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Frank R. Flanegin

Denis P. Rudd

Patrick J. Litzinger

Richard Mills

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**CASINO STOCKS AND KATRINA:
AN EXAMPLE OF MARKET OVER-REACTION?**

**Frank R. Flanegin
Denis P. Rudd
Patrick J. Litzinger
And
Richard Mills**

ABSTRACT

How efficient was the market in anticipating the impact of Hurricane Katrina on the Gulf coast casino industry? This study uses the event study methodology to investigate the stock market's reaction affecting equity prices of small casino companies with operations on the Gulf Coast centered on Biloxi, Mississippi. Cumulative Abnormal Returns (CARs) for 1 day, 3 day, and 6 day event windows are examined. As such the impact of Katrina on stock prices of casino firms in the Gulf Coast is better understood.

Introduction

Most Americans remember the days when meteorologists tracked Katrina across the Gulf of Mexico and reported ever increasing wind speeds; at one point in time out in the Gulf of Mexico Katrina was a category five storm with sustained winds in excess of 175 MPH. "Hurricane Katrina was the costliest and one of the deadliest hurricanes in the history of the United States. It was the six strongest Atlantic Hurricane ever recorded and the third strongest Hurricane on record that made landfall in the United States"(Wikipedia). Even as we watched live pictures from the Gulf region individuals and markets appeared to not fully comprehend the scale and scope of destruction caused by Katrina. Not until two or three days later was the scale and scope of the destruction totally realized.

Not until two or three days later that the scale and scope of the destruction was totally realized. Many lost their homes and all of their possessions. This level five storm

at landfall, the second in the 2005, killed 1,836 people. It was the deadliest U.S. hurricane since Hurricane Okeechobee in 1928. Katrina totaled 81.2 billion dollars in damage, which made it the costliest disaster in U.S. history.

Since 1928 the risk of loss of certain companies increased substantially. In the field of finance people have spent decades of effort studying and reporting the relationship between risk and return. While the Efficient Market Hypothesis explains that stock prices only move as a result of new information, the lack of information is also very important. The lack of information greatly increases the risk of investment, and when the risk of any investment is increased, the required return must also increase. The Price Mechanism is the only way the market has to translate this increase in risk and subsequent increase in the required return to investors. This can be stated simply as, other things equal “when the required return of any investment increases, its price must go down.”

This leads us to the reason for this paper: how efficient was the market in anticipating the impact of Hurricane Katrina on the Gulf coast casino industry? Utilizing Event Study Methodology, the authors compare the abnormal returns for multiple time periods, also known as Cumulative Abnormal Returns (CARs) of small Casino Companies with operations on the Gulf Coast centered on Biloxi, Mississippi.

Aftermath of Katrina

While New Orleans garnered the majority of headlines before, during, and after Katrina, many smaller cities also suffered, in relative terms, equal or worse devastation. In all 64 cities were effected by Katrina. One of the cities with the most damage was Biloxi, Mississippi. After a number of years stagnant gaming receipts (\$1.17 billion in 2003 and 1.23 billion in 2004), Biloxi appeared poised to finally get moving again. The Hard Rock Casino was scheduled to open just two days after Katrina hit and the area's first high-rise condominiums were selling for up to \$350,000. That all changed on the morning of August 29 when this costly and deadly hurricane hit Mississippi. As Chevis Swetman, president of the Peoples Bank, said, "All that promise disappeared in one day, along with pretty much everything else."

The Beau Rivage was severely damaged by water that reached up to the third floor. This casino, though, seemed to have suffered the least damage of all of the beachfront casinos. Grand Casino Biloxi had their casino blown across U.S. 90. Treasure Bay's pirate ship was washed ashore. The President Casino Biloxi was washed across highway U.S. 90 and landed on top of a Holiday Inn approximately a mile away. Casino Magic and Isle of Capri, both in Biloxi, suffered heavy damage. Only one casino seemed prepared for the disaster and that was Harrah's New Orleans. It closed shortly before the storm and was used by first responders as a base of operations in the days after the storm.

