

The January Effect: A Test of Market Efficiency

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ABSTRACT

The purpose of this study is to test the weak form efficient market hypothesis by analyzing the effects of year end selling and the January effect on stock price. Specifically, is it possible to earn an above normal return at the beginning of the new year? Numerous past studies suggest that at year end investors sell underperforming stocks, thus negatively impacting stock price. Past studies also suggest repurchase of previous year losers in January. According to the weak form efficient market hypothesis, it is not possible to outperform the market – adjusted appropriately for risk – by using past information such as the sale of underperforming stocks at the end of the previous year. The market should adjust to this information sufficiently fast to disallow any investor’s earning an above normal risk adjusted return. Evidence here suggests that the market is weak form efficient with respect to year end selling. Results here support the strength of market efficiency. Specifically, for this study stock price begins rising before the last trading day of the year instead of decreasing.

INTRODUCTION

The existence of the January effect has been frequently debated in finance literature for many decades. The January effect occurs when an investor obtains abnormally large returns on small cap stocks at the turn of the calendar year. In order for this to happen the investor buys stock in a small or underperforming company at the end of the current year and then sells the stock when its price rises in January of the new year.

BACKGROUND AND PURPOSE

According to Fama (1970), market efficiency claims that at any given point in time stock prices reflect all available information in the market. There are three different levels of market efficiency: strong form efficiency, semi-strong form efficiency, and weak form efficiency. When a market is strong form efficient an investor should not be able to earn an above average rate of return by acting on either public or private information. When a market is semi-strong form efficient an investor should not be able to earn an above average risk-adjusted rate of return based on all public information. When a market is weak form efficient the market reacts so fast to past information that no investor can use yesterday’s news to earn an above average rate of return or a return higher than that of the S&P 500 Market Index. Many investors in the past have been able to earn an abnormal rate of return by using private information (or insider trading), which suggests that the market is not strong form efficient. Is the market weak form efficient with respect to the past information hypothesized to cause the January effect? To answer this question, this study will examine stock price returns 30 days before and after the last trading day for three consecutive years and analyze how this information affects trading, to see if investors can earn an abnormal rate of return in January of the new year. Is it possible for investors to “beat” the

market by acting on past information? To address this research question and test the weak form efficient market hypothesis, this study will analyze stock price returns 30 days before and after the last trading day of years 2010, 2011, and 2012 to test for the hypothesized January effect.

The purpose of this study is to test whether an investor can earn abnormal risk-adjusted returns by selling stocks in January that were purchased when underperforming at the end of the previous year. This study tests to see if, based on solely past information, an investor can earn an abnormal return at the beginning of the new year.

For this study a sample of 90 companies will be examined. 30 of the worst performing companies will be examined for each year 2010, 2011, and 2012. Each 30 firm sample will be elected from those companies identified as the largest prior year losers 2010 through 2012. This study tests the weak form efficient market hypothesis by examining the rate of return that stocks earn in the 30 days before and after the last trading day of each sample year.

LITERATURE REVIEW

Investors in the stock market typically accept the existence of the January effect, but some question its validity. Sydney B. Wachtel (1942) observed the effect on stock prices in 1942 and is responsible for naming it the January effect. One of the explanations that professionals in the field of finance believe could explain the January effect centers around tax-motivated transactions. Based on this explanation, it follows that logical investors would engage in tax-loss selling at the year-end to mitigate negative tax consequences (Reinganum, 1983). Then when they receive their year-end bonuses they re-enter the market in January pushing the prices higher.

Another explanation discussed in the field of finance is the window dressing hypothesis. This hypothesis says that at year-end portfolio managers sell losing stocks to make their portfolios look better. Portfolio managers who want to attract more customers sell off losing stocks so that their year-end report shows only profitable stocks. Then in January portfolio managers reinvest in lesser-known small, riskier stocks with the hope of making a profit, thus raising the January prices (Haugen & Lakonishok, 1988).

The January effect has been shown to negatively correlate with stock size, meaning that small-cap stocks are affected more by the January effect than other stocks (Keim, 1983). Haug and Hirschey (2006) show this in their study spanning the years from 1802 to 2004, with every year persistently showing the existence of the January effect in small-cap stocks. Ritter (1988) found that the difference between the returns of small-cap stocks versus large-cap stocks was 8.17 percent for the first nine trading days in January during the years 1971 to 1985. Small-cap stocks are affected most by the January effect because of the buying of small-cap stocks that are riskier, as mentioned above, in the hope of making a higher return in the new year (Ritter, 1988).

