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Super Bowl Indicator and Equity Markets: Correlation Not Causation

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The first discussion of the Super Bowl Indicator relating equity market performance to the league (conference) of the winner of the Super Bowl was in 1978. The intention was to show that correlation does not necessarily imply causation. Various authors examined and discussed this relationship. The Super Bowl has been played for 50 years. This study examines the relationship between the Super Bowl winner's classification and the movement of the equity market utilizing three equity market indexes for the entire period. Over the 50 years of the Super Bowl, the winner's classification has correctly predicted the direction of at least one of the three indexes 86 percent of the time. It seems that the Super Bowl Indicator has maintained a rather close relationship with the equity market throughout the game's history. While correlation does not imply causation, it does provide interesting conversation and teaching points regarding the behavior of the equity markets.

Keywords: Super Bowl Indicator, Correlation, Causation, Equity Markets

JEL Classification: G110, G120

I. Introduction

In the current edition of their *Fundamentals of Investments* textbook, Jordan, Miller, and Dolvin (2015) include a section on inane technical market indicators that have unusual correlations with the stock market. Some of these indicators include the Odd-lot Indicator, the Hemline Indicator, the Daytona 500 Indicator, and the Super Bowl Indicator. And, while it is anyone's guess as to which of these are the most commonly known, the one that seems to get the most attention is the Super Bowl Indicator (SBI). Koppett (1978) appears to be the originator of the SBI and, ironically, his intention was to point out a coincidence that had no predictive value. He simply observed that for the first 11 Super Bowls, "…whenever an old NFL team won the Super Bowl in January, the stock market rose during the next 11 months and finished that calendar year higher than it began. And whenever an old AFL team won, the market finished that year lower." Koppett's point was simply that this was an example of a numerical association that had no causal implications. In fact, Zweig (2011) recounts that in a 2001 interview, Koppett seemed astounded that something he meant as a joke was still part of the consciousness of the investment community. Koppett, who died in 2003, would likely be even more astounded to learn that his indicator is still included in textbooks today, and that it has evolved to better fit the data.

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II. Background

A brief history of professional football may help the reader better understand Koppett's original indicator and how that indicator has evolved. The American Football League (AFL) was created in 1960 as a separate and independent alternative to the existing National Football League (NFL). The AFL began with eight teams and added one more in 1966 and another in 1968. Prior to 1960 the NFL had 12 well-established teams and franchised new teams in 1960, 1961, 1966, and 1967. By 1968, the NFL and the AFL consisted of 16 and 10 teams, respectively (see Table 1).

Table 1: Professional Football Before the 1970 League Merger

Pre-Merger NFL and AFL Teams (current name in parentheses)		
	NFL Teams	**AFL Teams**
1	Atlanta Falcons	Boston Patriots (New England)
2	Baltimore Colts (Indianapolis)	Buffalo Bills
3	Chicago Bears	Cincinnati Bengals
4	Cleveland Browns	Denver Broncos
5	Dallas Cowboys	Houston Oilers (Tennessee Titans)
6	Detroit Lions	Kansas City Chiefs
7	Green Bay Packers	Miami Dolphins
8	Los Angeles Rams	New York Jets
9	Minnesota Vikings	Oakland Raiders
10	New Orleans Saints	San Diego Chargers
11	New York Giants	
12	Philadelphia Eagles	
13	Pittsburgh Steelers	
14	San Francisco 49ers	
15	St. Louis Cardinals (Arizona)	
16	Washington Redskins	

The two leagues were entirely separate until they agreed to have their respective champions play following the 1966 season. Thus, on January 15, 1967, the Green Bay Packers, representing the NFL, and the Kansas City Chiefs, representing the AFL, played in the first World Championship Game (later officially renamed the Super Bowl). The two leagues continued to operate separately for four iterations of the Super Bowl until the leagues decided to merge into one large league made up of two conferences prior to the 1970 season. Koppett's original observation was based exclusively on the alignment of the teams prior to the merger as shown in Table 1.

The new post-merger league would be called the National Football League and would consist of an American Football Conference (AFC) and a National Football Conference (NFC). To balance the number of teams in each conference, the Baltimore Colts, Cleveland Browns, and Pittsburgh Steelers were paid $1 million each to become part of the new AFC along with the 10 pre-merger AFL teams. Thus, the new league began play with 13 teams in both the AFC and the NFC (see Table 2). Some newer definitions of the SBI refer to these post-merger conferences instead of the pre-merger leagues (Gitman and Joehnk, 1996) originally referenced by Koppett (1978).