In all, twelve casinos were destroyed and thousands of jobs were lost just in the gaming sector, the trickle down effect was monumental. The unemployment rate climbed to 5.1% after a four year low of 4.9% in August. Most of these jobs were related to the casino industry. Many investors tend to overreact during times of crisis, and this

hurricane proved no exception. The natural disaster helped drive down the share prices of the companies. This disaster did create other opportunities for gaming companies in other cities. Many gamblers adjusted quickly and went to cities such as Atlantic City and New Jersey. That adjustment could affect the long-term prosperity of Gulf Coast casinos, but hard-core is that gamblers are expected to find their way back to Biloxi and New Orleans.

With the stocks sagging, gasoline prices climbed. This made investors cautious because the higher gas prices could curb consumer spending and raise business costs. Wall Street wasted no time lowering earnings estimates for the companies. The first month after Katrina, the market value of 52 companies included in the Dow Jones gaming index dropped nearly \$3 billion dollars.

Methodology and Data

The first step in any event study is to identify an event. In this study the event was Hurricane Katrina that hit the Gulf Coast on the morning of August 29th, 2005. The next step was to identify the various casino companies that were affected by this event. In the case of this event, the sample size is relatively small in that a finite number of gaming licenses had been approved by the state from which the authors had to eliminate those companies whose stock was not actively traded. We identified all Casino Companies that had exposure in the Gulf Coast Region. Our sample is listed below in Table 1.

TABLE 1

GULF COAST CASINO SAMPLE

AZR	Aztar Corp.
ISLE	Isle of Capri
ASCA	Ameristar Casinos
HET	Harrahs
MGM	MGM Mirage
PENN	Penn National Gaming
BYD	Boyd Gaming
STN	Station Casinos
MCHI	Monarch Casinos
LVS	Las Vegas Sands
PNK	Pinnacle Entertainment

The next step is to calculate the impact of the event on each and every firm in the sample.

The appraisal of this impact is measured by any “abnormal” return. The abnormal return is actually any ex-post return different from the normal return of the company over the given event period.

EQUATION 1

$$AR_{it} = R_{it} - E(R_{it} | X_{it})$$

Where

AR_{it} = Abnormal Return

R_{it} = Actual Return

E(R_{it} | E_{it}) = Calculated Expected Return

For modeling “normal returns” $E(R_{it} | E_{it})$ we have chosen the market model. The market model is a statistical model that relates the return of any security to the return of a chosen market proxy, such as the S & P 500. In reality the market model is an

EQUATION 2

$$R_{it} = \alpha_i + \beta_i (R_{mt}) + \epsilon_{it}$$

Where

R_{it} = Actual return of security I during time t

α_i = Constant term

β_i = R's relational coefficient

R_{mt} = The Return of the market proxy

ϵ_{it} = Error term assumed to be 0

Ordinary Least Squares regression where the Y variable is represented by the return of security I, and the X variable is the return of the market proxy. Replacing these variables within the regression equation, we essentially have the equation for a straight line $Y=MX+b$ where b is the intercept and M is the slope of the line.

The market model which regresses a security's return against the market return provides us with the relationship between the market and that individual security. The slope of the line then becomes Beta. With Beta any slope greater than 1 represents a security whose returns, both positive and negative, tended to move more than the market moves. A slope less than one represents a security whose returns tended to move less than the market moves.

This methodology allows us to estimate the returns of any security based on how the market moves during any time period. However, the estimation period for Beta are outside the event window being studied. For this study the estimation period begins 30 days prior to the event, and a 220 trading day pre-event period is used for the estimation of Beta.

The calculation of abnormal returns (CARs) utilizes equation 2 in a multi-period analysis in which the actual returns of each casino company over the multi-period event window are taken and then the market model estimated returns over the same multi-period window are subtracted. The authors calculated cumulative abnormal returns for 1 day, 3 day, and 6 day event windows as reported in Table 3 for each casino company.

