

Obesity Related Stocks Risk and Return

Frederick Adjei^{1,*}, Mavis Adjei²

¹Department of Accounting, Economics and Finance, Southeast Missouri State University, Cape Girardeau, USA

²Department of Management and Marketing, Southern Illinois University, Carbondale, USA

*Corresponding author: fadjei@semo.edu

Received January 25, 2024; Revised February 28, 2024; Accepted March 04, 2024

Abstract In the last two decades there has been a significant increase in obesity in the United States of America. In this study, we examine the performance of firms directly related to the obesity trend; fast food restaurants such as McDonalds, soft drink companies such as the Coca-Cola company, and candy manufacturers such as the Hershey's company. Particularly, we examine the risk-return profiles as well as the Buy-and-Hold Abnormal Returns (BHAR) of these stocks in relation to the economic cycle. We find that junk foods' stocks have higher monthly returns and are riskier than the average stock. Additionally, junk foods' stocks report positive abnormal returns, and this return is higher during economic recessions. However, we also find a decline in Sharpe ratios of junk foods' stocks during recessions, indicating that Junk foods' stocks offer lower risk-adjusted returns during recessions.

Keywords: obesity, risk, abnormal return, junk foods

Cite This Article: Frederick Adjei, and Mavis Adjei, "Obesity Related Stocks Risk and Return." *Journal of Finance and Economics*, vol. 12, no. 2 (2024): 24-28. doi: 10.12691/jfe-12-2-1.

recessions, indicating that Junk foods' stocks offer lower risk-adjusted returns during recessions.

1. Introduction

Obesity is defined as a Body Mass Index (BMI) of 30 or higher according to the Centers for Disease Control and Prevention (CDC). In the last three decades there has been a substantial increase in obesity, in the United States. According to data collected in the CDC's Behavioral Risk Factor Surveillance System, in 1990, no U.S. states had obesity prevalence greater than 15% of the population. However, by the year 2000, 23 states had an obesity prevalence between 20% and 24%. By 2010, no state had obesity prevalence below 20%. Particularly, in West Virginia and Kentucky, from 2011 to 2021 obesity prevalence rose from 32.4% to 40.6% and 30.4% to 40.3%, respectively. This is a rather appalling trend.

Generally, people gain weight when they consume more calories than they burn through activity. Eating high-calorie, low-nutrient foods and beverages increase a person's risk of weight gain. It is well known that consuming fast foods and soft drinks or soda reduce the quality of a person's diet and increase risk of weight gain.

Cognizant of the obesity trend, we conduct an admittedly simple empirical study to examine the relationship between the economic cycle and the performance of firms in the junk foods business, as these are the firms likely to considerably profit from this alarming trend. In this study, Junk food is defined as fast foods, soda, or candy. We find that junk foods' stocks have higher monthly returns than the market and are riskier than the average stock. Additionally, junk foods' stocks report positive abnormal returns, and this return is higher during economic recessions. We also report a decline in Sharpe ratios of junk foods' stocks during

2. Literature Review

There is limited research on the connection between stock prices or economic growth and weight gain. Cawley [1], studies the relationship between income and weight finding that the link between income increase and weight gain is moderated by individual characteristics, such as societal preferences, gender, and race. Further, Cawley finds that the initial increase in income may be expended on foodstuffs but, the marginal utility on foodstuffs declines with additional income.

Similarly, Grecu and Rothhoff [2], find an inverted U-shaped relationship between income and obesity. Grecu and Rothhoff document that in low-income households, as income increases, health status; associated with weight, worsens. However, in high-income households, good health status is more valued and so as income increases, health status; associated with weight, improves.

Schmeiser [3] examines households which collect the Earned Income Tax Credits (EITC); a one-time increase in income and finds that the EITC can explain up to 21% increase in BMI from 1990 to 2002. Akee et al. [4] study the effect of casino profits on the weight of Cherokee Indians by tracking the Cherokee Indians in western North Carolina semiannually; the Cherokee Indians receive a 40% income increase from casino profits every six months. The authors find that the increase in income is correlated with an increase in BMI among lower-income Cherokee Indian youth.

