

Beyond Seasonality: A Statistical Exploration of the Santa Claus Rally

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Introduction

Ever wonder why markets surge around Christmas?

The stock market, a realm of fortunes won and lost since the 17th century, has its share of mysteries. While legends like Benjamin Graham, Warren Buffett, etc., navigated its tides to wealth, others have been swept away.

Understanding this enigmatic beast has long been a quest for investors and researchers, but a curious truth has emerged: *asset returns often defy prediction*. Imagine a drunken sailor's walk—that's how some economists view market movements, seemingly random and

impossible to predict.

Yet, amidst the chaos, *glimmers of order persist*. The stock market whispers secrets in recurring patterns and anomalies like the *January effect* (markets rising early in the year), the *days of the week*, etc. Investors, eager to exploit these whispers, position themselves to ride the waves.

One such whisper is the *Santa Claus rally (or SC rally)*, a supposed surge in the last 5 trading days of December and the first 2 days of January. *Legend has it Yale Hirsch spotted this trend 50 years*

ago. Investors have flocked to it ever since, but a crucial question hangs in the air: *Has the Great Financial Crisis changed the game?*

This project delves into that question. We'll be analyzing stock data from 2010 to 2023 for major indices like the S&P 500, Euro STOXX 50, FTSE 100 and the Nikkei 225, all sourced from Yahoo Finance. Can we still hear the whispers of the Santa Claus rally, or has the market moved on? Buckle up, fellow analysts and researchers, and let's see if the magic of Christmas still holds power on Wall Street.

Method of Analysis

The objective of this project is to examine if a significant difference exists between returns posted during the Santa Claus rally and other days of the year in the Post-GFC era.

To achieve this objective, daily stock price data for S&P 500, Euro STOXX 50, FTSE 100 and Nikkei 225 will be collected from Yahoo Finance and the returns will be computed for each stock indices above.

Basic descriptive analysis will be conducted to examine the properties of the data. Then a dummy variable regression analysis will be carried out to achieve this objective above. This statistical method will help tell if a significant difference exists between returns posted during the Santa Claus rally and other days of the year. The model to be estimated is given below.

$$return_t = \beta_0 + \beta_1 SCrally_t + \varepsilon_t$$

Where:

return = daily stock return (gain or loss)

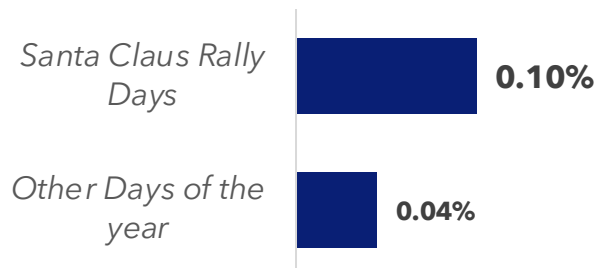
β_0, β_1 = model parameters

$SCrally = \begin{cases} 1, & \text{if day falls on Santa Claus rally day} \\ 0, & \text{if any other day or non Santa Claus} \end{cases}$

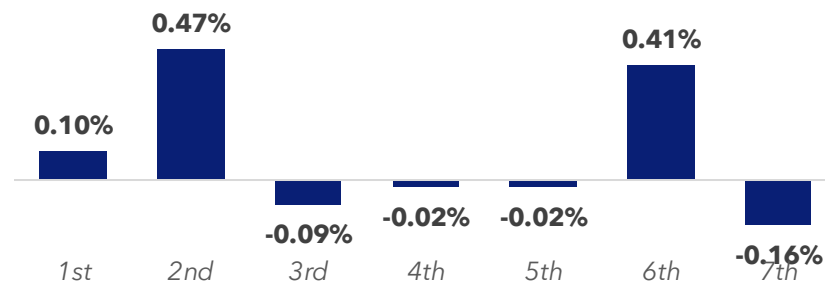
ε_t = stochastic disturbance term

Descriptive Analysis: S&P 500

S&P 500 average return



S&P 500 return on SC rally days (Avg.)