Finally Table 4 containing the average market model return, the average abnormal return, and the actual S & P 500 market proxy return was constructed. The information from Table 4 was graphed and reported as Figure 2.

TABLE 3

1, 3, and 6 Day Abnormal Returns										
NAME	Beta	Actual 1 day	Estimated 1 day	Abnormal 1 day	Actual 3 day	Estimated 3 day	Abnormal 3 day	Actual 6 day	Estimated 6 day	Abnormal 6 day
AZR	1.330	0.010	0.009	0.001	-0.001	0.018	-0.019	0.002	0.032	-0.030
ISLE	1.850	-0.027	0.012	-0.039	-0.049	0.024	-0.073	-0.051	0.050	-0.101
ASCA	1.580	0.008	0.012	-0.004	-0.043	0.022	-0.065	-0.049	0.039	-0.088
HET	1.260	0.003	0.009	-0.006	-0.040	0.017	-0.057	-0.055	0.031	-0.086
MGM	1.290	0.012	0.011	0.001	-0.012	0.018	-0.030	0.001	0.033	-0.032
PENN	1.490	0.008	0.011	-0.003	-0.016	0.021	-0.037	-0.021	0.038	-0.059
BYD	1.560	-0.004	0.012	-0.016	-0.026	0.022	-0.048	-0.030	0.039	-0.068
STN	0.943	0.000	0.006	-0.006	-0.025	0.013	-0.038	-0.016	0.023	-0.039
LVS	1.330	0.011	0.009	0.002	-0.016	0.018	-0.034	0.008	0.032	-0.024
PNK	1.430	-0.033	0.011	-0.044	-0.120	0.020	-0.140	-0.130	-0.036	-0.094
	Average	-0.001	0.010	-0.011	-0.035	0.019	-0.054	-0.034	0.028	-0.062

TABLE 4

Average Return Comparisons			
	1 Day	3 Day	6 Day
Market Returns	0.0060	0.0126	0.0235
Market Model	0.0101	0.0192	0.0280
Actual Returns	-0.0114	-0.0540	-0.0620

Discussion and Analysis

The day before Katrina made landfall the nation, if not the world, was well aware of the size and scale of this category 4-5 hurricane. As can be seen from Figure 1, the exact amount of devastation ultimately caused by this hurricane was not forecast the day before it made landfall, but people knew it was going to be enormous.

While enough information existed to predict the destruction of many, if not all, the casinos in and around Biloxi, the fear of this destruction was of secondary importance to the public as almost everyone's attention was drawn towards New Orleans. This lack of attention continued not only in the day or two leading up to landfall, but also the day after landfall. During this period of time, the risk of loss for certain companies increased substantially. The field of finance has a history of studying and reporting the relationship between risk and return. The Efficient Market Hypothesis explains that stock prices only move as a result of new information. The lack of information is also very important. Lack of information greatly increases the market risk of investment, and when the risk of any investment is increased, the required return must also increase. The price mechanism

is the only way the market has to translate this increase in risk and subsequent increase in the required return to investors.

