

UNCOVERING THE TRUTH: THE ABSENCE OF SANTA CLAUS RALLY IN U.S. STOCK MARKET RETURNS

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Abstract

This research paper investigates the existence of the Santa Claus Rally in the U.S. stock market. The Santa Claus Rally is a phenomenon where stock market returns are significantly higher in the last five trading days of December and the first two trading days of January than the average returns of the remaining trading days of the year. Using data from January 2000 to December 2021, this study finds that the Santa Claus Rally does not exist in the U.S. stock market. The study also examines the existence of the Santa Claus Rally in two calendar sub-periods and during periods of economic expansions and recessions. The empirical results show that the Santa Claus Rally is not prevalent in the U.S. stock market during any of these sub-periods. The paper provides a review of the literature on stock market anomalies and concludes that publicly available academic research on the investigation of the Santa Claus Rally in stock returns is limited.

INTRODUCTION

The existence of calendar regularities such as the day-of-the-week effect and the January effect has received much attention in academic literature as well as the popular press. The existence of calendar regularities (or irregularities) in the stock market more commonly referred to as stock market anomalies challenge the well-accepted theory of stock market efficiency. Many researchers have documented different market anomalies that exist in the stock market. The existence of calendar regularities in stock market returns create understandably some skepticism about the efficiency of the stock market. Although, researchers have largely concluded that stock markets are generally efficient. The existence of calendar regularities in the stock market is a much-discussed topic of interest in the academic and professional literature.

One stock market anomaly that has received some recognition in academic literature is Santa Claus Rally in stock market returns. The existence of the Santa Claus Rally in stock returns indicates that the mean return of the last five trading days of the year and the first two trading days of the next year of the stock market is significantly higher than the mean returns of the remaining days of the year. The prevalence of the Santa Claus Rally in stock

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returns is very interesting and adds to the list of many popular stock market anomalies discussed in academic literature. Stock market anomalies are intriguing as it challenges the largely accepted theory of stock market efficiency. However, calendar regularities in the stock market such as the Santa Claus Rally in stock returns can be transient and can disappear over time. We believe it is therefore necessary to reexamine these documented anomalies in different data sets and in recent times. Furthermore, it is important to examine the robustness of an anomaly separately during periods when the stock market is performing well and generating positive returns as well as when performing poorly and generating negative returns.

We examine the prevalence of the Santa Claus Rally in U.S. stock returns in recent years. Specifically, we compare Santa Claus Rally's day returns with that of the remaining days of the year for the time, January 2000 to December 2021. We first investigate the existence of the Santa Claus Rally in stock returns during the overall period of our study. We then examine the existence of this anomaly in stock returns by two calendar sub-periods, i.e., the first sub-period, when the overall stock market generated negative returns (2000 to 2009), and then the second sub-period, when the overall stock market generated positive returns (2010 to 2021). We also examine the existence of the Santa Claus Rally separately during periods of economic expansions and periods of economic recessions. We believe our analysis will better understand the Santa Claus Rally in stock market returns. In particular, we utilize two major representative U.S. stock indices for this purpose, the S&P 500 stock index and the NASDAQ index for the period, January 1, 2000, to December 31, 2021. We conducted several statistical tests to compare the mean daily returns of Santa Claus Rally days with that of the remaining days. We briefly discuss selected literature relevant to our research in the next section.