Some critics don't believe that the January effect is still relevant in today's stock market and believe that it does not present investors with real opportunities to take advantage of any abnormal returns. However, Haugen and Jorion (1996) found that in the "1977-93 period, the excess January returns for the equally weighted index were still quite large, averaging 2.9 percent across the period". Rozeff and Kinney (1976) found that from the years 1904 to 1974 average stock market returns in January were 3.48 percent compared to the 0.42 percent in the other 11 months of each year. More recently in a study done from the years 1926 to 1993, Haugen and Jorion concluded that the January effect is still present in the market and not going away.

Many investors predict how well the market will do in the current year based off of how the stocks do in January, so if the January effect is found to be present investors believe the year will

be good. This study will look further into the year-end effect on the market, as well as conduct a test of market efficiency.

Fama (1970) defined market efficiency in relation to how quickly the stock market responds to different levels of information. The three ways to differentiate a market’s speed of reacting to information are weak form, semi-strong form, and strong form efficiency. This study focuses on weak form efficiency, which says that no investor can earn an above average risk-adjusted return by acting on past information alone. The finance literature suggests that no investor can earn an above average return unless they are acting on illegal insider trading information. If investors are able to use the past information imbedded in identifying prior year under-performers and “beat the market” by purchasing these stocks in January, then market efficiency in the weakest form is questioned.

The January effect has been a frequently witnessed phenomenon that some investors take as an indicator of how well firms will perform over the next year. This study will test the efficiency and effect of the underperformance of a firm on the returns it delivers during the first 30 days of the new year.

METHODOLOGY

This research study will analyze of 90 companies, 30 for each year 2010, 2011, and 2012. Each 30 firm sample will be randomly selected from those companies identified as the largest prior year losers 2010 through 2012. The study selects the three year time period 2010 through 2012 after the great recession of 2008. By selecting years of economic recovery the study mitigates the extraneous variance associated with the great recession, a time when many large firms collapsed resulting in a massive negative contagion effect on all firms in the market. Likewise results for the January effect can be examined over time, or vertically, as well as across time, or horizontally. Tables 1, 2, and 3 describe the sample.

Table 1: Description of Study Sample for 2010

Ticker	Firm Name	Announcement Date	Traded Index
WY	Weyerhaeuser Company	30-Dec-10	NYSE
DF	Dean Foods Co	31-Dec-10	NYSE
HRB	H & R Block Inc	31-Dec-10	NYSE
CRK	Comstock Resources Inc	31-Dec-10	NYSE
APOL	Apollo Education Group Inc	31-Dec-10	NASDAQ
DO	Diamond Offshore Drilling Inc	31-Dec-10	NYSE
ESI	ITT Educational Services Inc	31-Dec-10	NYSE
BXS	BancorpSouth Inc	31-Dec-10	NYSE
SVU	Supervalu Inc	31-Dec-10	NYSE
PHM	PulteGroup Inc	31-Dec-10	NYSE
MU	Micron Technology Inc	31-Dec-10	NASDAQ
GT	Goodyear Tire & Rubber Company	31-Dec-10	NASDAQ
ODP	Office Depot Inc	31-Dec-10	NYSE
AKS	AK Steel Holding Corporation	31-Dec-10	NYSE
MWW	Monster Worldwide Inc	31-Dec-10	NYSE
AA	Alcoa Inc	31-Dec-10	NYSE
			OTC
EKDKQ	Eastman Kodak Co	31-Dec-10	Markets
MON	Monsanto Company	31-Dec-10	NYSE
NVDA	NVIDIA Coporation	31-Dec-10	NASDAQ

WDC	Western Digital Corporation	31-Dec-10	NASDAQ
YRCW	YRC Worldwide Inc	31-Dec-10	NASDAQ
AIG	American International Group Inc	31-Dec-10	NYSE
IPG	The Interpublic Group of Companies Inc	31-Dec-10	NYSE
SANM	Sanmina Corporation	31-Dec-10	NASDAQ
C	Citigroup Inc	31-Dec-10	NYSE
GCI	Gannett Co Inc	31-Dec-10	NYSE
			OTC
AAMRQ	AMR Corporation	31-Dec-10	Markets
WNR	Western Refining Inc	31-Dec-10	NYSE
AES	The AES Corporation	31-Dec-10	NYSE
THC	Tenet Healthcare Corp	31-Dec-10	NYSE