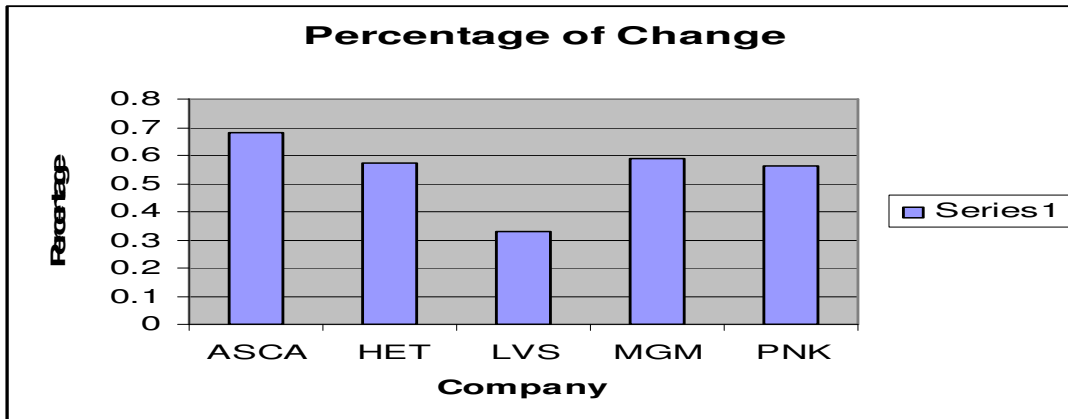
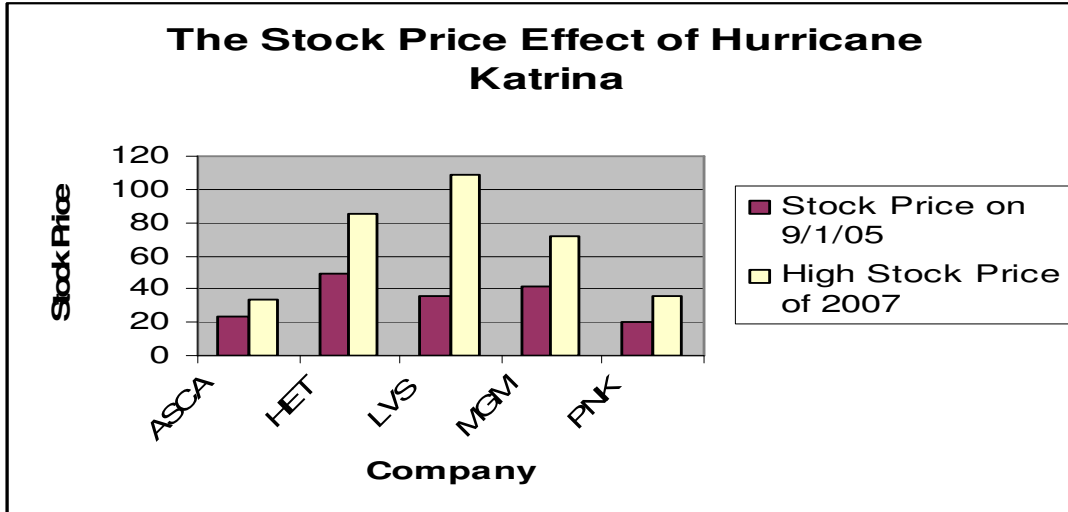
As can be seen by Table 3, and more effectively represented by Figure 2, the average abnormal return for the entire sample of Hurricane Katrina affected casinos was a negative .011 or -1.1% on day one while the overall market had a very healthy day with a return .006 or .60%. The one day return is represented by from $t = -1$ to $t = 0$ (with $t = 0$ representing the actual day Katrina made landfall). As the news of the level of destruction became apparent during the two days following landfall, the overall market reaped a gain of .0126 or 1.26% over the three day period (days $t = -1$ to $t = +2$). Our sample of Gulf Coast casinos had an average return of -.054 or -5.4%. As the news continued to be spread and attention was somewhat diverted from the situation in just New Orleans to the remainder of the affected Gulf Coast, the overall market continued to do well, gaining more than .0235 or 2.35% over the six day period. The returns of the affected casino companies continued to fall by more than .062 or 6.2% over the same time period.

The only conclusion that can be drawn from this chain of events is that the market did not correctly anticipate the catastrophic effect of hurricane Katrina and that the astute investor could have made a healthy profit by shorting the stocks of any number of Gulf Coast casinos. When the stocks took a beating, it was time for smart investors with long-term goals to snap up shares of companies that might survive and perhaps, eventually, thrive.