LITERATURE REVIEW

Numerous researchers have documented the existence of several stock market anomalies in academic literature. Some of the popular stock market anomalies discussed in the academic literature are the day-of-the-week effect (for example, Cinko and Avci 2009), January effect (for example, Haugen and Jorion 1996), Friday the Thirteenth effect (for example, Kolb and Rodriguez 1987), among others. Researchers were able to identify many of these anomalies in different stock markets all over the world. For example, Patel (2008) identified calendar regularities of the November-December effect and the March-to-May effect in the Indian stock market. Additionally, researchers have sometimes documented these calendar regularities in financial asset classes other than stocks. For example, Kohers and Patel (1996) documented the day-of-the-week effect on daily returns of junk bonds. These anomalies are intriguing as researchers are unable to explain the existence of these calendar regularities (or maybe irregularities) that exist in stock markets. However, researchers have recently found some of these popular calendar anomalies are disappearing or at least losing momentum in recent years in returns of stock markets. For example, Patel (2016) found January effect is no longer exists in international stock markets. In another study, Patel (2009) documents that Friday the Thirteenth effect does not exist in the U.S. stock market. Philpot and Peterson (2011) reviewed day-of-the-week effect literature and state researchers have recently found this pattern has either diminished or reversed in stock markets. The documentation and refutation of these anomalies are not only interesting but also serve an important role in investigating the efficiency of the stock market. We want to investigate the Santa Claus Rally in the stock market in recent years. The Santa Claus Rally in the stock market is described as when the stock market generates significantly higher returns on average during the last five trading days in December and the first two trading days in January than the mean returns of the remaining days of the year. We believe Santa Claus Rally has not been thoroughly investigated in the academic literature. We provide a review of some literature specifically related to the Santa Claus Rally in the stock market.

Nippani, Washer, and Johnson (2015) state Santa Claus Rally has been described in the popular press but has not been rigorously examined in academic literature. Nippani, Washer, and Johnson indicate Santa Claus Rally may be interrelated with the January effect. Therefore, the authors exclude January days from the data and compare the returns of the Santa Claus Rally days with that of the returns of the remaining days of the year. The authors examined the Santa Claus Rally in stock market returns of the U.S. as well as other countries. The period analyzed had different beginning dates for each index, but all ended on January 3, 2014. The authors found Santa Claus Rally returns were statistically higher than that of the rest of the year. Additionally, the Santa Claus Rally prevailed in small as well as large U.S. firms. The authors also used an alternative definition of the Santa Claus Rally, calling it a short period of Santa Claus Rally which is the trading days between Christmas and New Year's Day. This so-called short period is typically four or five trading days each year for the U.S. market. The authors examined if the stock returns during the relatively shorter period from Christmas to New Year's holiday season are significantly different from the returns during the rest of the year. The authors concluded again the existence of the Santa Claus Rally in stock returns. Finally, the authors indicate their results were more robust for the long holiday period versus the shorter holiday period. The longer period included the first two trading days of January whereas the shorter period did not include the first two trading days of January.

Washer, Nippani, and Johnson (2016) state popular press has mentioned the existence of the Santa Claus Rally in stock returns. Santa Claus Rally is a period defined as the last five trading days of December and the first two trading days of January. In this study, the authors examined the prevalence of the Santa Claus Rally separately for large firms and small firms in the US stock market from 1926 to 2014. The authors find Santa Claus Rally is stronger for smaller firms than for larger firms. The authors found the three most important trading days are the last day of the month of December and the first two days of the month of January.

Zubairu and Oyedeko (2017) examined the existence of the Santa Claus Rally in the Nigerian stock market. The authors indicate their study covered the time from January 1985 to December 2016. The reason this period is appropriate for their analysis since this time consists of much uncertainty in the market such as the 2008-2009 market crash that affected not only the stock market but also the overall economy of Nigeria. The authors did not find Santa Claus Rally in the Nigerian stock market. On the other hand, the authors found the January effect anomaly in the Nigerian stock market.

Nippani and Shetty (2021) examined the Santa Claus Rally in the Indian stock market. The authors indicate the leading Indian stock market indices exhibit Santa Claus Rally in stock returns where stock returns are higher on average during the seven days that comprise of the last five days of the month of December and the first two days of the month of January in comparison to the remaining days of the year. The authors also found that the size effect relates to the Santa Claus Rally in the Indian stock market. The Santa Claus Rally is more prevalent in the returns of small firms than that of large firms in the Indian stock market.

Our review of the literature indicates that publicly available academic research on the investigation of the Santa Claus Rally in stock returns is limited. We believe researchers should thoroughly investigate the existence of stock market anomalies on different data sets during different periods. We, therefore, believe our examination of the Santa Claus Rally in stock returns will add to the existing literature. In the next section, we discuss the empirical results of our study.