Table 2: Professional Football After the 1970 League Merger

	NFC Teams (post-merger)	AFC Teams (post-merger)
1	Atlanta Falcons	*Baltimore Colts (Indianapolis)
2	Chicago Bears	Boston Patriots (New England)
3	Dallas Cowboys	Buffalo Bills
4	Detroit Lions	Cincinnati Bengals
5	Green Bay Packers	*Cleveland Browns
6	Los Angeles Rams	Denver Broncos
7	Minnesota Vikings	Houston Oilers (Tennessee Titans)
8	New Orleans Saints	Kansas City Chiefs
9	New York Giants	Miami Dolphins
10	Philadelphia Eagles	New York Jets
11	San Francisco 49ers	Oakland Raiders
12	St. Louis Cardinals (Arizona)	*Pittsburgh Steelers
13	Washington Redskins	San Diego Chargers

*NFL teams who became part of the AFC.

Since the 1970 merger, the NFL has added six more teams giving the league a total of 32 teams. The conference affiliations of the new teams and their classification in terms of the SBI have led to some complications. For example, in 1976, the Tampa Bay Buccaneers and the Seattle Seahawks franchises were established with Tampa Bay in the AFC and Seattle in the NFC, but then these conference affiliations were switched one year later. The Tampa Bay franchise has remained in the NFC since 1977; however, the Seattle franchise was returned to the NFC in 2003. Additionally, the Cleveland Browns franchise (an original NFL team that became part of the AFC) moved to Baltimore and became the Baltimore Ravens in 1996. While it was the Browns franchise that moved, the NFL considered the Ravens to be a "new" team so the original Cleveland franchise was restored in 1999. In terms of the SBI, the Tampa Bay Buccaneers, Seattle Seahawks, and Baltimore Ravens are all relevant because they have all won Super Bowls.

Krueger and Kennedy (1990) provide the first "rigorous examination" of the SBI with what they called the Super Bowl Stock Market Predictor (SB SMP). They begin by using Stovall's (1989) definition of the SB SMP, which is simply that the stock market will finish the year higher than it started if a team from the old National Football League wins that year's Super Bowl, and it will finish the year lower than it started if a team from the old American Football League wins the Super Bowl. Stovall's definition is nearly identical to Koppett's (1978) definition, except that Koppett referred to the stock market rising during "the next 11 months" after the game. At the same time, Koppett also said that the market "finished the year higher than it began." Stovall makes it clear that the entire calendar year is the focus of observation for the market's performance. Krueger and Kennedy (1990) examined the performance of the SB SMP against five different stock market indexes for the first 22 Super Bowls and found that the Super Bowl winner correctly predicted the sign of the annual market return 91 percent of the time. While the accuracy of the SB SMP was remarkable, rational people recognized that it was merely a statistical anomaly that provided little value beyond a classroom exercise in differentiating between association and causation. This is the exact point Koppett sought to make in 1978. Still, an awareness of this association remains after 50 Super Bowl games have been played as the SBI is still mentioned in the popular media, textbooks, and finance classrooms. Thus, one reason for this paper is simply to

update the SBI to include the 28 additional Super Bowl games that have been played since Krueger and Kennedy's original analysis to determine if the coincidental association still exists. Also, in 1990 the definition of the SB SMP used by Krueger and Kennedy (1990) was sufficient to analyze all the previous Super Bowl winners. However, since that time there have been four Super Bowl winners that did not exist when the NFL and AFL were separate entities. Even though Johnson (2014) discussed whether the SBI remains relevant, the question of how, or if, these new teams should be included in the analysis remains unresolved and is an objective of this paper. Finally, since the SBI is so commonly known, this paper will seek to determine whether there is any market reaction consistent with the SBI in the days following the Super Bowl.

III. Results

Of the 50 Super Bowl games that have been played, the winning team has predicted that the stock market will finish the year higher 34 times and lower 16 times (see Appendix 1). For this analysis, we are using the definition of calendar year returns used by Stovall (1989) and Krueger and Kennedy (1990). We also used Koppett's (1978) definition of old NFL teams predicting an increasing market and old AFL teams predicting a decreasing market, but modified the definition to include three Super Bowl winning teams that were not in existence before the 1970 merger. For the teams that did not exist prior to 1970, their predictive input is aligned with their respective conferences as of the date of their Super Bowl win. Tampa Bay and Seattle each won as the representative from the NFC and, therefore, predicted that the market would have an up year. The Baltimore Ravens won twice as a member of the AFC, thus predicting a down market.

