by the difference between the actual return and the predicted return, and finally testing whether the abnormal return is statistically different from zero (MacKinlay, 1997).

2.2. Normal Return Calculations

While identifying the event of interest and selecting the firms to be included in the study is a relatively simple process, there has been extensive literature related to the prediction of normal returns and the estimation of abnormal returns in event studies. The most basic model is the constant mean model. Brown and Warner (1980) have recommended this model when nominal returns are correlated to daily stock prices for the firm(s) being analyzed in the study. Further, multiple studies have concluded that despite its simplicity, the constant mean model produces equally robust results as more complex models when analyzing short-term time horizons (MacKinlay, 1997).

The equation for calculating the constant mean model is:

$$R_{it} = \mu_i + \zeta_{it} \quad E(\zeta_{it}) = 0 \qquad (1)$$

$$\text{var}(\zeta_{it}) = \sigma^2_{\zeta i}$$

μ = mean

R_{it} = is the period return on security i

ζ_{it} = is the time period t disturbance term for security i with an expectation of zero and a variance of $\sigma^2_{\zeta i}$ (MacKinlay, 1997).

The intent of the event study is to measure the unsystematic component because the market return and the information being analyzed are independent (Strong, 1992). As such, the market model removes the portion of the return that is related to the market portfolio return. By removing the variance within the abnormal return is reduced since the portion of the return that is related to the variation in the market return is removed (MacKinlay, 1997). This allows for analysis on the event exclusively rather than 'noise' or other outside factors. Analytical studies have shown that the market model is empirically strong when measuring expected/normal return (Brown and Warner, 1985; Cable and Holland, 1999). The market model is expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (2)$$

where $E(\varepsilon_{it} = 0)$ and $\text{var}(\varepsilon_{it}) = \sigma^2_{\varepsilon I}$.

R_{it} and R_{mt} = period t returns on the security i and the market portfolio

ε_{it} = the zero mean disturbance term

α_i, β_i, and $\sigma^2_{\varepsilon I}$ = parameters of the market.

In this instance the market portfolio is identified as a broad market index such as the S&P 500 or another equity index.

Oftentimes event study methods will utilize the Capital Asset Pricing Model (CAPM). This model controls for both market risk and security risk, which will reflect an investor's diversified portfolio (Lintner, 1965; Sharpe, 1963;1964). It is expressed as:

$$R_f + \beta_1(E(R_m) - R_f) \qquad (3)$$

R_f = risk free rate of return (typically a government security)

β_1 = beta (excess asset returns compared to market returns)

(R_m) = expected market return

CAPM is often overlooked when calculating normal return, however, due to fluctuating daily interest rates, changing Beta values over the course of time, and the predictive accuracy of the model is less robust than the market model (Cable and Holland, 1999).

Fama and French created the three factor model and posit that under certain circumstances it is superior to other models. This occurs when sample-matching methods are used (Ahern, 2009; Fama, 1965; Fama *et al.*, 1969; Fama and French, 1992).

$$ER_t = R_f + \beta_1(K_m - R_f) + \beta_2(SMB) + \beta_3(HML) + \alpha \qquad (4)$$

ER_t = Expected portfolio return

R_f = Risk free rate of return
β = Coefficient
K_m = Market portfolio return
SMB = Small market capitalization minus big market capitalization
HML = High book to market ratio minus low book to market ratio
α = Alpha factor

A derivation of the Fama & French three-factor model is the Carhart four-factor model (Carhart, 1997). Brav *et al.* (2000) conducted empirical studies and concluded that long-run event studies benefit from this model, as it captures the covariation in correlation of returns (Brav *et al.*, 2000). Carhart's four-factor model is:

$$ER_t = \propto^c + \beta_{mkt} EMKT_t + \beta_{val} VAL_t + \beta_{size} SIZE_t + \beta_{mom} MOM_t + \varepsilon_t \quad (5)$$

ER_t = Expected portfolio return
EKMT= Beta of security
VAL = Returns on high M/B portfolios minus returns on low M/B portfolios
SIZE = Returns on small market capitalization portfolios minus returns on large market capitalizations portfolios
MOM = Stock momentum (highest positive momentum equities minus least positive momentum)

