Investing During Major Depressions, Recessions, and Crashes

Stephen Ciccone
Associate Professor of Finance
University of New Hampshire
Peter T. Paul College of Business and Economics
10 Garrison Avenue, Durham, NH 03824
United States of America

Abstract

This paper explores returns to investing during five of the most famous financial crises in stock market history: the Great Depression, the 1970s Recession, the 1987 Black Monday Crash, the bursting of the Tech Bubble, and the Great Recession. The analysis utilizes both CRSP value- and equal-weighted indexes, the latter providing more exposure to small stocks. The results demonstrate the importance of continuing to invest throughout the crisis event and after. Although the negative returns during the crisis may unnerve investors, recovery returns tend to be abnormally high rewarding those staying in the stock market. The recovery is quicker and stronger for the equal-weighted index, which suggests that during times of crisis, investors may be able to enhance their returns by incorporating small stocks into their portfolio.

Keywords: Investing, Great Depression, Recession, Black Monday, Tech Bubble

1. Introduction

On Monday, February 5, 2018, the Dow Jones Industrial Average (the Dow) had its largest one-day point drop in history. The decline of 1175.21 points shook world markets with major indexes in Tokyo, London, Hong Kong, and elsewhere suffering sharp declines (Mullen, 2018). The Thursday of the same week, the Dow dropped another 1032.89 points, its second largest one-day point drop in history (Egan, 2018).

Although the February 2018 point drops were record setting, they were not close to the record for percent drops. Indeed the 4.6% drop of the Dow on February 5, 2018, pales in comparison to the 22.6% decline on October 19, 1987, widely known as Black Monday. Still, the large point drops demonstrate the fragility and riskiness of stock markets.

Given that riskiness, a key question is how stocks perform during the worst periods in market history. Should investors enter the market during these periods or should they flee? Helping to answer that question is the purpose of this paper. Many investors do panic and exit the stock market during periods of great distress (e.g., Bowley, 2010; Watts, 2018). But it is possible that these fearful investors are missing out on some excellent returns as the market recovers.

In this study, the stock returns during some of worst periods in stock market history are examined. Five periods of recession, depression, or market crash are selected: the Great Depression, the 1970s Recession, Black Monday, the bursting of the Tech Bubble, and the Great Recession.

The five events chosen are typically cited as some of the worst crashes or declines over the past 100 years (e.g., Colombo, 2014; DePietro, 2017; The Street Staff, 2017). With the exception of the market freefall associated with the Black Monday Crash of 1987, which lasted for about two months, they are also extended periods of market decline linked with a depression or recession. In addition, the events are well known by the investing public. Thus, the Flash Crash of 2001, in which the market declined almost 10% in just a few minutes but recovered a large part of the losses within the same day is not included. Nor is Black Friday Crash of 1989, which is not nearly as well known or as large as the Black Monday Crash of 1987. The focus of this paper remains on only the most famous, prolonged financial market crises.

The analysis utilizes both a value-weighted and an equal-weighted index of stocks. The former is influenced more by larger stocks, while the latter is influenced more by smaller stocks. The results suggest that investing during crisis periods can lead to strong returns. While there is a period of steep negative returns during each crisis, returns during the recovery period are typically significantly above historical norms. The recovery is quicker and the recovery returns are higher when using the equal-weighted index, which suggests that investors benefit by including small stocks in their portfolios during times of crisis.

The paper is organized as follows. Section 2 explains the data and methodology. Section 3 presents and discusses the results. Section 4 concludes.

2. Data and Methodology

The data used is from the Center for Research in Security Prices (CRSP). This data runs from 1926 through 2017. Two indexes are used: 1) the monthly CRSP Value-Weighted Index including distributions (dividends) and 2) the monthly CRSP Equal-Weighted Index including distributions. Because the value-weighted index gives more weight to stocks with high market caps (prices times shares), the biggest companies exert a disproportionate impact on the index returns. Although the price-weighted Dow is an exception, value-weighted indexes are the most common indexes. For example, the popular Standard and Poor's 500 Index (S&P 500) and the Nasdaq Composite Index are both value weighted. The CRSP equal-weighted index gives small stocks the same influence as large stocks. Because there are many more small stocks than large stocks, differences between the returns of the two indexes tend to be related to small stock performance.

Performance measures include mean and median percent returns and cumulative wealth indexes (CWI). The CWI uses a $1 base and indicates the amount that an initial investment of $1 will grow to if invested in a particular asset. It is computed by compounding the mean returns. A CWI of $1.50 indicates that a $1 initial investment grows to $1.50 (a 50% return) over the investment time horizon.

The analysis also evaluates dollar cost averaging. This popular style of investing assumes the same amount is invested in regular intervals. For this study, dollar cost averaging assumes $1 is invested in each month during the sample period.

