



# VALUESCOPE

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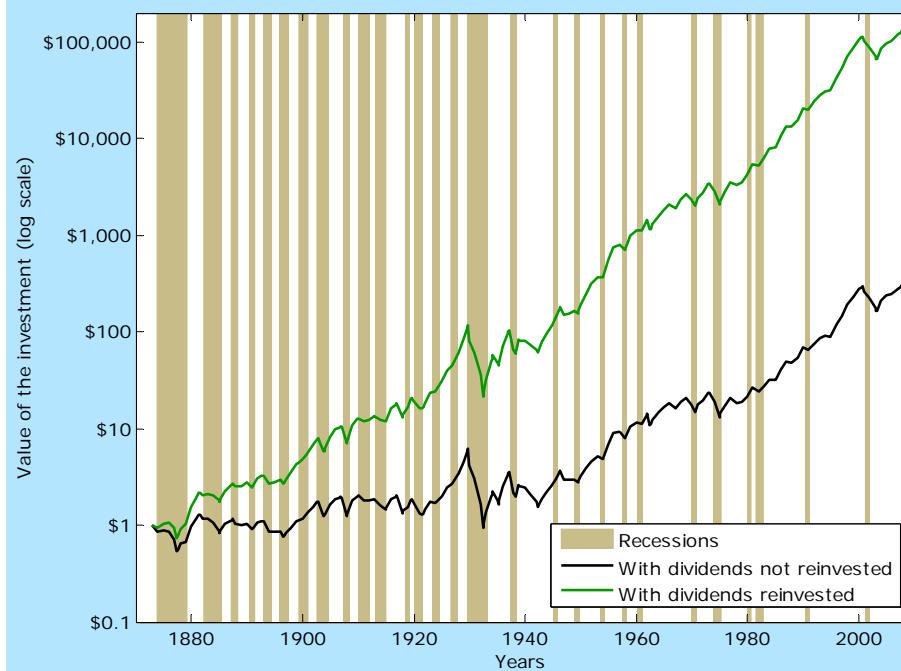
## Stock Market Performance During and After Recessions: An Historical Perspective

*"It will fluctuate."*

*J.P. Morgan, when asked what the stock market would do*

The performance of the U.S. stock market during the last year was marked by spectacular declines and a huge increase in volatility. Economists, finance professionals, journalists and others have compared the current problems with previous episodes of economic turmoil, including the 1970s recession and the *Great Depression*. In this paper we draw various historical comparisons to better understand what the future may bring. While we cannot predict the future, we hope that this analysis will bring more insight than J.P. Morgan's famous words, "It will fluctuate."

Figure 1. Value of \$1 Invested in 1872



First, we looked at the historical data. Since the current crisis, which does not yet have a name, is being compared with the stock market crash of 1929, it was important that we considered a long-term view in our analysis. Using historical data collected by Yale



economics professor Robert J. Shiller<sup>1</sup>, we were able to construct a stock market index for large companies. This index, which begins in December 1872 and ends in December 2008, is an extension of the S&P 500 index. For simplicity, the index used herein is referred to as the S&P 500 index.

The increase in the S&P 500 index over time is impressive (Figure 1). If one had invested \$1 in December 1872, had updated the portfolio regularly to reflect the S&P index composition, and had taken out all the dividends over the 136-year period, the value of the investment in December 2008 would have been \$173 (black line). Assuming that all the dividends were reinvested each year (green line), the initial \$1 investment in 1872 would have been worth \$76,962 in 2008. Figure 1 also identifies the crises of the 1930s, 1970s, 2001-2002, and the current stock market decline.