EMPIRICAL RESULTS

We collected daily prices of the Standard and Poor's (S&P) 500 stock index and the NASDAQ stock index from the yahoo finance website. We collected specifically stock prices from December 31, 1999, to December 31, 2021. We then calculated returns using the standard formula. Our sample consists of daily stock returns from January

1, 2000, to December 31, 2021, resulting in 5536 observations of these two major U.S. stock indices. We provide summary statistics of daily returns of these two major U.S. stock indices, namely, the S&P 500 index and the NASDAQ index for the twenty-two-year period from January 1, 2000, to December 31, 2021 in Table 1.

TABLE 1

SUMMARY STATISTICS OF DAILY PERCENTAGE RETURNS OF THE TWO U.S. STOCK INDICES (JANUARY 1, 2000 TO DECEMBER 31, 2021)

	S&P 500	NASDAQ
Mean	0.0289	0.0369
Standard Deviation	1.2369	1.5826
Minimum	-11.9841	-12.3213
Maximum	11.5800	14.1732
Range	23.5641	26.4945
Observations	5536	5536

Daily mean percentage returns of the NASDAQ index (0.0369) are higher than that of the S&P 500 index (0.0289) for the overall period January 1, 2000, to December 31, 2021. The overall data consists of 5536 daily return observations for both indices for the twenty-two years period from January 2000 to December 2021. During this period, the standard deviation of the NASDAQ index is higher (1.5826) than that of the S&P 500 index (1.2369). The NASDAQ index has a higher mean daily return as well as a higher standard deviation than that of the S&P 500 index for the twenty-two-year period of 2000 to 2021. Subsequently, the range of returns for the period is higher for the NASDAQ index (26.4945) as expected in comparison to the S&P 500 index (23.5641).

TABLE 2

DAILY MEAN PERCENTAGE RETURNS OF SANTA CLAUS RALLY DAYS AND REMAINING DAYS (JANUARY 1, 2000 TO DECEMBER 31, 2021)

		S&P 500	NASDAQ
Santa Claus Rally Days	Mean	0.1063	0.1806
	Observations	154	154
Remaining Days	Mean	0.0267	0.0327
	Observations	5382	5382
Significance Test Statistics			
T-Test			
T-test Value		0.787	1.143
Significance		0.431	0.253
Degree of Freedom		5534	5534
Mann-Whitney U Test			
Mann-Whitney Z		-0.091	-0.216
Significance		0.927	0.829

We now separate the returns by Santa Claus Rally days and the remaining days for the overall data from January 1, 2000, to December 31, 2021. We consider Santa Claus Rally days as the last five trading days in December and the first two trading days in January of the next year. Therefore, we compare the daily percentage returns of seven

trading days comprising Santa Claus Rally days with that of the remaining trading days of the year. Our sample comprises of twenty-two years data from January 2000 to December 2021. Therefore, our sample consists of 154 days (22 multiplied by 7) of Santa Claus Rally days in comparison to 5534 days of the remaining days for the twenty-two-year period from January 1, 2000, to December 31, 2021.

The mean daily percentage return of Santa Claus Rally days is 0.1063 which is substantially higher than that of the remaining days of 0.0267 for the S&P 500 index. However, these differences are not statistically significant when we utilized t-test statistics as well as Mann-Whitney U test statistics. We, therefore, conclude Santa Claus Rally does not exist in the S&P 500 index for the overall period. We now compare returns of Santa Claus Rally days with the remaining days of the year for the NASDAQ index. The mean daily percentage returns of the Santa Claus Rally days is 0.1806 versus the mean daily returns of 0.0327 for the remaining days for the NASDAQ index. The returns of Santa Claus Rally days are substantially higher than that of the remaining days but are not statistically significant when we utilized ttests as well as Mann-Whitney U test statistics. We, therefore, conclude that Santa Claus Rally does not also exist in the NASDAQ index for the overall period from January 1, 2000, to December 31, 2021.