Five periods of historically low stock market returns, often referred to as events herein, are examined: 1) the Great Depression from 1929 to 1939, 2) the 1970s Recession, 3) the 1987 Black Monday Crash, 4) the bursting of the Tech Bubble in the early 2000s, and 5) the Great Recession of 2007-2008. In this paper, the causes and background of the events are left to other information sources. The attention is only on the practical investing side.

Difference in means tests are used to determine statistical significance. The testing is performed 1) on the difference between the event period mean monthly returns and the total period (1926-2017) mean monthly returns and 2) on the difference between the equal- and value-weighted index returns during the event period. Two-tailed p-values are presented in the tables.

3. Results

3.1. Value-Weighted CRSP Index

Table 1 presents the return statistics for the total sample period (1926-2017) and for each of the five event periods using the Value-Weighted CRSP Index. The start and end months of the events are given. Because the dates are based both on the economists' or financial press definitions and on the period of declining stock returns, the dates may differ slightly from commonly cited time frames.

The mean monthly return over entire CRSP 1926-2017 sample period is 0.92%, which translates to 11.62% per year using geometric compounding. A dollar investment in 1926 would grow to over $5400 by 2017.

Perhaps surprisingly, average monthly returns during the Great Depression were positive at 0.13%. Although the CWI was $0.61, indicating a dollar invested at the beginning of the Great Depression was worth about 60 cents at the end, investing throughout the Depression was actually rewarded. In the dollar cost averaging strategy, $1 invested each month throughout the 119 months of the Depression (a total of $119) grew to $155.73.

Investing during the 1970s Recession generated poor returns. The mean monthly return was significantly negative (-0.41%) and the CWI dropped from $1 to $0.81 during the event period. Dollar cost averaging was slightly profitable as the $36 invested over the sample period grew to $37.21 at the period end.

The Black Monday crash was on October 19, 1987, but there were two months of dramatically poor returns associated with the crash. The mean monthly return in those two months was -14.88%, and the CWI dropped to $0.72.

Investing during the bursting of the Tech Bubble in 2000-2002 caused steep losses. The mean return was -1.81% and the CWI dropped to $0.55, almost half of the original $1 investment. A dollar cost averaging strategy also produced a loss. Investing $1 each month for the 30 months ($30 in total) resulted in an ending amount of $22.09.

The Great Recession mean monthly return was -2.08%, and the CWI dropped to $0.62. Dollar cost averaging resulted in a loss. The $20 invested over the sample period dropped to $17.64 at the period end.

The results so far show that returns during the crisis event periods are lower than historical averages, and the differences are statistically significant with at least 90% confidence for four of the five events. The low returns coincide with relatively high return volatility. However, dollar cost averaging through the crises lessens the negative impact of the event and may even result in gains, such as during the Great Depression. The next series of analyses demonstrates the importance of continuing to invest through and after the crisis.

Table 2 presents CRSP Value-Weighted Return statistics when investing through the trough, defined as the month with the lowest CWI during the event period, and then from the trough to the breakeven month, defined as when the CWI first exceeds $1.00.

Investing through the trough results in poor returns by definition. For example, during the Great Depression, the mean monthly return is -4.67%, which translates to -72.93% annually. The CWI is $0.17, indicating a loss of over 80%. Dollar cost averaging strategies also generate negative returns.

Continuing to invest after the trough generates rather impressive returns. The mean monthly return from the trough to the breakeven month, November 1944, of the Great Depression is 1.53%, and the CWI is $5.91. More broadly, for all five events, mean and median monthly returns are higher during the post-trough recovery period than the historical mean of the total return period (1926-2017). For three of the five events, the difference is statistically significant with at least 90% confidence. A fourth is almost significant (p-value = 0.12). Annualized returns tend to be 20% or more. For example, annual returns during the recovery period associated with the Great Recession are 24.75%, while annual returns during the recovery period associated with the 1970s Recession are 33.55%. The high returns occur with less risk than normal. For four of the five events, monthly return standard deviations are lower during the recovery period versus the historical monthly return standard deviation of 5.33% in Table 1. Missing out on these recovery returns would certainly be detrimental to overall investing performance.

3.2. Equal-Weighted CRSP Index

Tables 3 and 4 repeat the analysis using the Equal-Weighted CRSP Index. The differences in the equal- and value-weighted indexes are not statistically significant in any of the five total event periods (Table 3) or any of the five periods of decline (Table 4). However, the market recovery occurs quicker for the equal-weighted index versus the value-weighted. For example, in the Great Depression, the breakeven month actually occurs during the depression: November 1935 versus November 1944 using the value-weighted index. The Tech Bubble breakeven month is now May 2003 instead of January 2006. The only exception is the 1987 Crash for which the value-weighted index's recovery is quicker by a few months.