Chaudri and Timmer [5] study patterns of food consumption of low-income households and confirms that

these households are considerably more sensitive to economic cycles than higher income households. Chaudri and Timmer's work is consistent with the notion that increasing income in low-income households causes increases in consumption of calorie-dense foods such as *Junk foods*.

Drewnowski and Popkin [6] examine data on economic cycles and food availability revealing a key shift in the configuration of the global diet, a decoupling of the classic link between incomes and fat consumption. The authors find that global accessibility to inexpensive vegetable oils and fats has led to significantly higher fat consumption in low-income nations, resulting in increased obesity.

Madanoglu, Lee, and Kwansa [7] analyze the risks and returns of fast-food versus casual-dining restaurants. Their results show that casual-dining restaurants outperformed fast-food restaurants, higher mean monthly return, and higher return per unit of risk.

3. Hypothesis Development

The maintenance of a healthy weight is subject to both income and time limitations. When the unemployment rate is low, the opportunity cost of time is high, and there is a relatively higher household income. A low unemployment rate will reduce time-intensive investments in health such as home-cooked meals and physical activity such as running and may lead to consumption of junk foods leading to weight gain as well as an increase in performance of junk foods firms, translating into an increase in their stock prices.

Specifically, the effect of an increase in income on a person's weight is conditional. For low-income households, an increase in income may lead to the consumption of higher caloric, inexpensive, and energy dense junk foods. However, in high-income households, a good health status is valued [2] and so an increase in income may rather trigger further investment in time-intensive health improving activities such as physical exercise and consumption of healthier and usually more expensive foods such as fruits and vegetables, and a shun of junk foods for good health.

Impregnating the discussion with the business cycle, during a recession the unemployment rate is relatively high and low-income households may experience a reduction in income leading to a reduction of junk foods consumption. High-income households may also experience financial constraints during a recession. However, their constraint may not be enough to drive them to the consumption of junk foods, consistent with the findings of Chaudri and Timmer [5].

Additionally, like the Earned Income Credit, government stimulus checks influence households' spending. Consistent with Schmeiser [3], federal stimulus payments significantly increase consumer spending. Particularly, the payments have a large impact on spending for low-income households but less so for high-income households. The effects of a recession and/or federal stimulus payments will have impacts on sales revenues for junk foods' firms, affecting profits, and ultimately affect their stock prices. We make the following hypotheses:

H 1: During a recession, junk foods' stocks will perform worse than the average stock.

H 2: During periods of government stimulus payments, junk foods' stocks will perform better than the average stock.

The increased interest in junk foods' stocks during economic growth should increase trading activity in these stocks driving up the volatility in these stocks relative to the average stock.

H 3: During a recession, junk foods' stocks will be less risky than the average stock.

H 4: During periods of government stimulus payments, junk foods' stocks will be riskier than the average stock.

4. Data and Method

A firm is classified as a Junk Foods' firm if it sells fast foods; such as McDonalds, soft drinks; such as the Coca-Cola company, and candy manufacturers; such as the Hershey's company. To examine the performance of the Junk Foods' firms, we obtain daily and monthly stock price data from YahooFinance.com from June 1972 to December 2022. To be included in the study, a Junk Foods company must be publicly traded and have data available in YahooFinance.com and this limits our study to 22 firms. Since some firms become public later in the study period, there are 7005 firm-month observations. Additionally, we obtain price data on S&P500 index. We compute daily and monthly returns from the price data.

We conduct an initial comparison of Junk Foods' stock performance against the average stock by computing the Buy-and-Hold Abnormal Return (BHAR) for Junk Foods' stocks as follows:

$$BHAR_{i,T} = \prod_{t=1 \text{ to } T} (1 + R_{i,t}) - \prod_{t=1 \text{ to } T} (1 + R_{m,t}) \quad (1)$$

where $BHAR_{i,T}$ is the Buy-and-Hold Abnormal Return of Junk Foods' stock i over the period T , $R_{i,t}$ is the Junk Foods' stock i return for month t , and $R_{m,t}$ is the S&P 500 index month t return.