2.3. Abnormal Return Calculations

The calculation of abnormal return has also been examined exhaustively, resulting in several primary models utilized regularly today. Most notably, the Cumulative Abnormal Return (CAR) is widely utilized in various event studies. Simplistic in nature, the CAR is a two part process where:

$$AR_d = R_d - E(R_d) \quad (6)$$

R_d = One day return on firm
$E(R_d)$ = Expected one day return on firm

The formula above calculates an abnormal return for one day. Once that amount is determined the researcher must employ a second formula to achieve the cumulative abnormal return based upon the days after the event the research hopes to examine. This formula is as follows:

$$\text{CAR} = (1 + \text{AR1})\text{x}(1 + \text{AR2})\text{x}\ldots(1 + \text{ARn}) - 1.0 \quad (7)$$

Short-term time horizons are often classified as one year or less. CAR calculations are very often acceptable in event studies measuring abnormal returns of one year or less.

Long-term time horizons, herein identified as longer than one year, often require matching sample firms based upon certain characteristics such as book-to-market or market capitalization. This method provides the abnormal return that occurs by measuring the original equally invested security through the entire holding period. This model is the difference between the long-run return of a sample and a particular benchmark asset that is representative of the expected return and is often known as the Buy and Hold Abnormal Return (BHAR). Barber and Lyon (1997) are often considered pioneers in utilizing BHAR, as they calculate the long-term abnormal return as:

$$BHAR_{it} = \prod_{t=1}^{h}[1 + R_{i,ki+t}] - \prod_{t=1}^{h}[1 + E(R_{b,ki+t})] \quad (8)$$

$R_{i,ki=t}$ = month k_i +t simple return of stock
$R_{b,ki+t}$= corresponding return for the benchmark portfolio

There are criticisms of the BHAR model, which include the assumption of a perfect proxy when matching with the firm being analyzed (Kothari and Warner, 2004), research sample bias when selecting proxy firms, and finally 'bad models' that result from this researcher bias (Fama, 1998).

3. Data Collection Methods

Our data collection methods entailed a multi-variable approach and covered five full seasons and half of the most recent season. Consequently our initial list included a review of 82 full one-hour episodes, beginning with the very first episode that aired in February 2010 and ending with an episode that aired in January 2015. Next, original air dates were confirmed against multiple data sources beginning with Netflix, which lists the original air date. Iconfirmed those dates against a second date that was provided directly from CBS Website, www.cbs.com to ensure accuracy for initial airing.

Upon confirming initial air dates I then analyzed the data to screen for publicly traded corporations and eliminate closely-held corporations, companies that were part of a conglomerate, public non-profits, and privately owned firms. Once that data was reviewed I analyzed the publicly traded firms and their stock price for 255-days preceding the initial air date of the show in an attempt to remove firms that may have experienced some other event such as a stock split, special dividend, CEO termination/appointment, bankruptcy, or merger/acquisition. By doing so I was able to control for the event in question, which in this instance was the prime time airing of UCB highlighting the firm.

This data collection method resulted in 12 publicly traded firms for us to analyze. The authors can be contacted for the entire list. Below please find the twelve firms that are analyzed in this study.

Table-1

Firm	Episode	Date
Waste Management	1	2/7/10
Churchill Downs	5	3/14/10
1-800-FLOWERS	9	4/11/10
Choice Hotels Intl.	10	9/6/10
Direct TV	12	10/10/10
ABM Industries	19	12/5/10
Norwegian Cruise Lines	21	1/2/11
Unifirst	22	1/9/11
Popeye's	37	4/2/12
MasTec	44	5/11/12
ADT	57	4/12/13
Family Dollar	68	11/8/13

4. Methodology

This paper will analyze the market response for the firms appearing on UCB by utilizing event-study methodology. The empirical analysis will include the calculation of abnormal stock price returns, abnormal gross revenue results, and abnormal net profit margin results. By doing so Iwill be able to test the following hypothesis:

H_a = A firm featured on Under Cover Boss (UCB) will not experience any statistically significant return in stock price performance

To calculate the normal stock price Iwill retrieve daily stock price results for each analyzed firm from Yahoo! Finance. Iwill retrieve daily stock price returns 255-days prior to the initial air date for each firm. This will allow us to use the single index-market model to establish the normal return estimate for five consecutive business days after the firms appear on UCB. Further, firms will be screened to ensure that no other abnormal events occurred during the 255-day period leading up to the initial airing of the episode for each firm. This includes stock splits, CEO changes, unannounced dividends, bankruptcy filings, or merger/acquisition announcements. Finally, firms being analyzed will also need to be publicly traded for 255-days or more before the initial airing to be included in our analysis.