## RECESSIONS

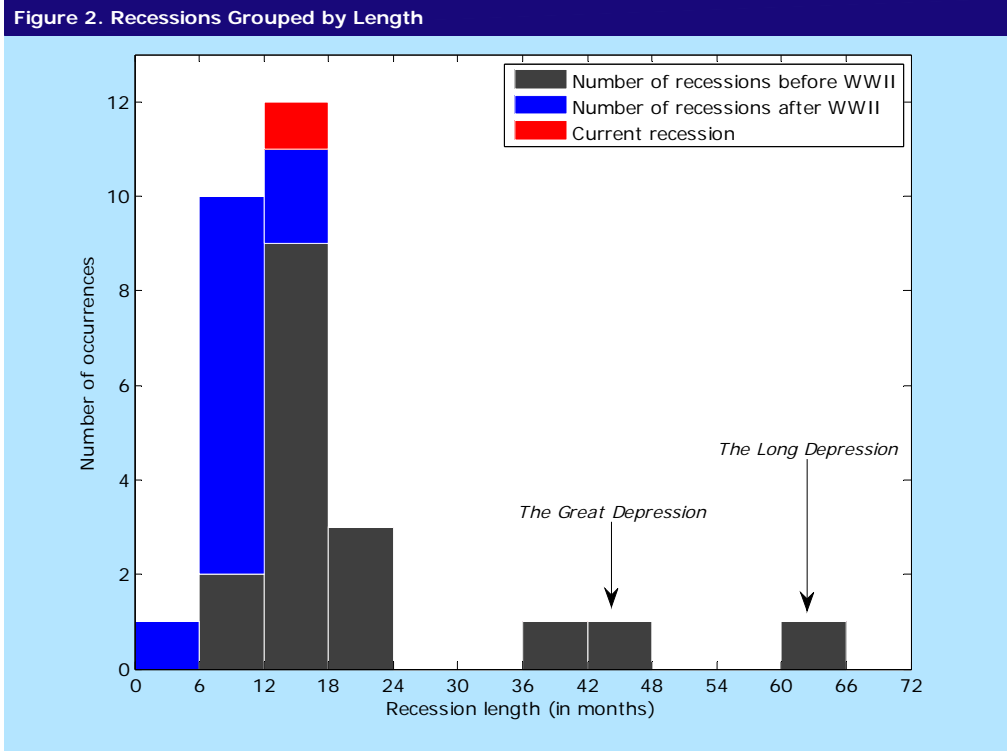
The shaded areas in Figure 1 represent recession periods as defined by the National Bureau of Economic Research (the current recession that started in December 2007 is also included). Unlike the generally quoted definition, the NBER does not define a recession as two consecutive quarters of decline in real GDP. Instead, the panel of economists looks at other indicators, such as employment, and identifies when a significant decline in economic activity has occurred.

The large shaded area (Figure 1) during the mid-1930s represents the *Great Depression*, which lasted 43 months from peak to trough. In comparison, the longest recession on record occurred from October 1873 to

March 1879 and is known as the *Long Depression*.

Another interesting fact about recessions is the change in frequency and duration over time. Before the 1940s, recessions happened more often and lasted longer. After World War II, there were fewer recessions and they did not last as long. The change is associated with the creation of the Federal Reserve System in 1913 and with more proactive Federal Reserve monetary policies. The period after the mid-1980s is known to economists as the *Great Moderation*<sup>2</sup> because it corresponds to a general decline in volatility that occurred broadly across all economic sectors. It may take a few years to determine if the *Great Moderation* is over or if it has just suffered a setback.

By grouping recessions by duration, we created a histogram depicting the number of recessions by length of time (i.e., less than six months, between six months and one year, and so on). For example, Figure 2 illustrates that there were ten recessions that lasted from six months to one year, but only one that lasted less than six months (a brief recession in 1980). On



<sup>1</sup> Robert J. Shiller, Stock Market Data Used in *Irrational Exuberance* Princeton University Press, 2000, updated, <http://www.econ.yale.edu/~shiller/data.htm>. Last accessed December 15, 2008.

