

# An Analysis of S&P-500 declines since 1950

Rho Asset Management AG

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## ■ INTRODUCTION

We analyze the declines in the S&P-500 cash index since 1950 to gain insight into its behavior, after declines small and large. The analysis is based on a total of 76 declines. This analysis is particularly relevant today, because we are in the midst of a severe decline.

Note that compared to the return profiles of the Rho Programs, Altius, Citius and Fortius, the S&P-500 declines can be much longer, have a significantly longer time to new highs or full recovery, and are far deeper in the magnitude of worst draw-down. The reason for the superior risk/reward performance of the Rho Programs is that the many systems and markets in their portfolios have low or little correlation to one another, providing tremendous diversification to the portfolio. In contrast, during critical declines, the stocks in the equity indexes tend to be highly correlated to one another, providing little, if any, diversification to equities-only portfolios.

## ■ KEY FINDINGS

### MONTHS TO WORST DRAWDOWN

On average, it took 20 months to reach the point of worst draw-down, using the five longest-lasting declines. For the current decline, this would be near June 2009. However, the lowest monthly point may have occurred in February 2009.

### MONTHS TO FULL RECOVERY

We define the time in months from the point of worst draw-down to a new equity high as the number of months to full recovery. The two worst declines had recovery periods of 55 and 69 months beyond the point of worst draw-down. So the message is, not surprisingly, that the deeper the decline, the longer the time to full recovery. A linear regression analysis of the 13-worst declines yields the formula for the time to recovery in months:

$$\text{Months to full recovery} = -1.6 * (\% \text{ Decline from high}) - 21.$$

The current downturn registered a  $-52.5\%$  draw-down by the end of February 2009 based on monthly data. Inserting this into the equation, the number of months to recovery is estimated as  $-52.5 \cdot -1.6 \cdot 21 = 63$  months. So if February 2009 is the absolute low of the move, a full recovery to new equity highs is not predicted until May 2014 from historical data. The data-set is quite small, so we could easily get a 12-month deviation on either side, a faster or slower recovery, ranging from 55 to 75 months.

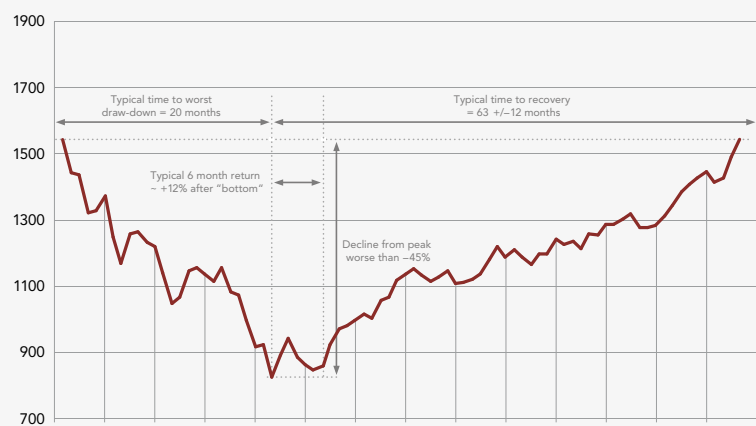
### CONFIRMATION OF BOTTOM: TIME-AND-DISTANCE TEST

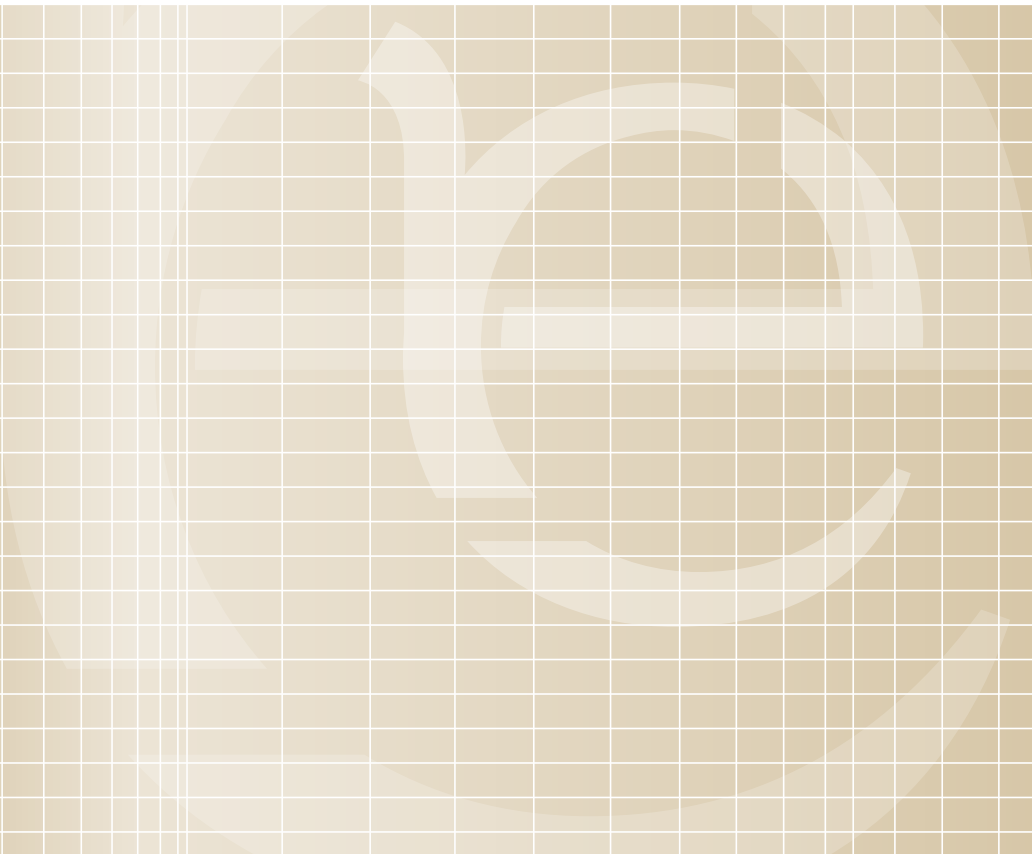
In 87.5% of declines lasting at least 2 months, the S&P-500 return was positive in the 6-months following the point of maximum draw-down, with an average gain of approximately 12 percent. If February 2009 is to be the lowest point of the current decline, the market must be above its February 2009 close in August 2009 and beyond. When the 6-month return was negative, the market tipped back into a draw-down. So the 6-month positive return requirement seems to be an effective time-and-distance test to check for a potential market bottom.

### VISUALIZING A SEVERE DECLINE

A typical long-lasting decline may in the S&P500 index may be visualized as shown below.

#### S&P500 INDEX





Rho Asset Management (“Rho”) is a Swiss based long/short directional futures investment manager established in 2007. The founders of Rho have combined more than 50 years of experience in alternative investments and a successful track record in trading and managing client assets.

Our goal is to provide the highest possible RETURN EFFICIENCY to our investors using ALTIUS, CITIUS and FORTIUS, all fully automated trading programs. Rho is research and technology driven, specializing in design and implementation of systematic trading strategies. All strategies are based on quantitative analyses of price behavior in the global financial and commodity markets.

Rho is dedicated to providing our clients with tangible value in investment performance and quality of client service.