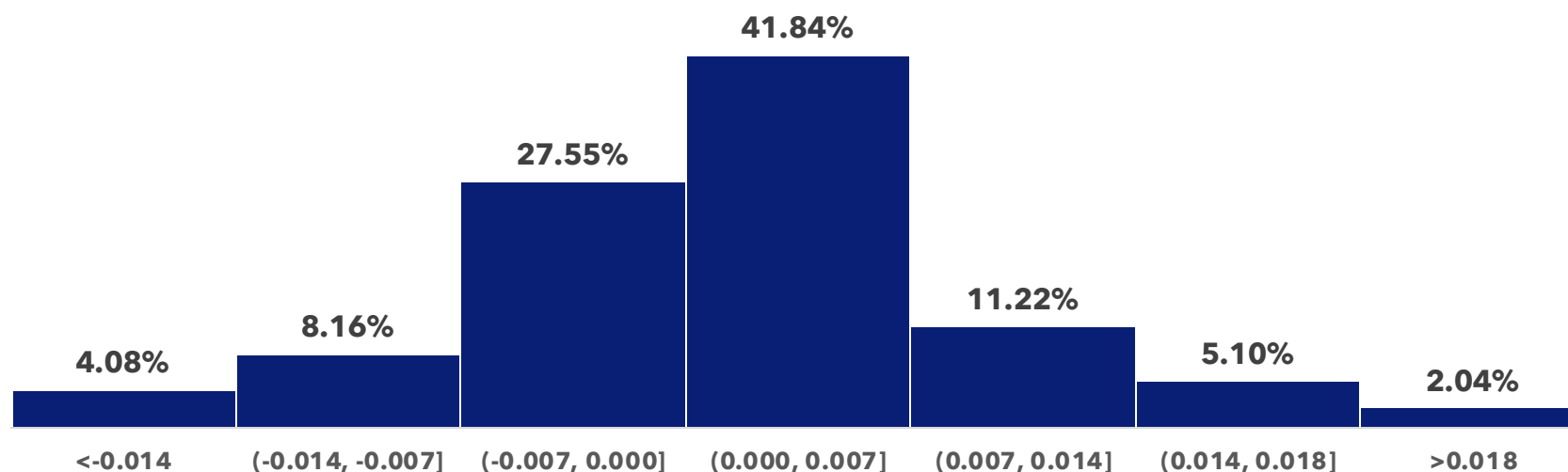
Between 2010 and 2023, the S&P 500 posted an

average return of

0.1% during

the Santa Claus rally days compared to the **0.04%** on other days of the year.

Distribution of SC rally return (2010-2023)



With **60.2%**

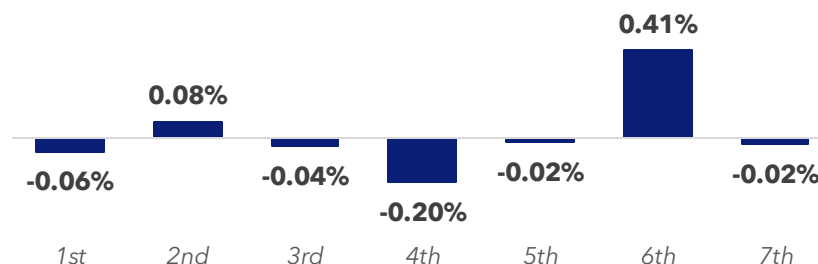
of the recorded returns higher than zero, it is evident that the distribution of returns leans towards the positive spectrum. This historical pattern suggests that the S&P 500 has exhibited a higher frequency of positive returns compared to negative returns during the Santa Claus Rally.

Descriptive Analysis: Euro 50

Euro STOXX 50 average return



Euro 50 return on SC rally days (Avg.)