The predicted market movement is compared to the actual market movement for each year as measured by the Dow Jones Industrial Average, The New York Stock Exchange Index, and the Standard & Poor's 500 Index. Over the 50 years that the Super Bowl game has been played, these three indexes moved in the same direction in 36 of those years. In the remaining 14 years, one of the indexes moved in the direction opposite the other two. Thus, the association between the Super Bowl winning team and the ensuing stock market performance will vary depending on which index is used. Table 3 summarizes the results for each of the three indexes:

Table 3: Predicted Versus Actual Market Movement

	Annual Return		
	DJIA	**NYSE**	**S&P500**
Correct	40	38	37
Incorrect	10	12	13
Percentage Correct	80%	76%	74%

After 50 Super Bowl games, the association between the Super Bowl winner and the direction of the stock market's returns for the year is still very strong. Collectively, the three indexes have responded in the predicted manner 76.67 percent of the time, a remarkable coincidence.

Even more remarkable is the result of the analysis of the 14 years when the indexes disagree. Lowering the threshold for a successful "prediction" to at least one of the three indexes responding in the predicted manner, yields the results shown in Table 4.

Table 4: At Least One Index Predicts Correctly

At Least One Index Correct	43
All Indexes Incorrect	7
Percentage At Least One Correct	86%
At Least Two Indexes Correct	37
One Index Incorrect	13
Percentage At Least Two Correct	74%
All Indexes Correct	35
At Least One Index Incorrect	15
Percentage All Indexes Correct	70%

The Super Bowl winner has correctly predicted the direction of at least one of the three indexes studied in 86 percent of the 50 Super Bowl years. A threshold of only one index moving in the predicted direction admittedly is posturing the data to make for a seemingly more unlikely result. However, if the purpose of the exercise is to showcase an extreme example of coincidental association, such posturing can be effective. This would appear to be the reason for inclusion in the Jordan, Miller, and Dolvin (2015) textbook, even though their standard was a simple association with a single index.

Turning attention to whether this long running association has any impact when a new Super Bowl champion is crowned provides some interesting results. Since the relationship between Super Bowl winners and market performance is included in popular textbooks and it has been shown to be oddly efficacious, does the market react in the appropriate direction to the new information provided by the crowning of the new Super Bowl champion? The market returns on the day after each of the 50 Super Bowls for each of the three indexes is examined and the results are presented in Table 5.

Table 5: Predicted Versus Actual Market Returns on the Day After

	Day +1		
	DJIA	**NYSE**	**S&P500**
Daily Returns as Predicted	28	26	27
Daily Returns not as Predicted	22	24	23
Percentage as Predicted	56.00%	52.00%	54.00%

As Table 5 shows, the results are not so remarkable. Collectively, the market indexes respond in the predicted manner only 54 percent of the time. Given that teams from the NFL/NFC have won 34 out of the 50 Super Bowls, thus predicting a positive market reaction, the long-term positive trend of the market may be the only explanation necessary for the prediction to be correct slightly more than 50 percent of the time.[1] In fact, if we look at the market returns the day after the game since Krueger and Kennedy (1990) showed the relationship for the entire year, we actually find no relationship whatsoever between the winner of the game and the market returns the following day (see Table 6).

[1] The S&P 500 Index has gone up in 37 out of the 50 calendar years (74 percent) since the first Super Bowl game was played. In the 39 years prior to the first Super Bowl, it went up in 64 percent of the years.

Table 6: Predicted Versus Actual Market Returns Since 1990

Since Krueger and Kennedy (1990)			
	Day +1		
	DJIA	**NYSE**	**S&P500**
Daily Returns as Predicted	13	13	12
Daily Returns not as Predicted	13	13	14
Percentage as Predicted	50.00%	50.00%	46.15%

With next-day returns responding as predicted less than 50 percent of the time, it is safe to conclude that the game and the new champion do not impact the stock market in the immediate short run. While market participants have been aware of the SBI for at least the last 26 games played, they clearly do not adjust their behavior in the day following the game. Thus, investors are not able to realize short-term gains trading on the information from this long-running coincidental association.

Prior to Super Bowl 48, Power (2015) warned that the New England Patriots could deflate the stock market for 2015. It turns out that he was correct, in a sense. The Patriots did win the Super Bowl and the stock market was down for the year, so Power's prediction was accurate, even though one could certainly argue the soundness of his logic. Through 50 iterations of the Super Bowl, the predictive relationship between the winner of the game and the performance of the stock market is still inexplicably strong. However, the fact that market participants do not adjust their behavior immediately following the game is evidence that the relationship is nothing more than a long-running coincidence that makes for amusing classroom anecdotes and entertaining newspaper articles.