Table 2: Description of Study Sample for 2011

Ticker	Firm Name	Announcement Date	Traded Index
CYH	Community Health Systems Inc	30-Dec-11	NYSE
NIHD	NII Holdings Inc	30-Dec-11	NASDAQ
ODP	Office Depot Inc	30-Dec-11	NYSE
BAC	Bank of America Corporation	30-Dec-11	NYSE
JNS	Janus Capital Group Inc	30-Dec-11	NYSE
MTOR	Meritor Inc	30-Dec-11	NYSE
RSH	RadioShack Corp	30-Dec-11	NYSE
SPLS	Staples Inc	30-Dec-11	NASDAQ
			OTC
AAMRQ	AMR Corporation	30-Dec-11	Markets
YRCW	YRC Worldwide Inc	30-Dec-11	NASDAQ
AKAM	Akamai Technologies Inc	30-Dec-11	NASDAQ
CSC	Computer Sciences Corporation	30-Dec-11	NYSE
SHLD	Sears Holding Corporation	30-Dec-11	NASDAQ
X	United States Steel Corp	30-Dec-11	NYSE
CVC	Cablevision Systems Corporation	30-Dec-11	NYSE
AIG	American International Group Inc	30-Dec-11	NYSE
NFLX	Netflix Inc	30-Dec-11	NASDAQ
ANR	Alpha Natural Resources Inc	30-Dec-11	NYSE
FSLR	First Solar Inc	30-Dec-11	NASDAQ
MWW	Monster Worldwide Inc	30-Dec-11	NYSE
HCBK	Hudson City Bancorp Inc	30-Dec-11	NASDAQ
HSP	Hospira Inc	30-Dec-11	NYSE
WHR	Whirlpool Corp	30-Dec-11	NYSE
FCX	Freeport-McMoRan & Gold Inc	30-Dec-11	NYSE
OI	Owens-Illinois Inc	30-Dec-11	NYSE
HIG	The Hartford Financial Services Group Inc	30-Dec-11	NYSE
HPQ	Hewlett-Packard Company	30-Dec-11	NYSE
CMA	Comerica Incorporated	30-Dec-11	NYSE
TLAB	Tellabs Inc	30-Dec-11	NASDAQ
FHN	First Horizon National Corporation	30-Dec-11	NYSE

Table 3: Description of Study Sample for 2012

Ticker	Firm Name	Announcement Date	Traded Index
EXC	Exelon Corporation	31-Dec-12	NYSE
RRD	R.R. Donnelley & Sons Company	31-Dec-12	NASDAQ
ATI	Allegheny Technologies Inc	31-Dec-12	NYSE
PBI	Pitney Bowes Inc	31-Dec-12	NYSE
HPQ	Hewlett-Packard Company	31-Dec-12	NYSE
JCP	J.C. Penney Company Inc	31-Dec-12	NYSE
BBY	Best Buy Co Inc	31-Dec-12	NYSE
CLF	Cliffs Natural Resources Inc	31-Dec-12	NYSE
AMD	Advanced Micro Devices Inc	31-Dec-12	NYSE
APOL	Apollo Education Group Inc	31-Dec-12	NASDAQ
ETR	Entergy Corporation	31-Dec-12	NYSE
GT	Goodyear Tire & Rubber Company	31-Dec-12	NASDAQ
FTR	Frontier Communications Corporation	31-Dec-12	NASDAQ
IGT	International Game Technology	31-Dec-12	NYSE
SVU	Supervalu Inc	31-Dec-12	NYSE
DMND	Diamond Foods Inc	31-Dec-12	NASDAQ
KWK	Quicksilver Resources Inc	31-Dec-12	NYSE
NAV	Navistar International Corporation	31-Dec-12	NYSE
AKS	AK Steel Holding Corporation	31-Dec-12	NYSE
ESI	ITT Educational Services Inc	31-Dec-12	NYSE
ANR	Alpha Natural Resources Inc	31-Dec-12	NYSE
EKDKQ	Eastman Kodak Co	31-Dec-12	OTC Markets
NIHD	NII Holdings Inc	31-Dec-12	NASDAQ
HD	The Home Depot Inc	31-Dec-12	NYSE
MCD	McDonald's Corp	31-Dec-12	NYSE
TRV	The Travelers Companies Inc	31-Dec-12	NYSE
NCIT	NCI Inc	31-Dec-12	NASDAQ
CECO	Career Education Corp	31-Dec-12	NASDAQ
GTAT	GT Advances Technologies Inc	31-Dec-12	NASDAQ
STI	SunTrust Banks Inc	31-Dec-12	NYSE

