



Dealing with the inevitable - a study of equity market drawdowns

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- Maximum drawdown, the largest cumulative loss from a peak to a trough in the value of an investment, is widely used to assess the risk and performance of portfolios.
- In this article, we are taking a look at a comprehensive sample of historical drawdowns across various major equity markets and study summary statistics, including the frequency, length and severity of these events.
- While many investors have learned the hard way that it is incredibly difficult to anticipate stock market pullbacks, we argue that there is value in developing a good understanding of these events.
- A suitable strategic asset allocation paired with a good game plan for the worst case prevents investors not only from emotional actions against their interests but may even allow them to harvest the elevated risk premiums often available during crisis times.

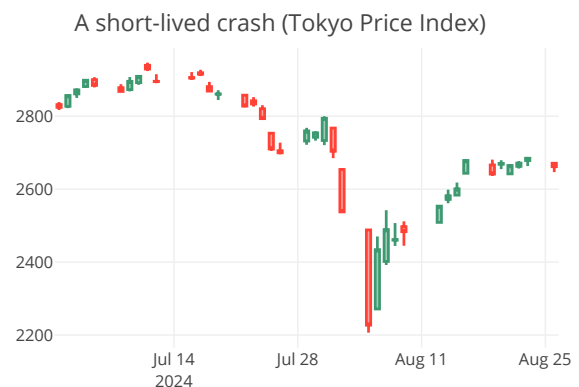
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Achieving equity-like returns over the long term without suffering painful losses at some point is the dream of practically all financial market participants, from which countless hedge fund strategies have emerged. Unfortunately, this dream all too often turns out to be illusory and costly. In this article, we, therefore take a closer look at a large sample of equity market drawdowns to develop a better understanding of its typical frequency, length and severity. While we generally take a cautious stance on strategies that claim to be able to predict crashes, we believe that patient investors who have a solid roadmap for such periods can increase risk-adjusted returns by upping risk taking during tumultuous times.

1 An intuitive risk measure

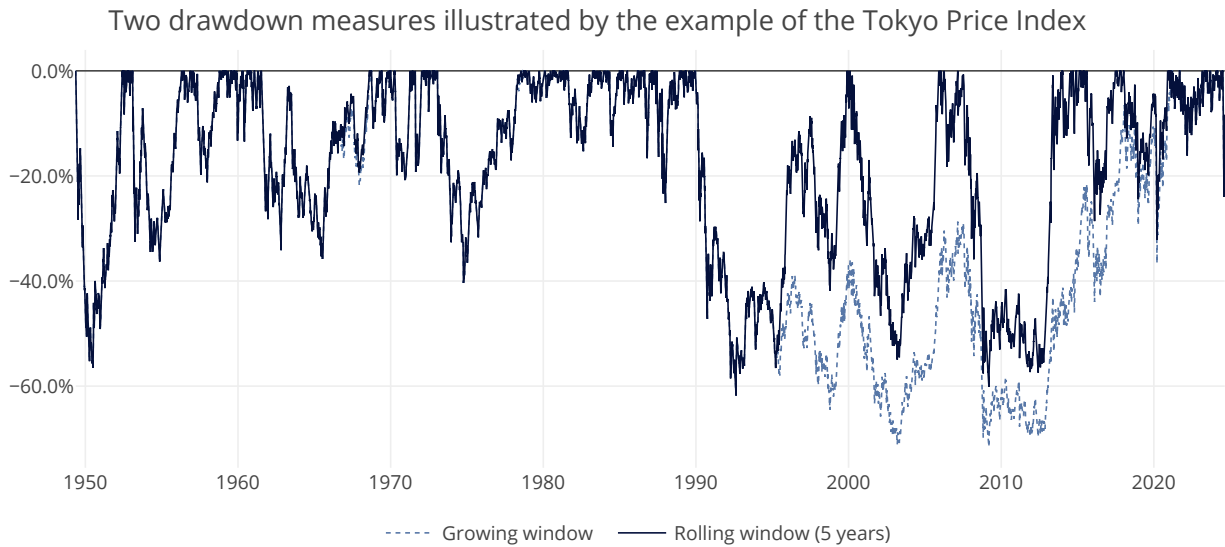
For many investors, the question of how much an asset or portfolio can lose at the worst possible moment (maximum drawdown) is more meaningful and intuitive to interpret than statistics such as volatility or value at risk, which are commonly used by experts. It also allows the derivation of related metrics such as peak-to-trough, total drawdown duration and time to recovery, which are directly related to an investor's time horizon. For instance, a high allocation to equities is generally considered unsuitable for investors with a time horizon of only a few years, as experience shows that equity market drawdowns can last significantly longer, meaning that such an investor may be forced

to sell their position at precisely the worst possible time. The same applies to excessive leverage, which can force investors to sell against their will when asset prices are depressed. On the other hand, significant pullbacks are frequently the most interesting phases in financial markets, as forced or panic selling by some market participants can lead to real distortions and price inefficiencies, rewarding those willing and able to adequately respond with higher expected returns. The recent, short-lived crash in Japanese equities (Figure 1) is an excellent example of this phenomenon. No



Source: Source: Amadeus Capital

Figure 1: From Volkswagen to Gamestop to the flash crash in Japanese stocks in August 2024, forced selling by leveraged investors is often the driving force behind exaggerated movements. Remaining able to act in such times should be a priority for every market participant.



Source: Bloomberg, Amadeus Capital

Figure 2: The bursting of the Japanese asset price bubble in the early 1990s led to the prolonged decline of a major stock market in modern times. Investors who entered the market at its peak in December 1989 had to wait 31 years to get their money back. This poses a problem for measuring subsequent cycles, which is why we introduce a drawdown measure of based on a rolling window (5 years) rather than all-time highs.

doubt there were few market participants who thought that the stock market of an entire country deserved a 20% lower valuation than a few days earlier on the heels of a tiny rate hike by the BoJ and slightly weaker labor market numbers in the US, but it hardly mattered to the leveraged market participants who had to close their positions at any cost.