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Appendix 1: SBI Predicted Versus Actual Market Returns: 1967-2016

Year	SB	Super Bowl Winner	NFL/AFL	Prediction	DJIA	NYSE	S&P500
1967	1	Green Bay	NFL	+	15.20%	23.12%	20.09%
1968	2	Green Bay	NFL	+	4.27%	9.42%	7.66%
1969	3	NY Jets	AFL	-	-15.19%	-12.51%	-11.36%
1970	4	Kansas City	AFL	-	4.82%	-2.52%	0.10%
1971	5	Baltimore Colts	NFL	+	6.11%	12.34%	10.79%
1972	6	Dallas	NFL	+	14.58%	14.26%	15.63%
1973	7	Miami	AFL	-	-16.58%	-19.63%	-17.37%
1974	8	Miami	AFL	-	-27.57%	-30.28%	-29.72%
1975	9	Pittsburgh	NFL	+	38.32%	31.86%	31.55%
1976	10	Pittsburgh	NFL	+	17.86%	21.50%	19.15%
1977	11	Oakland	AFL	-	-17.27%	-9.30%	-11.50%
1978	12	Dallas	NFL	+	-3.15%	2.13%	1.06%
1979	13	Pittsburgh	NFL	+	4.19%	15.54%	12.31%
1980	14	Pittsburgh	NFL	+	14.93%	25.68%	25.77%
1981	15	Oakland	AFL	-	-9.23%	-8.67%	-9.73%
1982	16	San Francisco	NFL	+	19.60%	13.95%	14.76%
1983	17	Washington	NFL	+	20.27%	17.46%	17.27%
1984	18	LA Raiders	AFL	-	-3.74%	1.26%	1.40%
1985	19	San Francisco	NFL	+	27.66%	26.16%	26.33%
1986	20	Chicago	NFL	+	22.58%	13.97%	14.62%
1987	21	NY Giants	NFL	+	2.26%	-0.25%	2.03%
1988	22	Washington	NFL	+	11.85%	13.04%	12.40%
1989	23	San Francisco	NFL	+	26.96%	24.82%	27.25%
1990	24	San Francisco	NFL	+	-4.34%	-7.46%	-6.56%
1991	25	NY Giants	NFL	+	20.32%	27.12%	26.31%
1992	26	Washington	NFL	+	4.17%	4.69%	4.46%
1993	27	Dallas	NFL	+	13.72%	7.86%	7.06%
1994	28	Dallas	NFL	+	2.14%	-3.14%	-1.54%
1995	29	San Francisco	NFL	+	33.45%	31.31%	34.11%
1996	30	Dallas	NFL	+	26.01%	19.06%	20.26%
1997	31	Green Bay	NFL	+	22.64%	30.31%	31.01%
1998	32	Denver	AFL	-	16.10%	16.55%	26.67%
1999	33	Denver	AFL	-	25.22%	9.15%	19.53%
2000	34	St. Louis	NFL	+	-6.17%	1.01%	-10.14%
2001	35	Baltimore Ravens	***AFC***	-	-7.10%	-10.21%	-13.04%
2002	36	New England	AFL	-	-16.76%	-19.83%	-23.37%
2003	37	Tampa Bay	***NFC***	+	25.32%	29.28%	26.38%
2004	38	New England	AFL	-	3.15%	12.16%	8.99%
2005	39	New England	AFL	-	-0.61%	6.95%	3.00%
2006	40	Pittsburgh	NFL	+	16.29%	17.86%	13.62%
2007	41	Indianapolis	NFL	+	6.43%	6.58%	3.53%
2008	42	NY Giants	NFL	+	-33.84%	-40.89%	-38.49%
2009	43	Pittsburgh	NFL	+	18.82%	24.80%	23.45%
2010	44	New Orleans	NFL	+	11.02%	10.84%	12.78%
2011	45	Green Bay	NFL	+	5.53%	-6.11%	-0.003%
2012	46	NY Giants	NFL	+	7.26%	12.93%	13.41%
2013	47	Baltimore Ravens	***AFC***	-	26.50%	23.18%	29.60%
2014	48	Seattle	***NFC***	+	7.52%	4.22%	11.39%
2015	49	New England	AFL	-	-2.23%	-6.42%	-0.73%
2016	50	Denver	AFL	-	13.42%	9.01%	9.54%

*Highlighted returns indicate results that are not consistent with the predicted result.