This study will use the standard risk-adjusted event study methodology from the finance literature. To test weak form market efficiency the following null and alternative hypothesis will be used:

H₁₀: The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is not significantly affected by this type of information on the event day.

H₁₁: The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is significantly negatively affected by this type of information on the event day.

H₂₀: The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is not significantly affected by this type of information around the event day as defined by the event period.

H2₁: The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is significantly affected by this type of information around the event day as defined by the event period.

The Data for this study will be collected from <http://finance.yahoo.com/>. The event date (Day 0) is the last trading day for the tax calendar year. Every stock return from the companies and from the S&P 500 index will also be collected from <http://finance.yahoo.com/>.

The event study methodology follows:

1. Historical prices for both the firms and the S&P 500 will be collected from day -180 to day +30, being the event period -30 to +30 and Day 0 the announcement day.
2. Holding Period Return will be calculated for all the companies as well as for the S&P 500 on the event period days (-180 to +30). HPR will be obtained from the following formula:

$$\text{Current Daily Return} = (\text{current day close price} - \text{previous day close price}) / \text{prev. Day close price}$$
3. A regression analysis was performed with firm return as the dependent variable and the corresponding S&P return as the independent variable over the pre-event period (from day -180 to -30). The alphas and the betas were obtained from the regression. 90 regressions were performed.

Table 4: Alphas and Betas of Study Sample

2010		
Company	Alpha	Beta
WY	0.000356162	1.345358787
DF	-0.004538366	0.358301265
HRB	-0.001836898	0.944571163
CRK	-0.001969006	1.352763616
APOL	-0.003324069	0.560923574
DO	-0.001273077	1.043600818
ESI	-0.003413117	0.594246121
BXS	-0.002965725	1.0149153
SVU	-0.003085672	1.197011085
PHM	-0.002815007	1.597856726
MU	-0.002234814	1.869010551
GT	-0.002085738	1.768407324
ODP	-0.002949085	2.207353505
AKS	-0.002788258	1.778870431
MWW	0.002030169	1.8942236
AA	-0.000197848	1.444333238
EKDKQ	-0.002100564	1.938079457
MON	-0.00026822	0.777766267
NVDA	-0.001592304	1.33417143
WDC	-0.001386812	1.332350802
YRCW	-0.005050456	1.504280592
AIG	0.000881022	1.58873504
IPG	0.001370536	1.608747079
SANM	-0.002367177	2.254301719
C	-0.000488029	1.380144293
GCI	-0.001860449	1.743739833

AAMRQ	-0.000192182	1.520231325
WNR	0.00371783	1.592452899
AES	0.000323847	1.560159386
THC	-0.001256386	1.394360742
2011		
Company	Alpha	Beta
CYH	-0.002251466	1.485841764
NIHD	-0.002784759	1.076003821
ODP	-0.001891966	2.238717621
BAC	-0.003881371	1.985945393
JNS	-0.000157304	-0.081196482
MTOR	-0.004323765	2.376147299
RSH	0.001667316	-0.024970532
SPLS	0.000258305	0.072210191
AAMRQ	-0.005996298	1.476590992
YRCW	-0.014556194	0.593845988
AKAM	0.002125607	0.003367818
CSC	-0.003237442	1.363958641
SHLD	4.35252E-05	1.415774643
X	-0.00293591	1.918144774
CVC	-0.002184404	1.076152532
AIG	-0.001793736	1.599753312
NFLX	-0.00570027	0.911956683
ANR	-0.003227206	2.505932448
FSLR	-0.006539991	1.522452892
MWW	-0.003278344	1.999832832
HCBK	-0.002571723	1.369253775
HSP	-0.003382587	0.830350836
WHR	-0.002388276	1.175521143
FCX	-0.001007926	1.58989414
OI	-0.001519159	1.616630243
HIG	-0.001380776	1.994997713
HPQ	-0.00176581	1.107653766
CMA	-0.001822283	1.408770506
TLAB	0.002871443	0.086844539
FHN	-0.001970881	1.551812945
2012		
Company	Alpha	Beta
EXC	-0.001391083	0.361570156
RRD	-0.000865368	1.094195502
ATI	-0.002117563	2.44323
PBI	-0.00194838	1.424385803
HPQ	-0.00344097	1.432385135
JCP	-0.004223641	1.310457998
BBY	-0.001841789	0.979146807
CLF	-0.003427635	2.074621479
AMD	-0.008523398	2.268217587
APOL	-0.003551985	1.178542505
ETR	4.54258E-05	0.419844439