<sup>2</sup> James H. Stock and Mark W. Watson, *Has the Business Cycle Changed and Why?*, NBER Working Paper No. 9127, August 2002

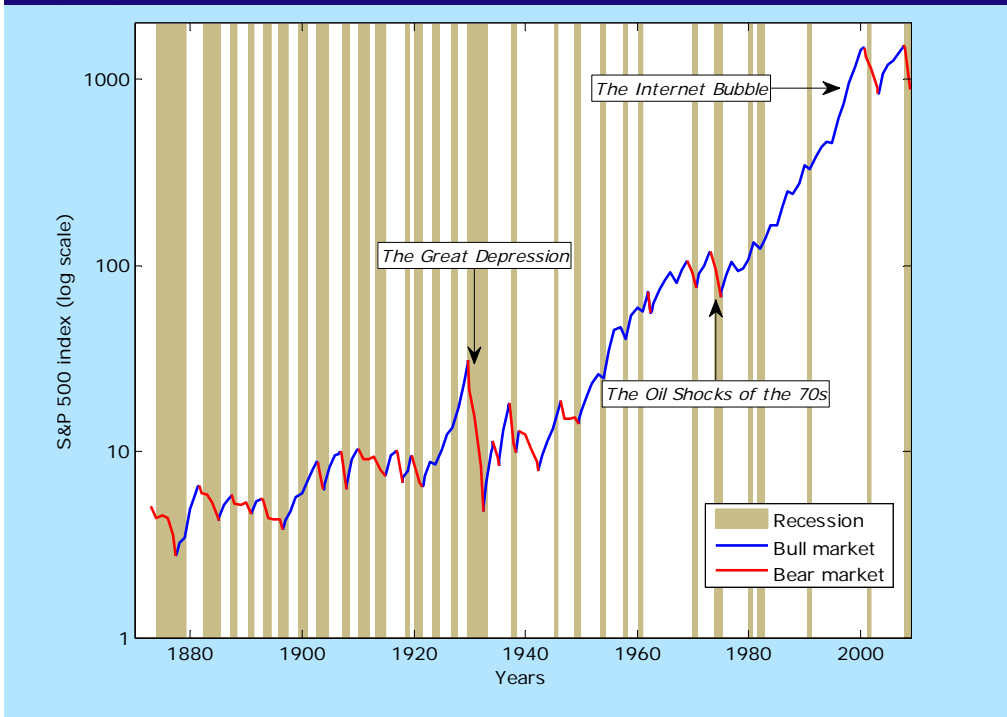


average, a recession lasts about 17 months. Due to the skewed distribution (Figure 2), most of the recessions lasted less than 18 months.

## BEAR MARKETS

While research completed by the National Bureau of Economic Research makes it easy to identify economic recessions, no commonly agreed upon definition exists for a bear market. Broadly defined, a bear market represents a substantial decline of at least 20% in stock prices over a period of several months. For example, the stock market crash of October 1987 declined over 20%, but did not trigger a bear market because it was short lived; however, the current stock market decline that began in late 2007 is considered a bear market.