We now examine these differences between Santa Claus Rally days and the remaining days with OLS regression analysis for more insight. We utilize specifically the following regression equation to examine the existence of the Santa Claus Rally in each of the two stock indices.

$$\text{RETURN} = \beta_0 + \beta_1 \text{SantaClausRally} + \varepsilon_t \quad (1)$$

The RETURN is the daily percentage returns of each of the two U.S. stock indices, i.e. S&P 500 index and NASDAQ index utilized in our study. The estimated coefficient of β_1 SantaClausRally is a dummy variable equal to 1 for each of the seven Santa Claus Rally days identified each year. Specifically, the seven Santa Claus Rally days are the last five trading days of December and the first two trading days of January of the next year. Subsequently, the daily returns of the remaining days of the year are equal to 0 for this dummy variable. Therefore, the independent coefficient of β_1 SantaClausRally is the difference between the mean daily percentage returns of Santa Claus Rally days over the mean daily percentage returns of the remaining days of the year. The β_0 represents the mean daily percentage returns of the remaining days of the year. Therefore, as per this equation, if the coefficient β_1 SantaClausRally is positive and statistically significant, then it means Santa Claus Rally is prevalent in U.S. stock returns. On the other hand, if this coefficient is not statistically significant then it means Santa Claus Rally does not exist in stock returns. We report the results of this analysis in Table 3.

TABLE 3

**OLS REGRESSIONS OF SANTA CLAUS RALLY DAYS AND REMAINING DAYS
(JANUARY 1, 2000 TO DECEMBER 31, 2021)**

	Constant	Santa Rally Days	F-Value	Significance
S&P 500	0.027	0.080	0.620	0.431
	[1.584]	[0.787]		
	(0.113)	(0.431)		
NASDAQ	0.033	0.148	1.307	0.253
	[1.518]	[1.143]		
	(0.129)	(0.253)		

Note: T-statistics and *p*-values are in brackets and parenthesis.

We first report the OLS regression results utilizing S&P 500 index. The intercept representing the mean daily returns of the remaining days is 0.027 percent. The Santa Claus Rally coefficient is 0.080, which means that the mean daily returns during the Santa Claus Rally days are 0.080 percent higher than that of the mean daily returns of the remaining days of the year. Therefore, the mean daily returns during the Santa Claus Rally days is 0.107 percent (0.027 plus 0.080). These differences however are not statistically significant. Therefore, we conclude Santa Claus Rally does not exist in the S&P 500 index during the period January 1, 2000, to January 31, 2021. We also examine the possibility of the prevalence of the Santa Claus Rally in the NASDAQ index during the overall period, January 1, 2000, to December 31, 2021. Our results are qualitatively similar to that of the S&P 500 index. For the NASDAQ index, the coefficient is positive and high at 0.148 that means mean daily returns during Santa Claus Rally days are 0.148 percent higher than the mean daily returns of the remaining days of the year. The mean daily returns of the remaining days are 0.033 percent. Therefore, the mean daily returns of Santa Claus Rally days is 0.1810 (0.148 plus 0.033). The differences in mean daily returns between Santa Claus Rally days and the remaining days of the year although substantial are not statistically significant. Therefore, we conclude that Santa Claus Rally does also not exist in the NASDAQ index.

We intend to examine Santa Claus Rally in more detail and do more analysis before concluding that it does not exist in the U.S. stock market. We, therefore, examine the existence of the Santa Claus Rally by two calendar sub-periods. The first sub-period utilized in our study is from 2000 to 2009 which includes the period between 2008 and 2009 when the U.S. stock market had negative returns. The second sub-period comprises the period from 2010 to 2021 when the U.S. stock market rebounded and is the recent decade.

TABLE 4

DAILY MEAN PERCENTAGE RETURNS OF SANTA CLAUS RALLY DAYS AND REMAINING DAYS BY TWO CALENDAR SUB-PERIODS

Panel A: January 1, 2000, to December 31, 2009			
		S&P 500	NASDAQ
Santa Claus Rally Days	Mean	0.1333	0.3037
	Observations	70	70
Remaining Days	Mean	-0.0050	-0.0135
	Observations	2445	2445
Total	Mean	-0.0012	-0.0046
	Observations	2515	2515
Panel B: January 1, 2010 to December 31, 2021			
Santa Claus Rally Days	Mean	0.0839	0.0780
	Observations	84	84
Remaining Days	Mean	0.0531	0.0712
	Observations	2937	2937
Total	Mean	0.0540	0.0714
	Observations	3021	3021