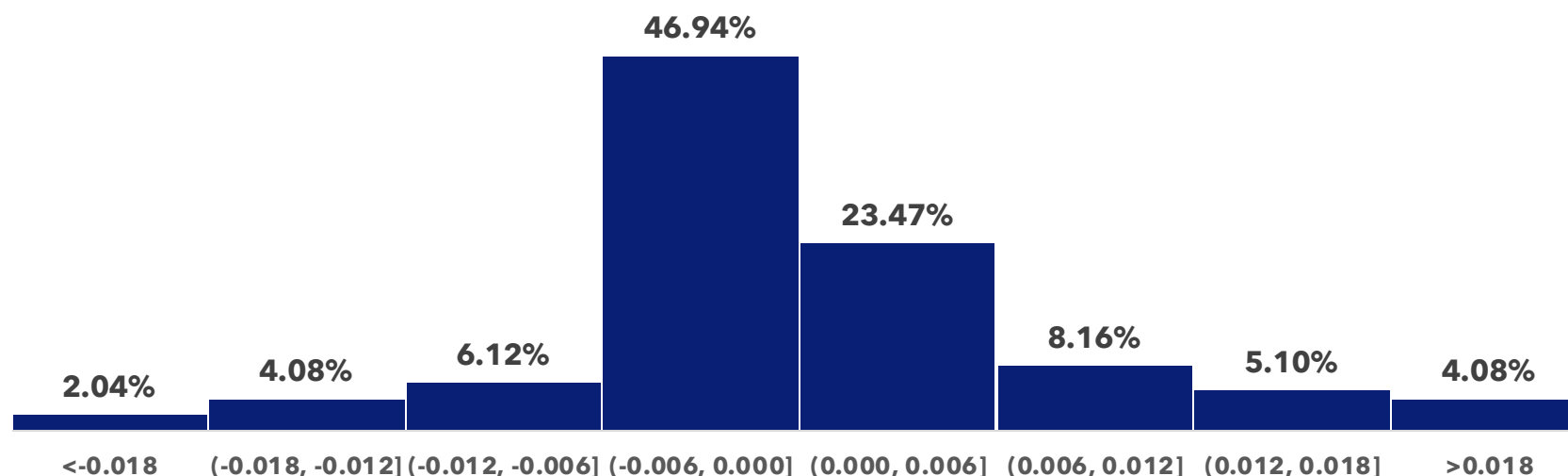
Between 2010 and 2023, the Euro 50 posted an

average return of

0.022%

during the Santa Claus rally days compared to the marginally lower **0.020%** on other days of the year.

Distribution of SC rally return (2010-2023)

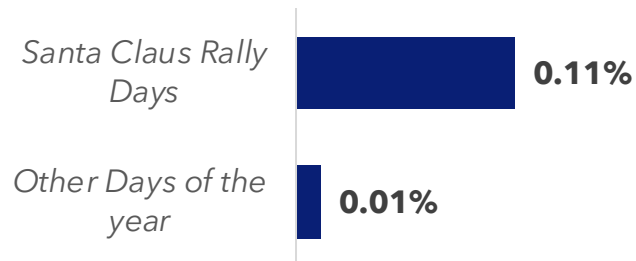


With **40.8%**

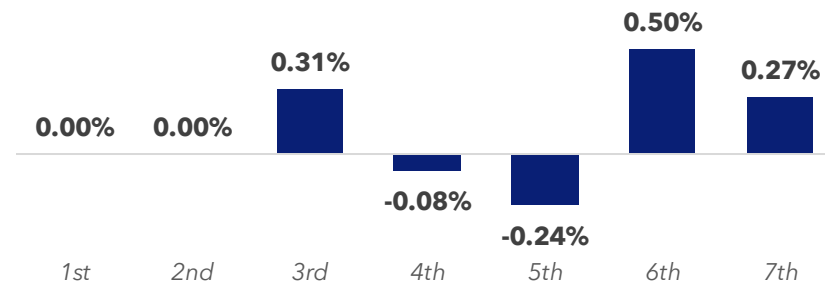
of the recorded returns higher than zero, it is evident that the distribution of returns leans towards the negative spectrum. This historical pattern suggests that the *Euro STOXX 50* has exhibited a higher frequency of negative returns compared to positive returns during the Santa Claus Rally.

Descriptive Analysis: FTSE 100

FTSE 100 average return



FTSE 100 return on SC rally days (Avg.)