Figure 3. Bear and Bull Markets

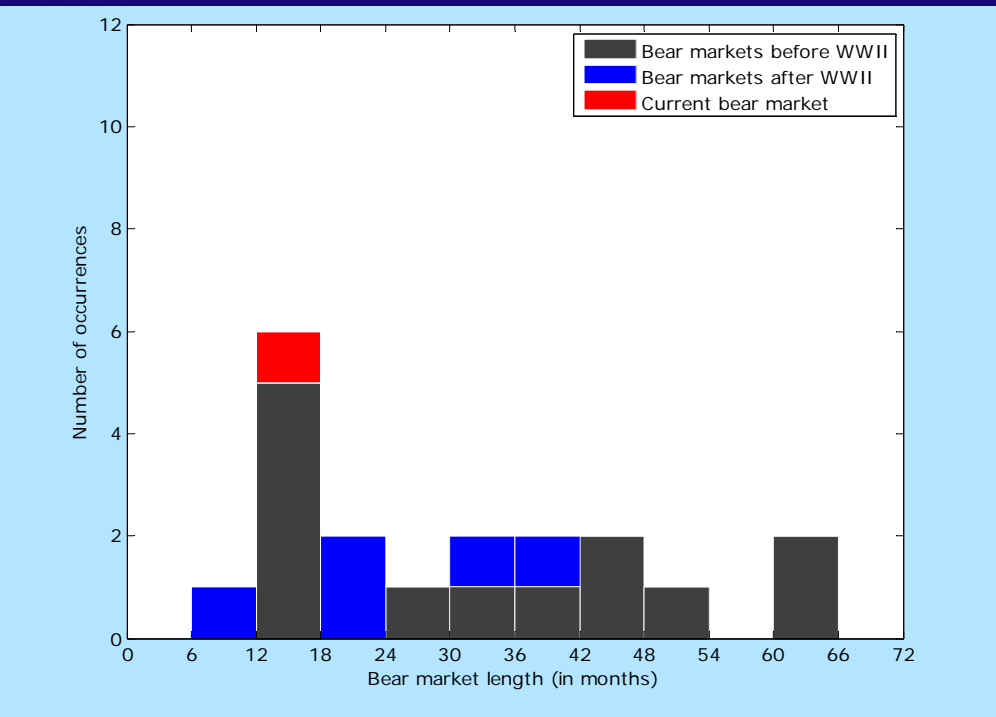


For purposes of this analysis, we define a bear market as a decline of at least 20% in the nominal value of the S&P 500 index that lasts at least six months. To simplify the analysis, we also considered the rest of the periods to be bull markets, which is usually the case (with the exception of some market corrections). This definition allowed us to identify 19 bear market periods, including the current crisis (Figure 3).

Most bear markets occur during periods of economic downturn. However, it is possible to have a stock market downturn that is not associated with a recession or a recession that is not accompanied by a large stock market downfall (e.g., the 1991 recession).

By grouping bear markets by length, we can study the distribution of these durations (Figure 4). The duration of bear markets varies from as short as

Figure 4. Bear Markets Grouped by Length





seven months (a brief episode during the 1960s) to as long as 63 months (during the *Long Depression*). On average, a bear market lasts 29 months, although after WWII the duration of the average bear market is only 22 months. The current bear market (included in Figure 4), which started in October 2007, is 15 months old. If the duration of the average bear market reveals anything, it is that the current bear market might last a while longer.

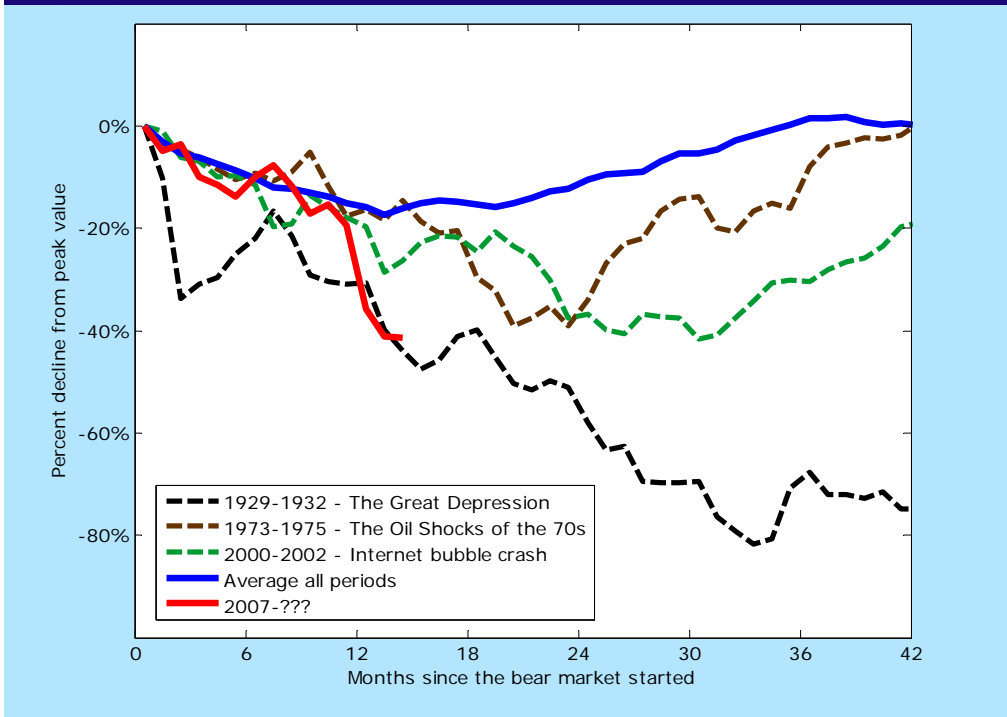
Duration is not the only way to characterize a bear market. Another way is to consider the evolution from the previous peak. Therefore, we examined each bear market, normalized the data such that the transformed peak values are equal to 100 and then computed the percent decline in the stock market as each bear market unfolded. In this analysis we also assumed that dividends were reinvested monthly.