GT	0.000763955	1.767670988
FTR	0.00102147	0.518589425
IGT	-0.001164115	1.269336899
SVU	-0.003520541	1.457361474
DMND	-0.001628047	0.672376421
KWK	-0.001809556	2.324921577
NAV	-0.003032515	2.732759676
AKS	-0.003520873	2.286965483
CLF	-0.003427635	2.074621479
ANR	-0.003437107	2.661229407
EKDKQ	0.001109714	0.869217378
NIHD	-0.007366774	1.124747759
HD	0.001572561	0.919610609
MCD	-0.00088545	0.566082088
TRV	0.001245791	0.77373781
NCIT	-0.000932024	0.12477702
CECO	-0.005081206	1.750229582
GTAT	-0.004511232	2.202288234
STI	0.000964335	1.577049028

4. The expected return for each firm will be calculated:
 $\text{Expected Return} = \text{Alpha} + \text{Beta} \times \text{S\&P actual return}$
5. Excess Return will be obtained from the difference between Actual and Expected Return. $\text{Excess Return} = \text{Actual Return} - \text{Expected Return}$.
6. Average Excess Return (for the Event period) will be calculated as:
 $\text{Average Excess Return (AER)} = \text{Total Excess Return} / n$ (number of firms in the sample).
7. Cumulative Average Excess Return for the event period (Day -30 to Day +30) will be calculated by adding the AER for each day in the event period.
8. A graph of AER and Cumulative AER, plotted for the event period (days -30 to +30), will accompany the data and research.

This analysis will graph the trends of the stock return variation over the event period. The research will determine the significance and timing of the reaction in the stock return of the worst performing firms over the event period.

QUANTITATIVE TESTS AND RESULTS

Is the market weak form efficient? If it is, how is the stock market affected by a trading strategy based on past information such as selling of stock losers at year end and buying the same in January? This study will observe and compare the average actual return as well as the average expected return. If the January effect surfaces, it would not be surprising to observe a difference between the average actual return and the average expected return over the event period (from day -30 to day + 30). To statistically test for a difference in the Actual Daily Average Returns (for the firms over the time periods day -30 to day +30) and the Expected Daily Average Returns (for the firms over the time periods day -30 to day +30), we conducted a paired sample t-test and found a significant difference at the 5% level between actual average daily returns and the risk adjusted expected average daily returns for the year 2010, but no significant difference for the years 2011 and 2012. Results here support the null hypothesis H_0 : The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is not significantly affected by this type of information around the event day as defined by the event

period. This finding fails to support the significance of the information around the event since the market's reaction was not observed.

Another purpose of this analysis was to test the efficiency of the market in reacting to year end selling and repurchasing in January. Specifically, do we observe weak form market efficiency as defined by Fama, 1970, in the efficient market hypothesis? The key in the analysis or tests is to determine if the AER (Average Excess Return) and CAER (Cumulative Average Excess Return) are significantly different from zero or that there is a visible graphical or statistical relationship between time and either AER or CAER. See AER and CAER graphs in Charts 1 through 6 below.