In addition to having a faster breakeven month, the recovery returns tend to be higher using the Equal-Weighted CRSP Index. The difference is statistically significant in three of the five recovery periods. For example, during the Great Depression, the mean monthly return is now 6.41% from the trough to breakeven versus 1.53% using the Value-Weighted CRSP Index. The 6.41% monthly return translates to a spectacular 110.76% annual return. And this spectacular return is occurring during the Great Depression.

The analysis using the Equal-Weighted CRSP Index suggests that investors enhanced their returns significantly if they incorporated small stocks into their portfolios during the five crisis events. The time to breakeven was shorter, and the recovery returns were greater.

4. Conclusions

This study explores investing during five different major stock market crises: the Great Depression, the 1970s Recession, the 1987 Black Monday Crash, the bursting of the Tech Bubble, and the Great Recession. The monthly Value- and Equal-Weighted CRSP Indexes are used to gauge market performance.

The results show that each crisis had a period of significantly negative returns. However, investors staying in the stock market were rewarded with strong recovery returns. Recovery mean monthly returns were significantly greater than the average monthly return for three of the five crisis events using the Value-Weighted CRSP Index and four of the five events using the Equal-Weighted CRSP Index. Recovery returns for the Equal-Weighted CRSP Index even averaged greater than 4% per month for four of the events. The performance of the equal-weighted index demonstrates benefits to incorporating small stocks into investment portfolios during and after a market crisis.

5. References

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Table 1: Monthly Return Statistics During Event Period: Value-Weighted CRSP Index

Monthly Return Statistics						
	Total Sample Period	Great Depression	1970s Recession	1987 Crash	Tech Bubble	Great Recession
Start Month	Jan 1926	Oct 1929	Jan 1973	Oct 1987	April 2000	Nov 2007
End Month	Dec 2017	Aug 1939	Dec 1975	Nov 1987	Sept 2002	June 2009
Mean	0.0092	0.0013	-0.0041	-0.1488	-0.0181	-0.0208
p-value	n/a	0.21	0.09	0.02	0.00	0.03
Median	0.0126	0.0037	-0.0229	-0.1488	-0.0180	-0.0119
Standard Deviation	0.0533	0.1062	0.0615	0.1083	0.0551	0.0723
CWI	$5426.1105	$0.6070	$0.8132	$0.7187	$0.5535	$0.6230
Dollar Cost Averaging	$1,165,457.59	$155.7283	$37.2117	$1.6464	$22.0931	$17.6382
Months	1104	119	36	2	30	20

For the total 1926-2017 sample period and for each of the five event sample periods, this table presents summary statistics for the Value-Weighted CRSP Index monthly returns. The base amount for the cumulative wealth index (CWI) is $1. Dollar Cost Averaging assumes $1 is invested at the beginning of each month. P-values are shown for a difference in means test comparing the event mean return to the Total Sample Period mean return.

Table 2: Monthly Return Statistics During Decline and Recovery: Value-Weighted CRSP Index

Monthly Return Statistics During Decline (Start Through Trough)					
	Great Depression	1970s Recession	1987 Crash	Tech Bubble	Great Recession
Start Month	Oct 1929	Jan 1973	Oct 1987	April 2000	Nov 2007
Trough Month	June 1932	Dec 1974	Nov 1987	Sept 2002	Feb 2009
Mean	-0.0467	-0.0205	-0.1488	-0.0181	-0.0423
p-value	0.00	0.01	0.02	0.00	0.00
Median	-0.0281	-0.0258	-0.1488	-0.0180	-0.0355
Standard Deviation	0.1016	0.0580	0.1083	0.0551	0.0607
CWI	$0.1708	$0.5855	$0.7187	$0.5535	$0.4855
Dollar Cost Averaging	$13.1161	$18.3619	$1.7187	$22.0931	$10.4390
Months	33	24	2	30	16
Monthly Return Statistics During Recovery (Recovery Month to Break Even)					
	Great Depression	1970s Recession	1987 Crash	Tech Bubble	Great Recession
Recovery Month	July 1932	Jan 1975	Dec 1987	Oct 2002	March 2009
Breakeven Month	Nov 1944	Dec 1976	April 1989	Jan 2006	Aug 2012
Mean	0.0153	0.0244	0.0210	0.0155	0.0186
p-value	0.29	0.06	0.07	0.12	0.10
Median	0.0131	0.0256	0.0211	0.0165	0.0251
Standard Deviation	0.0844	0.0473	0.0315	0.0317	0.0494
CWI	$5.9073	$1.7413	$1.4126	$1.8132	$2.0674
Dollar Cost Averaging	$274.3481	$29.0849	$19.7251	$51.8535	$51.9180
Months	149	24	17	40	42

For each of the five events, this table presents summary statistics for the Value-Weighted CRSP Index monthly returns from 1) the start month through the trough and 2) from the recovery month through the breakeven month. The trough is defined as the month during which the cumulative wealth index (CWI) is the lowest during the event period. The recovery month is the month after the trough. The breakeven month is the first month after the trough in which the CWI exceeds $1.00. The base amount for the CWI is $1. Dollar Cost Averaging assumes $1 is invested at the beginning of each month. P-values are shown for a difference in means test comparing the event mean return to the Total Sample Period mean return in Table 1.