The result is illustrated in Figure 5. Several stock market crises are included for comparison: the 1929 crash leading to the *Great Depression*, the 1973-1975 bear market due to oil shocks, and the 2000-2002 Internet bubble crash. The current crisis is represented in red while the average bear market evolution is represented in blue.

Once a bear market begins, the index declines, on average, 18% over a period of 13 months (assuming dividends were not reinvested, the decline would be larger). At each point in time there is at least one bear market performing worse than the average and at least one bear market performing better; thus the average performance might not reflect the severity of the decline. For this reason, we compared the current downturn not only to the average but with other bear markets.

The current crisis is obviously not typical; the stock market has already lost 41% of the peak value over a period of 14 months. However, it has already reached the bottom of the 1973-1975 and 2001-2002 bear

Figure 5. Stock Market Performance During a Bear Market



markets, a fact that could be seen as good news. As an interesting observation, notice that for a brief period of time the 2000-2002 downturn was more severe than the 1929-1932 crisis.

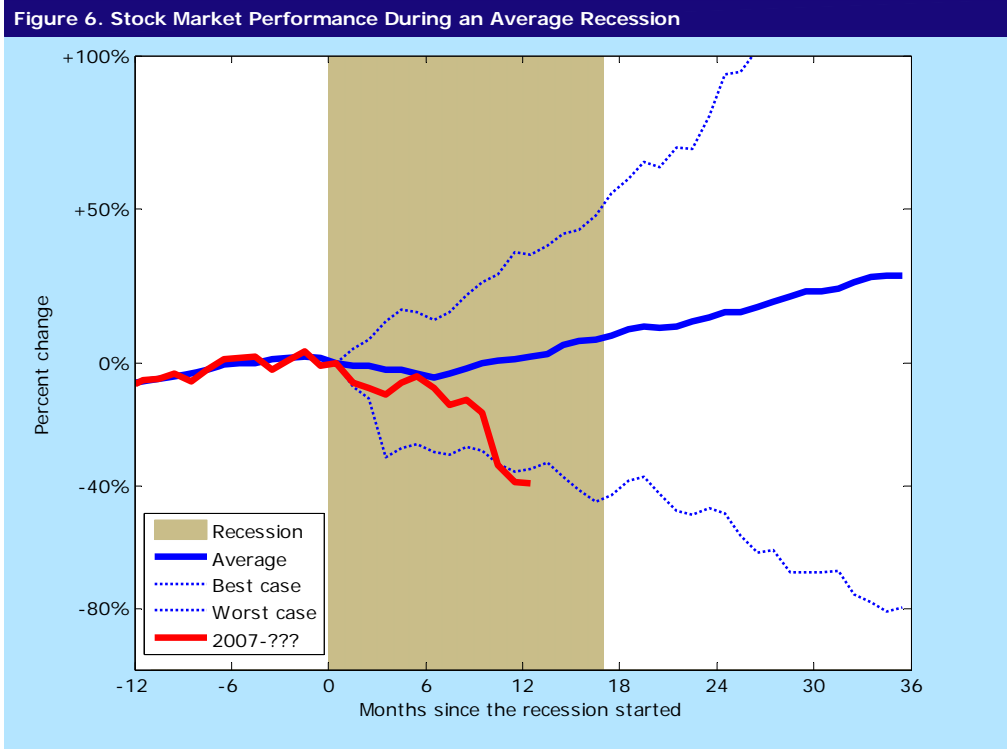
### STOCK MARKET PERFORMANCE DURING RECESSIONS

Another question we would like to address is: What is the expected stock market performance during a recession? To answer this question, we normalized the S&P 500 index values such that the transformed index was equal to 100 at the beginning of each recession. Then, we computed percent changes in the index since the recession started. Again, we assumed that dividends were reinvested monthly.