To test our hypotheses, we run the following ordinary least squares (OLS) regressions:

$$R_{it} = \beta_0 + \beta_1 R_{mt} + \beta_2 RES_t + \beta_3 STS_t + E_{it} \quad (2)$$

$$R_{it} - R_{mt} = \beta_0 + \beta_1 RES_t + \beta_2 STS_t + E_{it} \quad (3)$$

where R_{it} is the monthly return of firm i in month t , R_{mt} is the monthly return of the stock market proxied by the S&P500 index in month t , RES_t is a binary variable which is set to 1 if a month is during a recession and set to zero otherwise and STS_t is a binary variable which is set to 1 if a month is during a government stimulus period and set to zero otherwise. E_{it} is the error term.

Additionally, we examine the risk of Junk Foods stocks.

$$\sigma_{it} = \beta_0 + \beta_1 RES_t + \beta_2 STS_t + E_{it} \quad (4)$$

where σ_{it} is the monthly standard deviation of daily returns of firm i in month t , RES_t is a binary variable which is set to 1 if a month is during a recession and set to zero otherwise and STS_t is a binary variable which is set to

1if a month is during a government stimulus period and set to zero otherwise. E_{it} is the error term.

5. Empirical Results

Table 1a presents the descriptive statistics of the main variables used in the study over the whole study period. The mean monthly return of junk foods' stocks is 1.39% with a standard deviation of 11.32%. The mean monthly market return is 1.05% with a standard deviation of 3.8%. We also compute Buy-And-Hold Abnormal Returns for junk foods' stocks and find a 10.35% abnormal return. Next, we divide the study period into economic recessionary and economic expansionary periods. Table 1b presents the descriptive statistics for the expansionary periods. The mean monthly return of junk foods' stocks is 1.62% with a standard deviation of 10.97%. The mean monthly market return is 0.95% with a standard deviation of 3.9%. Table 1c presents the descriptive statistics for recessions. The mean monthly return of junk foods' stocks is -0.43% with a standard deviation of 13.77%. The mean monthly market return is 0.18% with a standard deviation of 2.22%. Additionally, the abnormal returns for junk foods stocks during recessions is 13.15%.

Table 2 presents the results of the OLS regressions on stock returns. The regression coefficients for the recession binary variable, are negative and statistically significant in both regressions, indicating that junk foods' stocks perform worse than the average stock during recessions. The finding is consistent with our hypothesis that during a recession the unemployment rate is relatively high and low-income households may experience a reduction in income leading to a reduction in junk foods consumption.

Next, the government stimulus coefficients are positive and statistically significant. The result is consistent with our hypothesis that federal stimulus payments have a large impact on spending for low-income households, translating into higher sales revenue for junk foods' firms, increasing profits, and finally increasing stock prices.

Table 3 presents the results of the OLS regression on risk, measured by the standard deviation of daily stock returns. The regression coefficient for the recession binary variable is negative and statistically significant for junk

foods' stocks indicating decreased trading activity because of the reduced interest in junk foods' stocks during economic recessions. Conversely, the market coefficient is positive and statistically significant. This result suggests that there is an increased interest in the market during recessions and the increased trading activity contributes to the higher volatility.

However, the government stimulus coefficient is positive and statistically significant. The result is consistent with our hypothesis that federal stimulus payments have a large impact on spending for low-income households, translating into higher revenues for junk foods' firms, translating into higher stock prices. Naturally, investors are attracted to the profits, leading to increased trading activity and hence an increase in volatility.

For robustness, we examine the Sharpe ratios of junk foods' firms to study their risk-return profiles during recessions and/or periods of government stimulus. The Sharpe ratio:

$$S_{it} = [R_{it} - R_f] / \sigma_{it} \quad (5)$$

where R_{it} is the monthly return of firm i in month t , R_f is risk-free rate proxied by the one-month treasury bill rate, and σ_{it} is the monthly standard deviation of daily returns of firm i in month t .

We run the following regression:

$$S_{it} = \beta_0 + \beta_1 RES_t + \beta_2 STS_t + E_{it} \quad (6)$$

where S_{it} is the monthly Sharpe ratio of firm i in month t , RES_t is a binary variable which is set to 1if a month is during a recession and set to zero otherwise and STS_t is a binary variable which is set to 1if a month is during a government stimulus period and set to zero otherwise. E_{it} is the error term.