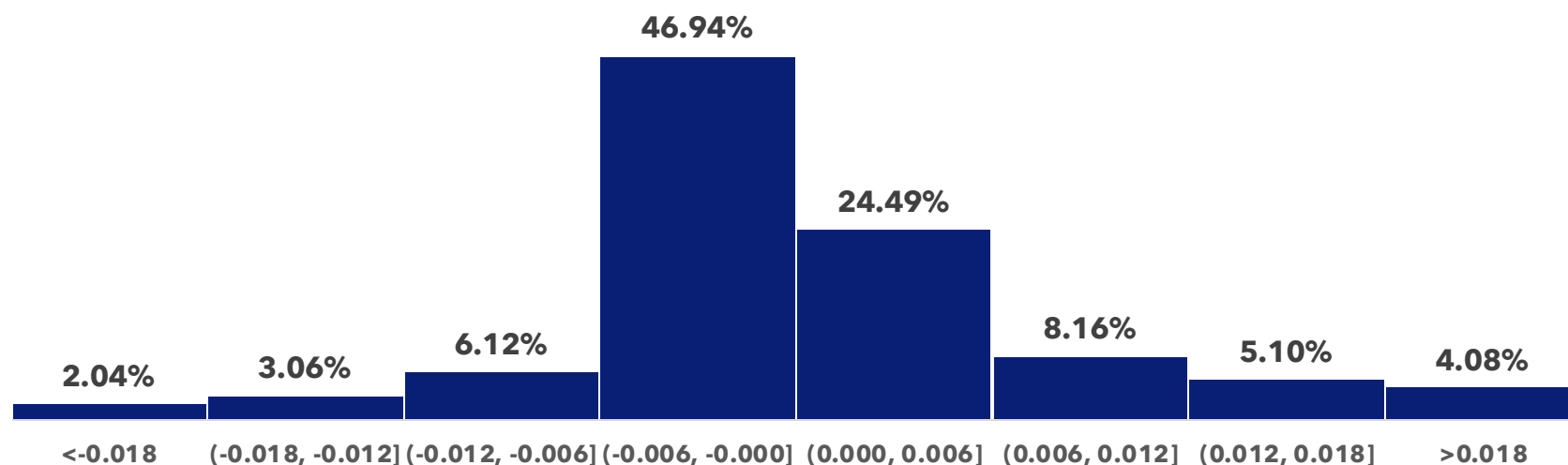


Between 2010 and 2023,
the FTSE 100 posted an
average return of

0.11%

during the Santa Claus
rally days compared to the
0.01% on other days of
the year.

Distribution of SC rally return (2010-2023)



With **41.83%**

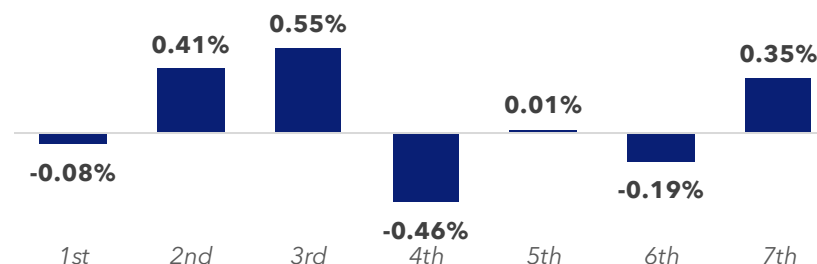
of the recorded returns higher than zero, it is evident that the distribution of returns leans towards the negative spectrum. This historical pattern suggests that *the FTSE 100 has exhibited a higher frequency of negative returns compared to positive returns during the Santa Claus Rally.*

Descriptive Analysis: Nikkei 225

Nikkei 225 average return



Nikkei 225 return on SC rally days (Avg.)