CHART 1: AVERAGE EXCESS RETURN FOR YEAR 2010

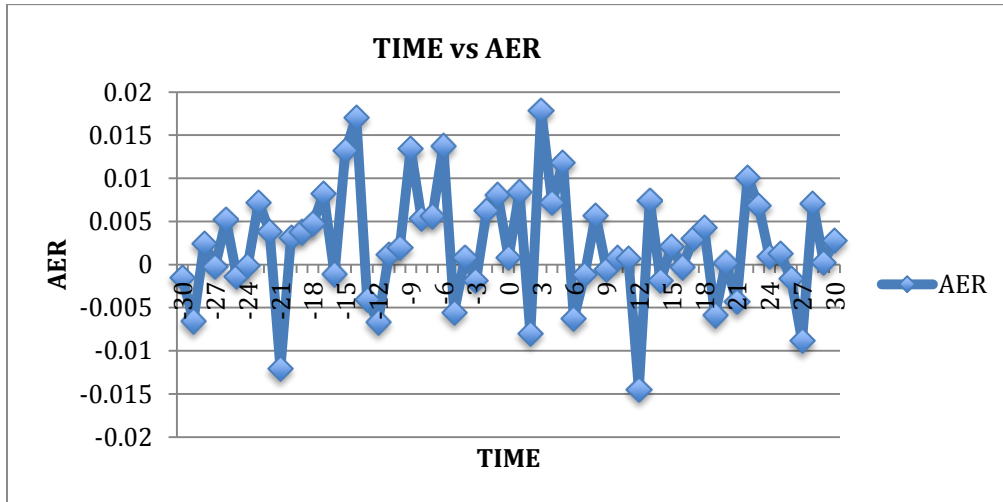
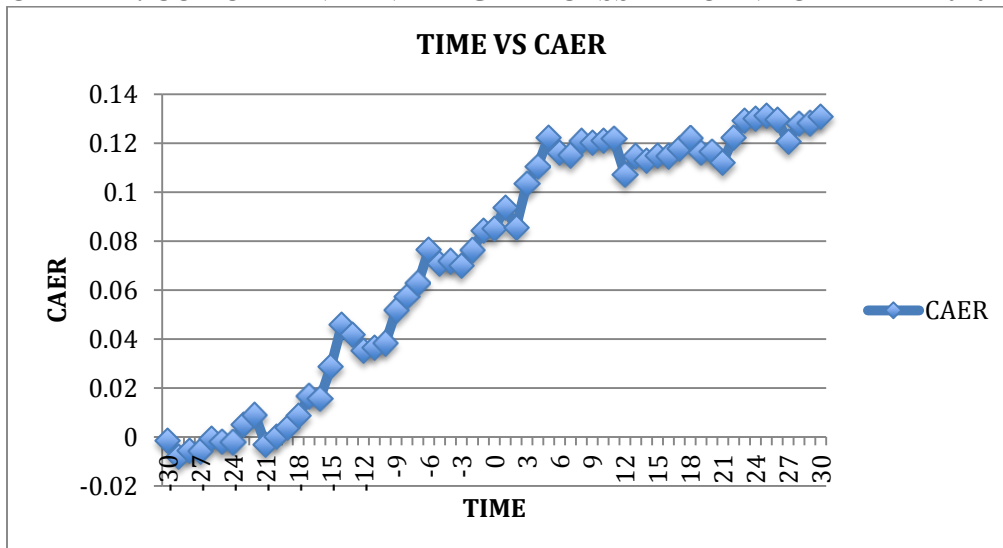


CHART 2: CUMULATIVE AVERAGE EXCESS RETURN FOR YEAR 2010



The graph in chart 2 shows that January effect had a positive impact on stock price beginning 21 days before the announcement day 0, the last trading day of the year and continued to make a positive impact on stock price until day 5. This evidence supports the null hypothesis $H1_0$: The risk adjusted return of the stock price of each annual sample and the global sample of worst

performing firms is not significantly affected by this type of information on the event day. For the sample of firms analyzed, price does not significantly drop on the event day, instead stock price began to rise up to 21 days before the event day.