Table 4 presents the results of the OLS regression on the Sharpe ratio. There is a general increase in investor risk-aversion in the stock market resulting in higher Sharpe ratios during recessions. However, for junk foods' stocks, we observe a decline in Sharpe ratios during recessions, as indicated by the negative coefficient for the recession binary variable. Junk foods' stocks offer lower risk-adjusted returns during recessions.

Table 1. Descriptive Statistics

Panel A						
Variable	Mean	Median	Std Dev	N	Min	Max
R_{it}	0.0139	0.0093	0.1132	7005	-0.5765	1.7447
R_{mt}	0.0104	0.0123	0.0376	7005	-0.2176	0.1873
$BHAR_{i,T}$	0.1035	0.0218	0.0218	574	-1.0037	4.3331
Panel B						
Variable	Mean	Median	Std Dev	N	Min	Max
R_{it}	0.0162	0.0104	0.1097	6242	-0.5000	1.7447
R_{mt}	0.0095	0.0123	0.0389	6242	-0.2176	0.1874
$BHAR_{i,T}$	0.1001	0.0180	0.4951	511	-1.0037	4.3331

Panel C						
R_{it}	-0.0043	-0.0030	0.1377	763	-0.5765	0.8701
R_{mt}	0.0018	0.0078	0.0223	763	-0.1694	0.1779
$BHAR_{i,T}$	0.1315	0.0578	0.6952	63	-0.6971	3.8227

Table 1 reports the descriptive statistics of the main variables used in the study. The data is monthly from January 1972 to December 2022, resulting in 7005 firm-month observations. where R_{it} is the monthly return of firm i in month t , R_{mt} is the monthly return of the stock market proxied by the S&P500 index in month t . We compute the Buy-and-Hold Abnormal Return (BHAR) for Junk Foods' stocks as follows:

$$BHAR_{i,T} = \prod_{t=1}^T (1 + R_{i,t}) - \prod_{t=1}^T (1 + R_{m,t}) \quad (1)$$

where $BHAR_{i,T}$ is the Buy-and-Hold Abnormal Return of Junk Foods' stock i over the period T , $R_{i,t}$ is the Junk Foods' stock i return for month t , and $R_{m,t}$ is the S&P 500 index month t return.

Table 2. Return Regressions

R_{it}					$R_{it} - R_{mt}$			
Variable		Estimate	Std. Error	t-value		Estimate	Std. Error	t-value
β_0		0.0139	0.0015	9.35		0.0060	0.00150	3.98
R_{mt}		0.1488	0.0364	4.09				
RES_t		-0.0409	0.0068	-6.01		0.0455	0.0071	-6.45
STS_t		0.0232	0.0064	3.63		0.0192	0.0066	2.89
N	7005				7005			
R^2	0.0075				0.0074			

Table 2 presents the results of the following OLS regressions:

$$R_{it} = \beta_0 + \beta_1 R_{mt} + \beta_2 RES_t + \beta_3 STS_t + E_{it} \quad (2)$$

$$R_{it} - R_{mt} = \beta_0 + \beta_1 RES_t + \beta_2 STS_t + E_{it} \quad (3)$$

where R_{it} is the monthly return of firm i in month t , R_{mt} is the monthly return of the stock market proxied by the S&P500 index in month t , RES_t is a binary variable which is set to 1 if a month is during a recession and set to zero otherwise and STS_t is a binary variable which is set to 1 if a month is during a government stimulus period and set to zero otherwise. E_{it} is the error term.

Table 3. Risk Regressions

σ_{it} (Junk Stock)					σ_{im} (S&P 500)			
Variable		Estimate	Std. Error	t-value		Estimate	Std. Error	t-value
β_0		0.1026	0.0003	309.50		0.0115	0.0001	119.14
RES_t		-0.0435	0.0017	-26.44		0.0016	0.0004	3.37
STS_t		0.0855	0.0015	55.40		0.0048	0.0005	10.65
N	4501				4501			
R^2	0.4543				0.0909			

Table 3 presents the results of the following OLS regressions:

$$\sigma_{it} = \beta_0 + \beta_1 RES_t + \beta_2 STS_t + E_{it} \quad (4)$$

where σ_{it} is the monthly standard deviation of daily returns of firm i in month t , RES_t is a binary variable which is set to 1 if a month is during a recession and set to zero otherwise and STS_t is a binary variable which is set to 1 if a month is during a government stimulus period and set to zero otherwise. E_{it} is the error term.