We first report daily mean percentage returns of Santa Claus Rally days and that of the remaining days for the period January 1, 2000, to December 31, 2009. These results are reported in Panel A of Table 4. For the S&P 500 index, the daily mean returns of Santa Claus Rally days are 0.1333 percent in comparison to -0.0050 percent of the remaining days. During these ten years from January 1, 2000, to December 31, 2009, the S&P 500 index generated negative mean daily returns outside of Santa Claus days. The Santa Claus Rally days generated 0.3037

mean daily returns in comparison to -0.0135 mean daily returns for the NASDAQ index for the period, January 1, 2000, to December 31, 2009. During this period, the NASDAQ index generated positive returns during Santa Claus Rally days and negative returns during the remaining period. These results are remarkable indicating that investors would have earned positive returns in the stock market by investing only during Santa Claus Rally days. We now examine the difference in returns of Santa Claus Rally days with that of the remaining days for the second sub-period, January 1, 2010, to December 1, 2021. During these twelve years, the S&P 500 index generated mean daily returns of 0.0839 percent in comparison to mean daily returns of 0.0531 percent for the remaining days. For the NASDAQ index, the mean daily returns were 0.0780 in comparison to 0.0712 for the remaining days from January 1, 2010, to December 31, 2021. We notice Santa Claus Rally days generated higher mean daily returns than that of the remaining days for both stock indices during both sub-periods examined in our study. Santa Claus Rally days generated higher returns when the overall market was generating negative returns (first sub-period) as well as when generating positive returns (second sub-period). It is interesting to notice that the difference between returns of Santa Claus Rally days and the remaining days of the year is more prominent when the stock market is not performing well and generating negative returns than when the stock market is performing relatively better and generating positive returns.

TABLE 5

OLS REGRESSIONS OF SANTA CLAUS RALLY DAYS AND REMAINING DAYS BY TWO SUB-PERIODS

Panel A: January 1, 2000, to December 31, 2009				
	Constant	Santa Rally Days	F-Value	Significance
S&P 500	-0.005	0.138	0.663	0.415
	[-0.177]	[0.815]		
	(0.859)	(0.415)		
NASDAQ	-0.013	0.317	1.838	0.175
	[-0.345]	[1.356]		
	(0.730)	(0.175)		
Panel B: January 1, 2010, to December 31, 2021				
S&P 500	0.053	0.031	0.066	0.797
	[2.660]	[0.257]		
	(0.008)	(0.797)		
NASDAQ	0.071	0.007	0.003	0.960
	[3.165]	[0.050]		
	(0.002)	(0.960)		

Note: T-statistics and *p*-values are in brackets and parenthesis.

We initially report the OLS regression results for the first sub-period, 2000 to 2009 in Panel A, Table 5. For the S&P 500 index, the intercept representing the mean daily returns of the remaining days is -0.005 percent. The coefficient of the Santa Claus Rally days is 0.138 indicating Santa Claus Rally days on average are 0.138 percent higher than the remaining days. However, this coefficient of Santa Claus Rally days is not statistically significant. Therefore, we conclude Santa Claus Rally does not exist for the S&P 500 index during the first sub-period from 2000 to 2009. The NASDAQ index also generated substantially higher returns during the Santa Claus Rally days than that during the remaining days of the year for the first subperiod, 2000 to 2009. The coefficient of the Santa Claus Rally days is 0.317, which indicates mean daily returns of Santa Claus Rally days are 0.137 percent higher

than that of the remaining days of the year for this period. However, the coefficient of the Santa Claus Rally is not statistically significant. We, conclude Santa Claus Rally also does not exist in the NASDAQ index for this period.

We find a similar outcome when we separately examine the existence of the Santa Claus Rally during the second sub-period (2010 to 2021) of our study. The coefficient of Santa Claus Rally days is positive when we examined S&P 500 index as well as the NASDAQ index. The coefficient of Santa Claus Rally days is 0.031 indicating the S&P 500 index generated a 0.031 percent higher mean daily return during Santa Claus Rally days over the remaining days of the year. However, the coefficient was not statistically significant indicating Santa Claus Rally does not exist during this period for the S&P 500 index. We find similar results for the NASDAQ index. The coefficient of Santa Claus Rally days is positive at 0.007 indicating the NASDAQ index generated higher mean daily percentage returns of 0.007 during the Santa

Claus Rally days over the remaining days of the year. However, the coefficient of the Santa Claus Rally is not statistically significant. We conclude Santa Claus Rally does not exist in the NASDAQ index for this period, as the coefficient is not statistically significant.