CHART 3: AVERAGE EXCESS RETURN FOR YEAR 2011

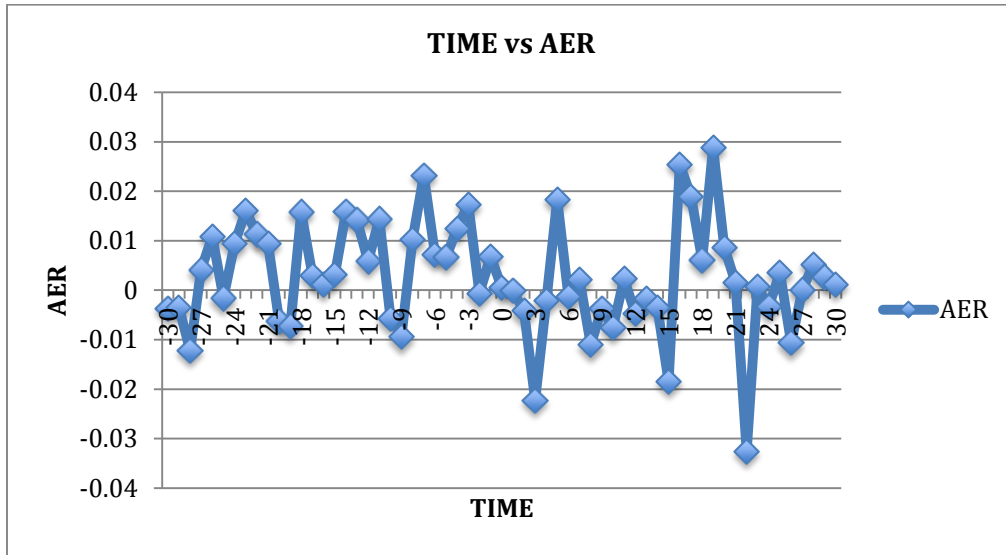
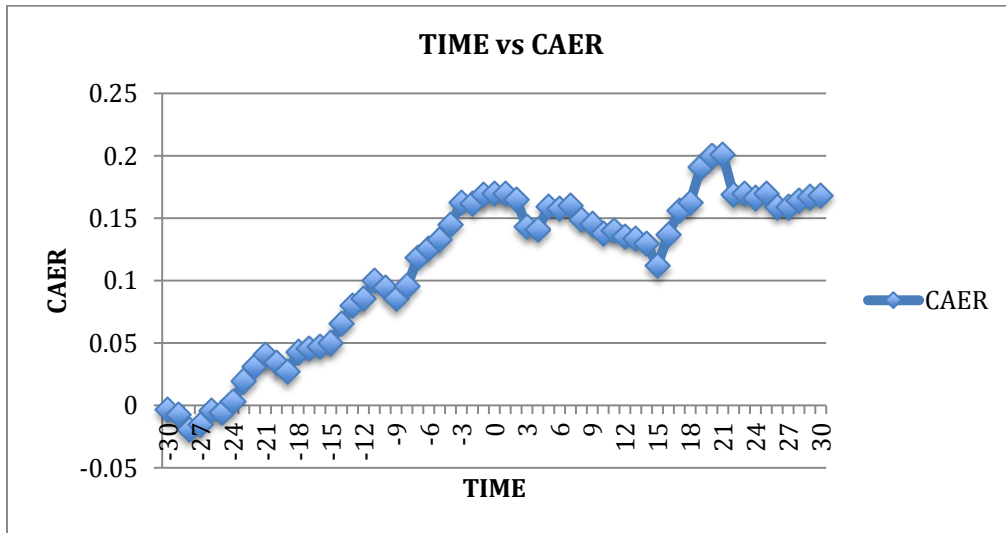


CHART 4: CUMULATIVE AVERAGE EXCESS RETURN FOR YEAR 2011



The graph in chart 4 shows that January effect had a positive impact on stock price beginning 28 days before the announcement day 0, the last trading day of the year. This evidence supports the null hypothesis H1₀: The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is not significantly affected by this type of information on the event day. For the sample of firms analyzed, price does not significantly drop on the event day, instead stock price began to rise up to 28 days before the event day.