Table 4. Sharpe Ratios

S_{it} (Junk Stock)					S_{im} (S&P 500)			
Variable		Estimate	Std. Error	t-value		Estimate	Std. Error	t-value
β_0		0.0164	0.0196	0.84		0.6042	0.0679	-8.89
RES_t		-0.3873	0.1044	-3.71		0.2412	0.3616	-0.67
STS_t		0.2289	0.0900	2.54		1.4625	0.3117	4.69
N	3122				3122			
R^2	0.005				0.020			

Table 4 presents the results of the following OLS regressions:

$$S_{it} = \beta_0 + \beta_1 RES_t + \beta_2 STS_t + E_{it} \quad (6)$$

where S_{it} is the monthly Sharpe ratio of firm i in month t , RES_t is a binary variable which is set to 1 if a month is during a recession and set to zero otherwise and STS_t is a binary variable which is set to 1 if a month is during a government stimulus period and set to zero otherwise. E_{it} is the error term.

6. Conclusions

Knowing the obesity trend, we conduct a simple empirical study to examine the relationship between the economic cycle and the performance of firms in the junk foods business. We examine the simple returns, abnormal returns, and risk of junk foods' stocks.

First, junk foods' stocks have higher monthly returns than the market and are riskier than the average stock. Additionally, junk foods' stocks report positive abnormal returns, and this return is higher during economic recessions, indicating that even though junk foods' stocks perform worse during recessions, they still beat the market. The regression results support the earlier finding that junk foods' stocks perform worse during recessions.

This finding may be explained by the decrease in income in low-income households during recessions and is consistent with Chaudri and Timmer [5] finding that low-income households are considerably more sensitive to economic cycles than higher income households. Additionally, our finding on the effect of government stimulus on junk foods' stocks presents indirect evidence that government stimulus works, at least for low-income households.

Finally, the decline in Sharpe ratios of junk foods' stocks during recessions, indicates that Junk foods' stocks offer lower risk-adjusted returns during recessions. With the increase in investor risk-aversion during recessions,

junk foods' stock will be less attractive to investors during recessions, even though they offer a higher return than the average stock.

We conclude that junk foods' stocks are more sensitive to the business cycle than the average stock.

References

- [1] Cawley, J. 2015. "An Economy of Scales: A Selective Review of Obesity's Economic Causes, Consequences, and Solutions." *Journal of Health Economics*, 43: 244-268.
- [2] Grecu, A.M. and Rotthoff, K.W. 2015. "Economic growth and obesity: findings of an Obesity Kuznets curve." *Applied Economics Letter*. 22(7): 539- 543.
- [3] Schmeiser, M. D. 2009. "Expanding wallets and waistlines: the impact of family income on the BMI of women and men eligible for the Earned Income Tax Credit." *Health Economics*, John Wiley & Sons, Ltd., 18(11): 1277-1294.
- [4] Akee, R., Simeonova E., Copeland W., Angold A., and Costello E. J. 2013. "Young Adult Obesity and Household Income: Effects of Unconditional Cash Transfers." *American Economic Journal: Applied Economics*, 5 (2): 1-28.
- [5] Chaudri, R., and Timmer C. P. 1986. "The Impact of Changing Affluence on Diet and Demand Patterns for Agricultural Commodities." *World Bank Staff Working Papers* 785. Washington, DC: World Bank, 1986.
- [6] Drewnowski, A., and Popkin, B. M. 1997. "The Nutrition Transition: New Trends in the Global Diet." *Nutrition Reviews*, 55: 31-43.
- [7] Madanoglu, M., Lee, K. and Kwansa, F. 2008. "Risk-Return Analysis of Fast-Food Versus Casual-Dining Restaurants: Who Moved My Cheeseburger?" *Journal of Hospitality & Tourism Research* 32 (3): 327-341.



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