Table 3: Monthly Return Statistics During Event Period: Equal-Weighted CRSP Index

Monthly Return Statistics						
	Total Sample Period	Great Depression	1970s Recession	1987 Crash	Tech Bubble	Great Recession
Start Month	Jan 1926	Oct 1929	Jan 1973	Oct 1987	April 2000	Nov 2007
End Month	Dec 2017	Aug 1939	Dec 1975	Nov 1987	Sept 2002	June 2009
Mean	0.0123	0.0110	-0.0037	-0.1615	-0.0074	-0.0155
p-value	n/a	0.46	0.13	0.06	0.09	0.09
p-value (vs. VW)	0.12	0.28	0.49	0.46	0.27	0.42
Median	0.0143	0.0036	-0.0290	-0.1615	-0.0174	-0.0162
Standard Deviation	0.0717	0.1529	0.0851	0.1566	0.0779	0.0921
CWI	$51,127.4974	$6.9557	$0.7819	$0.6907	$0.7344	$0.6736
Dollar Cost Averaging	$9,055,422.523	$214.9318	$39.1629	$1.6907	$26.1231	$19.9012
Months	1104	119	36	2	30	20

For the total 1926-2017 sample period and for each of the five event sample periods, this table presents summary statistics for the Equal-Weighted CRSP Index monthly returns. The base amount for the cumulative wealth index (CWI) is $1. Dollar Cost Averaging assumes $1 is invested at the beginning of each month. P-values are shown for 1) a difference in means test comparing the event mean return to the Total Sample Period mean return and 2) a difference in means test comparing the equal-weighted monthly mean return to the corresponding value-weighted monthly mean return in Table 1.

Table 4: Monthly Return Statistics During Decline and Recovery: Equal-Weighted CRSP Index

Monthly Return Statistics For Decline (Start Through Trough)					
	Great Depression	1970s Recession	1987 Crash	Tech Bubble	Great Recession
Start Month	Oct 1929	Jan 1973	Oct 1987	April 2000	Nov 2007
Trough Month	May 1932	Dec 1974	Nov 1987	Sept 2002	Feb 2009
Mean	-0.0502	-0.0281	-0.1615	-0.0074	-0.0460
p-value	0.00	0.00	0.06	0.09	0.00
p-value (vs. VW)	0.45	0.34	0.46	0.27	0.44
Median	-0.0517	-0.0431	-0.1615	-0.0174	-0.0247
Standard Deviation	0.1235	0.0700	0.1566	0.0779	0.0695
CWI	$0.1478	$0.4760	$0.6907	$0.7344	$0.4518
Dollar Cost Averaging	$11.7962	$16.7980	$1.6907	$26.1231	$10.3305
Months	32	24	2	30	16

Monthly Return Statistics During Recovery (Recovery Month to Break Even)					
	Great Depression	1970s Recession	1987 Crash	Tech Bubble	Great Recession
Recovery Month	July 1932	Jan 1975	Dec 1987	Oct 2002	March 2009
Breakeven Month	Nov 1935	Feb 1976	August 1989	May 2003	Dec 2012
Mean	0.0641	0.0601	0.0184	0.0432	0.0417
p-value	0.04	0.03	0.18	0.01	0.01
p-value (vs. VW)	0.06	0.09	0.60	0.12	0.07
Median	0.0205	0.0425	0.0186	0.0261	0.0559
Standard Deviation	0.1928	0.0927	0.0292	0.0658	0.0631
CWI	$7.5641	$2.1612	$1.4537	$1.38	2.3631
Dollar Cost Averaging	$91.0934	$19.1450	$24.3148	$9.6707	$29.2446
Months	42	14	21	8	22

For each of the five events, this table presents summary statistics for the Equal-Weighted CRSP Index monthly returns from 1) the start month through the trough and 2) from the recovery month through the breakeven month. The trough is defined as the month during which the cumulative wealth index (CWI) is the lowest during the event period. The recovery month is the month after the trough. The breakeven month is the first month after the trough in which the CWI exceeds $1.00. The base amount for the CWI is $1. Dollar Cost Averaging assumes $1 is invested at the beginning of each month. P-values are shown for 1) a difference in means test comparing the event mean return to the Total Sample Period mean return in Table 3 and 2) a difference in means test comparing the equal-weighted monthly mean return to the corresponding value-weighted monthly mean return in Table 2.