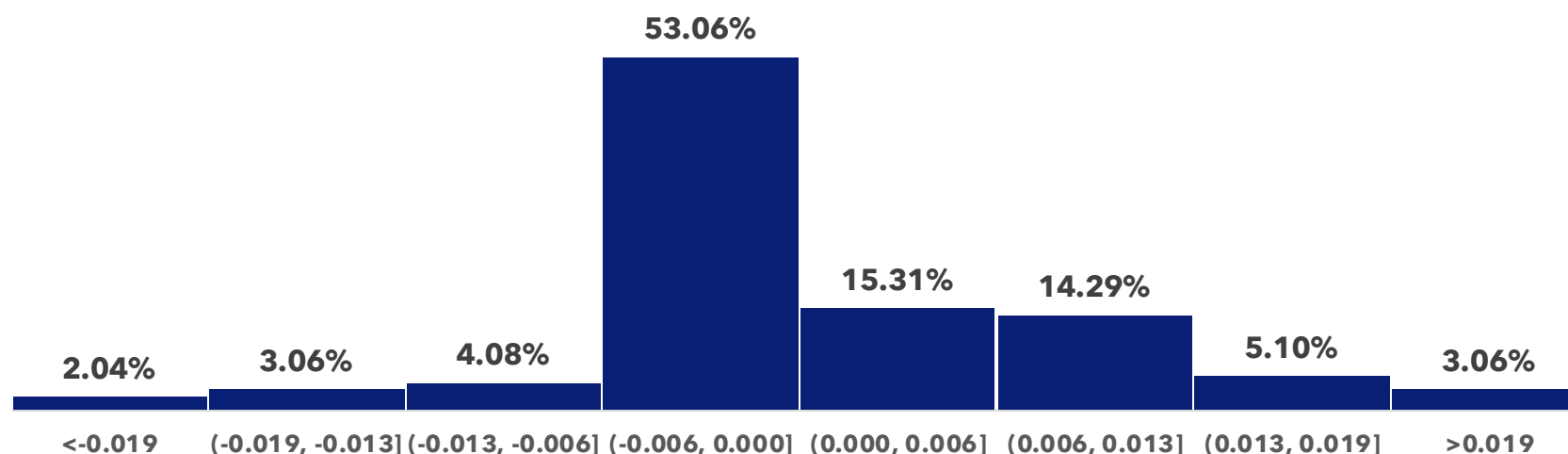


Between 2010 and 2023, the S&P 500 posted an average return of

0.09%

during the Santa Claus rally days compared to the **0.04%** on other days of the year.

Distribution of SC rally return (2010-2023)



With **37.8%**

of the recorded returns higher than zero, it is evident that the distribution of returns leans towards the negative spectrum. This historical pattern suggests that the Nikkei 225 has exhibited a higher frequency of negative returns compared to positive returns during the Santa Claus Rally.

Dummy Variable Regression Output

Stock Index		Coefficients	Standard Error	t Stat	P-value
S&P 500	Intercept	0.040%	0.000182	2.4328	1.50%
	SC Rally	0.050%	0.001112	0.4909	62.35%
Euro STOXX 50	Intercept	0.020%	0.000215	0.9171	35.91%
	SC Rally	0.003%	0.001311	0.0197	98.42%
FTSE 100	Intercept	0.012%	0.000167	0.7296	46.57%
	SC Rally	0.095%	0.001019	0.9361	34.93%
Nikkei 225	Intercept	0.038%	0.000212	1.8129	6.99%
	SC Rally	0.047%	0.001293	0.3614	71.78%

Source: Author's computation using EViews

The dummy variable regression analysis above reveals a noteworthy trend concerning the intercepts, representing the average daily returns during non-SC rally days across various indices. Notably, only the intercepts for the S&P 500 and Nikkei 225 exhibit statistical significance at the 5% and 10% alpha levels, respectively, indicating that these intercepts are distinctly different from zero.

Analyzing the SC rally coefficients, which reflect the excess return on SC rally days compared to other days, reveals they are all positive. This aligns with the previous observation of higher average returns during SC rallies. However, these coefficients lack statistical significance at both the 5% and 10% alpha levels, indicating the observed difference in returns could be attributable to chance.

Summary & Conclusion

Back to the question: *Is the Santa Claus rally significant in the aftermath of the Great Financial Crisis?*

From the analysis carried out, it is evident that the Santa Claus rally still exists evinced by the higher average returns during the Santa Claus rally days. However, these higher average returns are not

statistically significant, as revealed in the dummy variable regression analysis. This implies that the higher returns registered during Santa Claus rallies are due to chance.

In conclusion, based on the outcome of this analysis, there is not enough evidence to support the claim that the Santa Claus rally

exists in the post-GFC era. This implies that the data does not show consistent outperformance during the Santa Claus Rally period compared to other times of the year. The gains tend to be modest at best. So, while stocks may tilt positive during this holiday period, significant gains are by no means a guarantee.



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