Upon calculation of both daily and cumulative abnormal returns for each participating firm, Iwill then utilize t-tests to determine if the daily and the cumulative abnormal return that occurred over the 11-day period were significant at the 90% level. The model used for the t-test is:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2(n_1 - 1) + s_2^2(n_2 - 1)}{n_1 + n_2 - 2}}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad (9)$$

5. Results

Our methodology led to the exclusion of only one firm from the initial list. Norwegian Cruise Lines was not publicly traded at the time of the initial air date and subsequently was removed from our analysis. All of the other firms listed met or exceeded the criteria. The results from the t-tests conducted on each individual firm are listed below:

Table-2

Firm	Day after initial air	11-day CAR	Significance
Waste Management	0.002	-0.003	0.250
Churchill Downs	-0.025	-0.032	-1.504
1-800-FLOWERS	0.084	0.183	*4.151
Choice Hotels Intl.	0.021	0.032	*2.718
Direct TV	-0.006	0.000	-0.040
ABM Industries	-0.082	0.045	*3.470
Unifirst	-0.031	-0.006	-0.465
Popeye's	0.007	0.005	0.239
MasTec	0.049	0.047	*1.880
ADT	0.015	-0.006	-0.662
Family Dollar	-0.026	-0.001	-0.090

Our observations from above suggest that four firms experienced a significantly positive abnormal return at 90% confidence or greater – most notably 1-800-Flowers which enjoyed a whopping 18.3% abnormal return over the 11-day analysis and ABM Industries, which saw a 4.5% positive abnormal return during the same period. Additionally

MasTec and Choice Hotels International experienced positive abnormal returns that were significant at the 90% level, with returns of 4.7% and 3.2% respectfully. Analysis of these firms revealed no extraordinary occurrences during the 52-weeks leading up to the airing on CBS. The only firm experiencing an abnormal positive return that was not significant at any measurable level was Popeyes, which had a .5% CAR and a significance level of .239.

Interestingly, five firms experienced negative cumulative abnormal returns (CAR) during the analysis. However, none of them had statistically significant losses at a confidence level of 90% or greater during the review. Churchill Downs did experience the greatest abnormal loss, as the firm's stock price fell abnormally by 1.5% during the 11 day review. The other firms experiencing a loss in stock price during the review included Unifirst, ADT, Family Dollar, and Waste Management. Those losses were minimal, however, and not significant at any measurable level.

Analysis of annual revenue did suggest that each firm examined enjoyed increased revenue over a one year period as well as a four year period. The average one year increase in revenue was 6% among the 11 firms analyzed, with no single firm experiencing a revenue decrease for the 12 month period leading up to the initial air date and extending one quarter beyond the appearance on the show. Interestingly, 1-800-FLOWERS experienced the third lowest revenue growth during the period examined, yet the stock price experienced the highest positive abnormal return after the firm appeared on UCB for the first time. Similarly Choice Hotels International had a lower than average revenue growth compared to other firms appearing on the show, yet had the second highest positive abnormal return after appearing on the show. The same phenomena occurred with ABM, the third highest positive abnormal return but less than average revenue growth against the group. MasTec was the only firm to experience significantly positive abnormal stock price return while also exceeding the annual revenue growth compared to other firms, with a leading 16.05% revenue growth during the period.

Conversely, Popeye's had the second highest annual revenue growth, but the positive abnormal return on the stock price was negligible. Direct TV and Churchill Downs both experienced slightly higher than average annual revenue growth, yet Direct TV experience zero abnormal return and Churchill Downs actually experienced the largest negative abnormal return after appearing on the UCB.