So is getting back into Casino stocks after Katrina justified? These markets can be very profitable but after this disaster and all of the damage, it is a very risky idea. This,

however, should not stop investors from once again investing in these companies. A number of changes took place within the casino industry. The most important of these are the changes in casino laws. The original laws required the casinos to be located on the water, because of the destruction during Katrina the laws were changed to allow the casinos to be within 500 feet of the water's edge, giving the casino foundations a post-Katrina advantage.

The table below represents the stock prices of five casinos' stock prices right after Katrina and the high price of their stocks so far in 2007. This chart represents the stock prices of Las Vegas Sands Corporation (LVS), Pinnacle Entertainment Incorporated (PNK), MGM Mirage (MGM), Harrah's Entertainment (HET), and Ameristar Casinos (ASCA). ASA had their stock price rise from \$23.13 on September 1, 2005 to \$34.01 in 2007. HET's stock rose from \$48.98 on September 1, 2005, to \$85.54 dollars in 2007. LVS's change was \$35.68 to \$108.42 dollars. MGM and PNK went from \$42 dollars to \$71.3 and \$19.88 to \$35.51 respectively. As you can see Katrina made their stocks plummet immediately. Smart investors believe that the stocks would rise back up. That is what eventually happened.



The Percentage of Change graph above shows how much the stock has gone up since it fell after Katrina. ASGA has the highest percentage of change at 68%. HET has gone up 57%. LVS has had the smallest increase at 33%. MGM and PNK have seen their stock go up 58% and 56% respectively. All the casinos' stock has risen at least 33%. This is a great sign for the future of the restoration of Louisiana and their gaming.

This disaster has led many to help Louisiana get back on its feet. Investors will not just look at whether the Casinos are rebuilt and back up for business, but at the general welfare of the city. The state that almost a year and a half ago looked like it would never recover, has begun the long process. The re-opening of casinos could bring

back tourists and a lot of money to the city. Two of the biggest casinos are backing up and running as of the end of August 2005. MGM Mirage's Beau Rivage reopening put 1,525 people back to work. They opened the Grand as a temporary casino with 811 slots, 28 table games, 500 renovated hotel rooms, a spa, a golf course and a number of restaurants. This casino just has a feeling of being built from the ground up.

The Beau Rivage also reopened that weekend of the one year anniversary and had a great ceremony. All of their 3,800 workers paraded up the property's main drive. The five other casinos that reopened prior to the Grand and Beau Rivage Casinos were Imperial Palace, New Palace, Isle of Capri Biloxi, Treasure Bay and Boomtown. They all have brought a renewed sense of promise to the market. In June of 2006, the Isle of Capri got approved for a 50 acre casino site in Bay St.Louis. This will cost an estimated 300 million dollars.

On November 6, 2006, Silver Slipper became the first Mississippi land-based casino to be built in the state. It cost \$80 million and features 1,003 coinless slot machines, 25 table games, and 9 poker tables. This new casino brought 600 people from Mississippi back to work.

A few other casinos are getting ready to help rebuild Mississippi. Bacaran Bay Casino Resort is opening a resort in late fall of 2008 that will cost over \$500 million dollars. The Broadwater, which was formally Presidents Casino, and The Golden Nugget also have deals in place to open up in Mississippi.

In May of 2007 another event is going to be held in Biloxi, Mississippi that will generate a great deal of money and interest back into the city. The 14th annual Southern Gaming Summit conference and trade show will be held on May 9 and 10th. This will help drive some confidence into investors as it makes a significant milestone in the recovery and rebirth of the Gulf Coast gaming market. Investors will get a first hand look at how the Gulf Coast region is on its way to becoming what it used to be. This should give investors a good idea, if they plan on getting back into the market.