We observe an interesting phenomenon in the previous analysis. Specifically, we find the Santa Claus Rally coefficient is much higher than the remaining days for both stock indices during the first sub-period (2000 to 2009) in comparison to the second sub-period (2010 to 2021). In other words, we notice the difference in returns is substantially higher in the first sub-period when the overall stock market is not performing well in comparison to the second sub-period when the stock market rebounded and generated positive returns. We believe this analysis shed an important direction for our study. We want to explore the possibility that the Santa Claus Rally may have a more pronounced effect when the stock market is not performing particularly well such as in periods of economic recessions. We utilize the National Bureau of Economic Research (NBER) business cycle dates to determine periods of economic expansions and economic recessions. Following Kohers and Patel (1996) and Patel, Evans, and Burnett (1998), we consider expansion period starts on the first trading day of the month in which expansion month starts and ends on the last trading day of the month which the expansion month ends. In this particular study, we have four separate periods of expansions and three separate periods of recessions during the period from January 2000 to December 2021. The specific months included in the four expansion periods were from January 2000 to March 2001, December 2001 to December 2007, July 2009 to February 2020, and May 2020 to December

2021. The three separate periods of recessions were from April 2001 to November 2001, January 2008 to June 2009, and March 2020 to April 2020. In subsequent analysis, we compare the mean daily returns of Santa Claus Rally days with that of the remaining days separately during the two phases of economic cycles.

We report the results of this analysis in Table 6.

TABLE 6

DAILY MEAN PERCENTAGE RETURNS OF SANTA CLAUS RALLY DAYS AND REMAINING DAYS BY ECONOMIC CYCLES

Panel A: Expansion Periods			
		S&P 500	NASDAQ
Santa Claus Rally Days	Mean	0.0727	0.1572
	Observations	145	145
Remaining Days	Mean	0.0380	0.0392
	Observations	4805	4805

Total	Mean	0.0390	0.0427
	Observations	4950	4950
Panel B: Recession Periods			
Santa Claus Rally Days	Mean	0.6481	0.5566
	Observations	9	9
Remaining Days	Mean	-0.0669	-0.0213
	Observations	577	577
Total	Mean	-0.0559	-0.0124
	Observations	586	586

We now separate the overall data from January 1, 2000, to December 31, 2021, by the two phases of economic cycles. The overall data consists of 5536 daily observations. The expansion period consists of 4950 daily observations in comparison to 586 daily observations for the recession periods resulting in 5536 daily observations for each of the two indices.

We first compare the returns of Santa Claus Rally days with that of the remaining days of the year during the expansion periods of our sample. During the expansion periods, the mean daily returns of the 145 Santa Claus Rally days are 0.0727 percent in comparison to 0.0380 percent for the 4805 remaining days. On the other hand, the mean daily returns of the 9 Santa Claus daily returns are 0.6481 in comparison to -0.0669 during the 577 remaining days during the recessionary periods of our sample. We notice the difference in returns between the Santa Claus Rally days and the remaining days of the year during periods of recessions is 0.7150 [0.6481-(-0.0669)] which is much higher than during periods of expansions of 0.0347 [0.0727-0.0380] for the S&P 500 index. Similarly, the difference in mean daily percentage returns between the Santa Claus Rally days and the remaining days is higher of 0.5779 [0.5566-(-0.0213)] during periods of recessions than during than that periods of expansions of 0.1180 [0.1572-0.0392] for the NASDAQ index.