Table-3

Firm	**% change**
Waste Management	2.45%
Churchill Downs	6.41%
1-800-FLOWERS	2.83%
Choice Hotels Intl.	4.77%
Direct TV	6.77%
ABM Industries	4.65%
Unifirst	2.91%
Popeye's	15.21%
MasTec	16.05%
ADT	2.99%
Family Dollar	0.94%

These results led us to examine correlation between the cumulative abnormal return created by appearing on the show and annual revenue increase/decrease. Using bivariate regression to detect correlation, Iused the following formula:

$$\frac{\varepsilon_i^n\ [x_1\ -\bar{x}]}{\varepsilon_i^n\ [x_1\ -\overline{\bar{x}]2}} \qquad (10)$$

The results are found in the table below:

Table-4

Correlation between CAR and Revenue				
Regression Statistics				
Multiple R	0.041408416			
R Square	0.001714657			
Adjusted R Square	-0.109205937			
Standard Error	0.053365306			
Observations	11			
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.06085283	0.017544253	3.468534	0.007065
CAR 11-day	-0.036228225	0.291383214	-0.12433	0.903785

6. Analysis of Results

Investors hoping to capitalize upon a positive abnormal stock return for firms appearing on Undercover Boss will not find any correlation between a firm's appearance and a spike in the stock price; at least as a result from the initial airing of the show. While some firms experience positive abnormal returns, analysis of common traits, such as market capitalization, industry, exchange each is listed on, or CEO traits like education, ethnicity, or location of firm revealed no such correlation. As such, an equal number of publicly traded firms also generated negative stock price returns, although none were statistically significant.

These results also suggest that little predictive ability exists as it relates to a stock appearing on UCB and an increase in revenue for the next fiscal year. While this was not one of our initial hypotheses to examine, it is intriguing with respect to how little influence the show actually has on increasing revenue for a firm that appears on the show. Further, little, to no correlation existed between firms experience statistically significant positive abnormal returns and annual revenues that exceeded the average increase in revenue for all publicly traded firms appearing on the show. In short, an executive's appearance on the television show did not result in an abnormal 'bump' in sales the quarter immediately following appearance.

7. Future Studies/Analysis

While I was surprised by our results, there are several important features from both a practical and a theoretical perspective that should be considered for future research and analysis by investors and academicians.

First, and foremost, is that none of the firms experienced an abnormal negative return during the initial airing. As a result, I believe it is worthwhile for executives to consider appearing on the show if given the opportunity, as it appears as if no 'damage' can result to shareholders. Given the fact that the appearance only requires a firm to donate $250,000 to various people and social issues appearing on the show, the 60-minute 'commercial' is much higher for firms sponsoring the show. In 2013, for example, it cost approximately $56,000 for a 30-second advertisement on CBS during the airing of UCB (www.ibtimes.com). Naturally, the firm being showcased each week is getting maximum exposure for a fraction of the cost; about $4200 per minute.

Because of this phenomenon, it is recommended that future research analyze other shows that feature one particular brand or firm to detect abnormal stock price performance after the showing. As an example, The Lego Corporation recently produced a Netflix special that documented the history of the firm. It is our recommendation that firms continue to pursue these alternative advertising models, particularly with new media outlets and the increased usage of DVR recording devices, which allow users to skip traditional commercials.

A second line of research to consider would include highlighting the employees of the firm rather than the CEOs. With an ever-growing wage gap, it stands to reason that television viewers may be more moved by employees doing great things rather than CEOs pretending to be someone they aren't; both literally when they dress up for the show posing as a job applicant and figuratively when they return home to the corporate office and may not be able to change everything. As an example, Bank of America and Southwest Airlines tout the community service component that their employees provide each year. It stands to reason that reality television shows highlighting all of the great things real workers are doing may have an equal, if not greater, impact on stock price.

Finally, analysis and research should be conducted on corporate image and the detection of an abnormally positive increase in corporate image or brand after appearing on the show. As an example, a firm may want to measure its average daily brand index 100-day prior to the airing of the show, and then measure the five-day post appearance to see if the brand experiences a positive increase or negative decrease in stock price using various measurement tools.

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