The Louisiana gaming market will get back on its feet. It will once again be a major player in the gaming industry. In 2007 the re-opened casinos were approaching 75 percent of pre-storm levels. This study shows that after Katrina, the stock prices went down and risk went up considerably. Investors do know, though, that you have to take risk to get a great reward. In the future, these investors will not make the same mistake by not knowing when to get out of their stocks. Investors now know if there is a chance of a disaster like Katrina, sell immediately to avoid a huge financial loss. Katrina was not correctly anticipated and many will be paying for this underestimation for years to come.

FIGURE 1

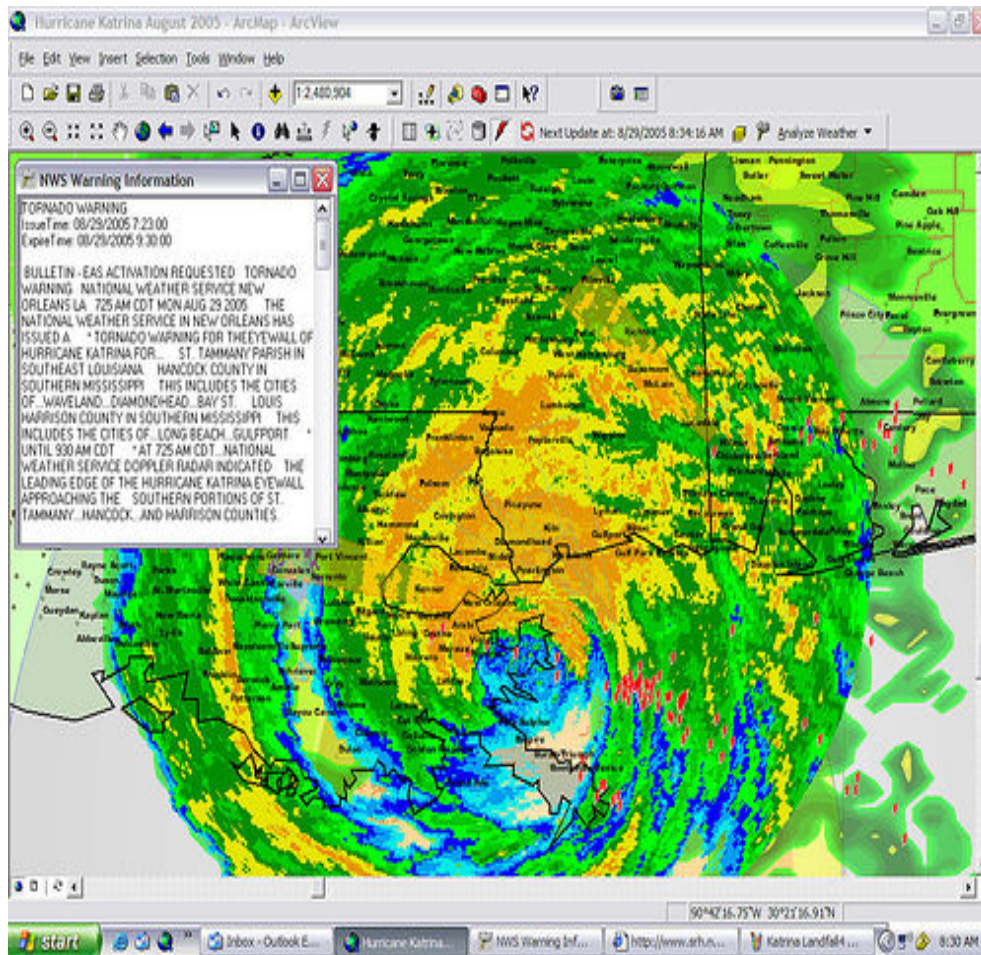
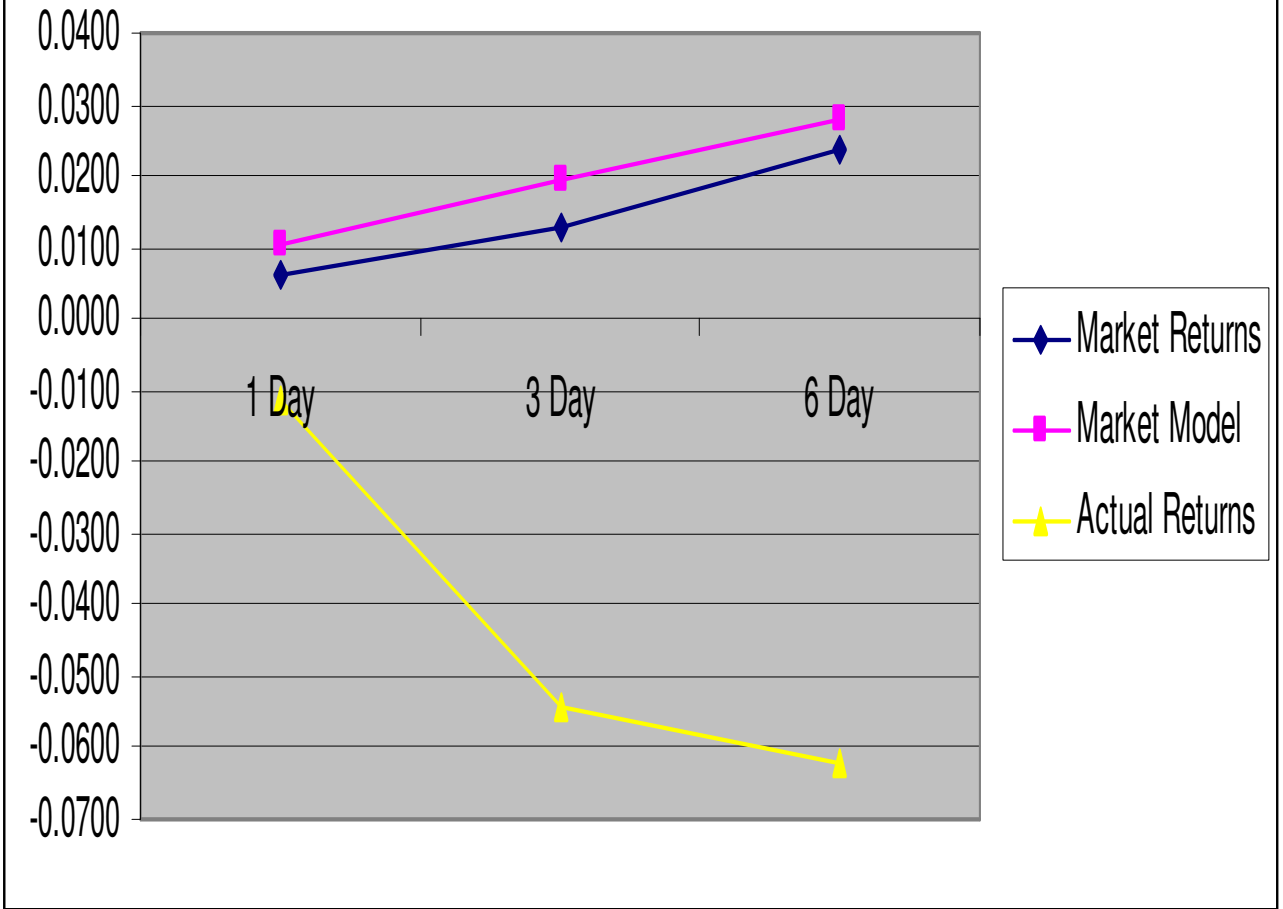


FIGURE 2

Average Return Comparisons



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Frank R. Flanegin Ph.D. is a Professor of Finance, Denis P. Rudd Ed.D. is a University Professor and Director of Hospitality and Tourism Management, Patrick J. Litzinger Ph.D. is a Professor of Economics and Department Head, Finance & Economics and Professor of Economics and Richard Mills Ph.D. is a Visiting Assistant Professor of Hospitality and Tourism at the School of Business, Robert Morris University. Pittsburgh.