Figure 6 shows the average market performance as a continuous blue line. The historical best and worst case scenarios (dotted blue lines) reveal the best and the worst stock market performances for a certain month from the start of the recession. They do not represent individual performance as shown in Figure 5; instead they represent the envelope of all stock market performance. The historical best and worst case scenarios are useful in identifying cases not yet encountered.

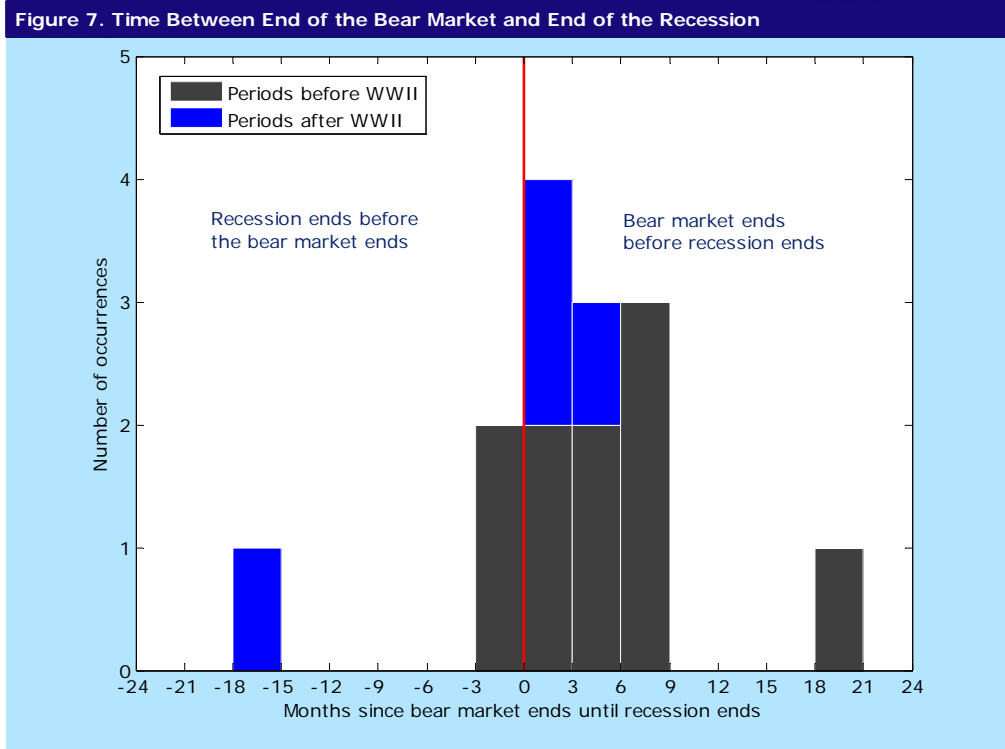


It is important to note that there were recessions during which the stock market did not experience a significant downturn and in fact actually increased (e.g., during the 1920s). The current stock market performance, represented by the red line, is not typical since it is well below the average performance. As of December 2008, the stock market downturn was similar to the worst case scenario and the 1929-1932 period (see also Figure 5). The main difference is that this time it took almost one year to reach the same level of negative return. Before WWII the dividend yield used to be higher, hence the relative lower cumulative total return for the current period.



There is a danger that the current crisis could follow the path of the 1929-1932 market crash. However, this assumes that the Federal Reserve and the federal government would not intervene in time to minimize the

effects of the economic downturn. Unlike during the *Great Depression*, the actions of the Fed and the federal government show just the opposite: they are doing whatever they can to prevent a repeat of the events of the 1930s.



It is not always the case that a bear market accompanies a recession; however, it happens most of the time. Focusing only on the cases when a bear market happens during the same time as a recession, we looked at the timing of the two events. We noticed that, on average, the bottom of the stock market, which is the end of the bear market, occurred before the end of the recession (Figure 7). Based on the historical data, the highest likelihood is associated with the bear market coming to an end one to nine months before the recession ends. As always, there are exceptions; the most notable being the 2000-2002 bear market that started