CHART 5: AVERAGE EXCESS RETURN FOR YEAR 2012

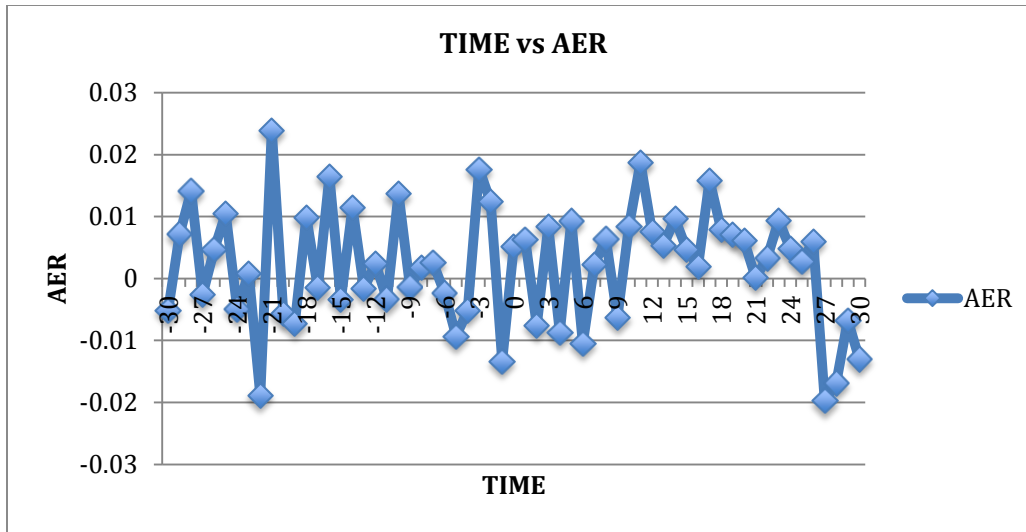
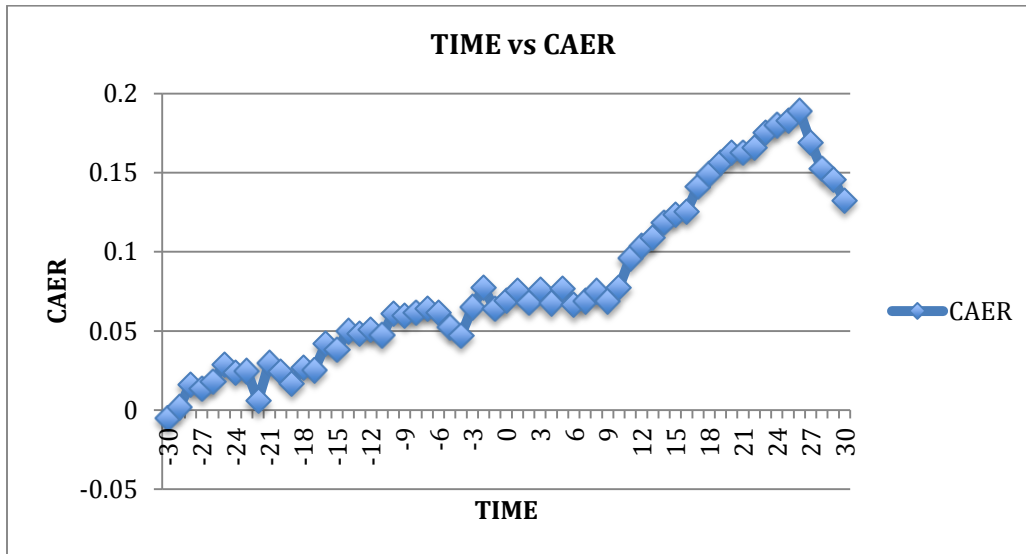


CHART 6: CUMULATIVE AVERAGE EXCESS RETURN FOR YEAR 2012



The graph in chart shows that January effect had a positive impact on stock price beginning 30 days before the announcement day 0, the last trading day of the year and continued to make a positive impact until day 25. This evidence supports the null hypothesis $H1_0$: The risk adjusted return of the stock price of each annual sample and the global sample of worst performing firms is not significantly affected by this type of information on the event day. For the sample of firms analyzed, price does not significantly drop on the event day, instead stock price began to rise up to 30 days before the event day. These results are consistent with the weak form market efficiency hypothesis which states that the stock price reflects all past information.

CONCLUSION

This study tested the effect of year end selling of underperforming stocks on the stock price’s risk adjusted rate of return for a randomly selected sample of 90 firms, 30 from 2010, 30 from 2011, and 30 from 2012. The standard risk adjusted event study methodology was used. The study analyzed 18,990 past observations on the ninety publicly traded firms and the S&P 500 market index. Appropriate statistical tests for significance were conducted. Results failed to show a

negative market reaction prior to the event day, the last trading day of the year. Findings also support efficient market theory at the weak form level as documented by Fama (1970).

Specifically, for this study selling up until the event day was not found, instead stock prices increased beginning 21 to 30 days prior to the last trading day of the year. This study suggests that the market is efficient with respect to the January effect. Results here also support weak form market efficiency.

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