TABLE 7

OLS REGRESSIONS OF SANTA CLAUS RALLY DAYS AND REMAINING DAYS BY ECONOMIC CYCLES

Panel A: Expansion Periods				
	Constant	Santa Rally Days	F-Value	Significance
S&P 500	0.038	0.035	0.168	0.682
	[2.613]	[0.409]		
	(0.009)	(0.682)		
NASDAQ	0.039	0.118	1.006	0.316
	[1.947]	[1.003]		
	(0.052)	(0.316)		
Panel B: Recession Periods				
S&P 500	-0.067	0.715	0.769	0.381
	[-0.662]	[0.877]		
	(0.508)	(0.381)		
NASDAQ	-0.021	0.578	0.410	0.522
	[-0.190]	[0.641]		

	(0.849)	(0.522)		
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Note: T-statistics and p-values are in brackets and parenthesis.

We report the OLS regression results for the expansion period in Panel A of Table 7. The coefficient of the Santa Claus Rally days is 0.035 indicating Santa Claus Rally days on average are 0.035 percent higher than the remaining days for the S&P 500 index. The intercept representing the mean daily returns of the remaining days is 0.038 percent. The coefficient of Santa Claus Rally days is not statistically significant. Therefore, we conclude Santa Claus Rally effect does not exist for the S&P 500 index during periods of economic expansions in our study. The NASDAQ index also generated higher returns during the Santa Claus Rally days than that during the remaining days of the year during periods of economic expansions.

The coefficient of the Santa Claus Rally days is 0.118, which indicates mean daily returns of Santa Claus Rally days are 0.118 percent higher than that of the remaining days of the year but not statistically significant during periods of economic expansions. We, therefore, conclude Santa Claus Rally also does not exist in the NASDAQ index as in the S&P 500 index during periods of economic expansions.

We now examine the existence of the Santa Claus Rally during periods of economic recessions. The coefficient of Santa Claus Rally days is positive and substantially high when we examined S&P 500 index as well as the NASDAQ index. The coefficient of Santa Claus Rally days is 0.715 indicating the S&P 500 index generated a 0.715 percent higher mean daily return on average during Santa Claus Rally days over the remaining days during periods of economic recessions. However, the coefficient was not statistically significant indicating Santa Claus Rally does not exist during periods of economic recessions for the S&P 500 index. We find similar results for the NASDAQ index. The coefficient of Santa Claus Rally days is positive at 0.578 indicating the NASDAQ index generated higher mean daily percentage returns of 0.578 during the Santa Claus Rally days over the remaining days during periods of economic recessions. However, the differences in returns although substantial are not statistically significant. We conclude Santa Claus Rally does not exist during periods of economic recessions as well as economic expansions for both stock indices, the S&P 500 and NASDAQ index examined in our study.

SUMMARY AND CONCLUSION

We found Santa Claus Rally day returns are higher than that of the remaining days of the year for the S&P 500 index as well as the NASDAQ index for the period January 1, 2000, to December 31, 2021. However, these differences are not statistically significant in each of the two indices. We utilized t-tests, Mann-Whitney U tests as well as OLS regression analysis to compare the differences in daily returns between the Santa Claus Rally days and the remaining days of the year. Significance test results are consistent and indicate the differences in returns are not statistically significant. We, therefore, conclude that the Santa Claus Rally is not prevalent in U.S. stock returns for the overall period, January 1, 2000, to December 31, 2021, examined in our study.

We also examined these differences by creating sub-periods by first examining the Santa Claus Rally during the period January 1, 2000, to December 31, 2009, and then during the period January 1, 2010, to December 31, 2021. The overall stock market generated negative returns during the first sub-period (2001-2009) and generated positive returns during the second sub-period (2010-2021). We found Santa Claus Rally day returns are higher than that of the remaining days of the year but are not statistically significant for each of the two stock indices in both sub-periods. We then examined the differences between the Santa Claus Rally days and that of the remaining days of the year separately by the two phases of economic cycles, i.e., during periods of economic expansions and during periods of economic recessions. We found Santa Claus Rally day returns are higher than that of the remaining days of the year but are not statistically significant during both phases of the economic cycles. We, therefore, conclude that the Santa Claus Rally does not exist during periods of economic expansions as well as during

periods of economic recessions in the U.S. stock market. We believe our results conclusively indicate the absence of the Santa Claus Rally in U.S. stock market returns in recent years.

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