We have previously argued that reliably forecasting major drawdowns and getting out of risk assets in advance is incredibly difficult if not completely impossible (notwithstanding that, of course given the sheer number of market participants and doom prophets, every crisis produces some who got it right). However, even in the absence of a crystal ball, we believe there is a lot of value in entering any choppy phase with a well-defined game plan, providing peace of mind and the opportunity to occasionally benefit from mispricings alike.

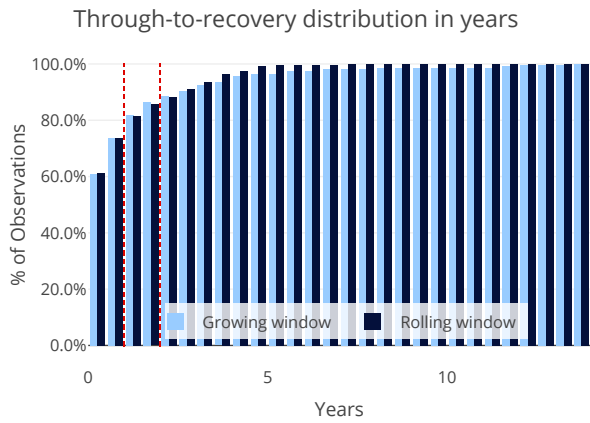
	Growing window	Rolling window
Sample size	541 years	541 years
Drawdowns > 10%	228	250
Median through	-17%	-17%
Median overall length	243 days	236 days
Median peak-to-through	88 days	88 days
Median time-to-recovery	131 days	136 days
Max overall length (Japan)	31 years	10 years
Max peak-to-through (Japan)	19 years	5 years
Max time-to-recovery (Japan)	14 years	7 years

Source: Source: Amadeus Capital
Figure 3

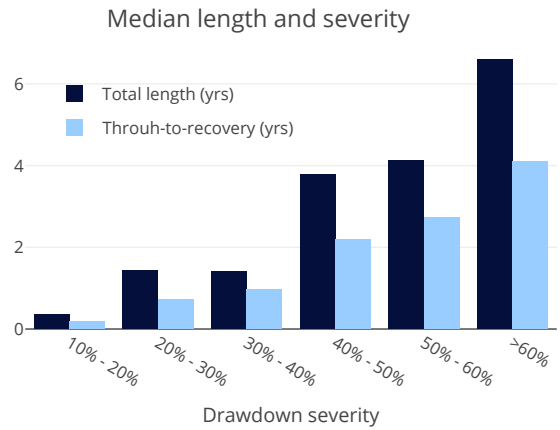
2 Understanding the depth and length of drawdowns

In order to better contextualize adverse market events, we have therefore examined a large sample of equity market declines in a number of broad market indices reflecting the performance of the US (S&P 500 and NASDAQ), UK (FTSE 100), Germany (DAX), France (CAC 40), Switzerland (SMI), Sweden (OMX), Japan (TOPIX), China (Hang Seng) and India (NIFTY). Finally, we also include the MSCI World Index. Data for all of these markets is available at least since the 1990s, but goes back to 1940 in the case of Japan and 1927 for the US (although the latter is based on simulations as the S&P 500 was only introduced in 1957). Drawdowns are typically calculated as a loss from the previous all-time high, though this creates a headache in the event of prolonged setbacks. The classic formula would treat the long decline and slow recovery in Japanese equities after the bubble in the 1990s as a single deep drawdown, ignoring the many bear markets and recoveries in the interim.

We therefore also propose a different formula that uses a rolling window of maximum 5 years instead of the all-time high to be able to recognize “drawdowns within drawdowns”. Both measures are compared in Figure 2. As can be seen, they generally lead to the same results, with the exception of the period after the Japanese asset price bubble burst in the early 1990s. While the dashed line reminds us that investors who invested in Japanese equities in December 1989 took no less than 31 years to get their money back, we can use the rolling window formula to identify and analyze the subsequent boom/bust cycles separately. If we apply



Source: Source: Amadeus Capital
Figure 4



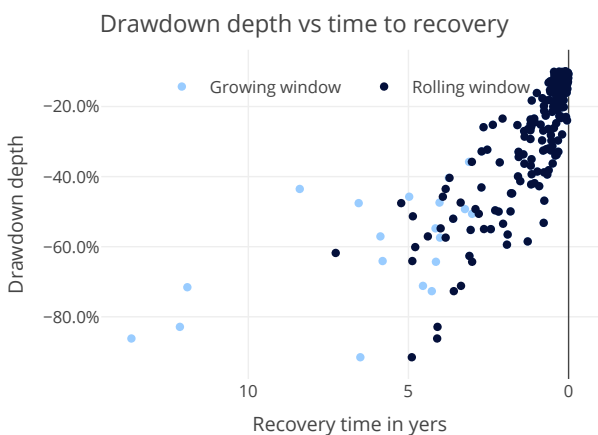
Source: Source: Amadeus Capital
Figure 6

this formula to the 11 indices mentioned above, we find 250 events in which the markets fell by more than 10% on a total return basis and in local currency (see Figure 6). Given a combined sample size of over 500 years of stock market returns, this means that equity investors have suffered such a loss every two to three years on average across all these markets. For the S&P 500, we measure 34 such events over 97 years, which means a loss of more than 10% about once every 34 months (2.8 years). Of course, the severity and duration of these declines vary widely, but on average (median) it took these markets a little less than three months to fall by 17% in these cases before recovering within about four and a half months.

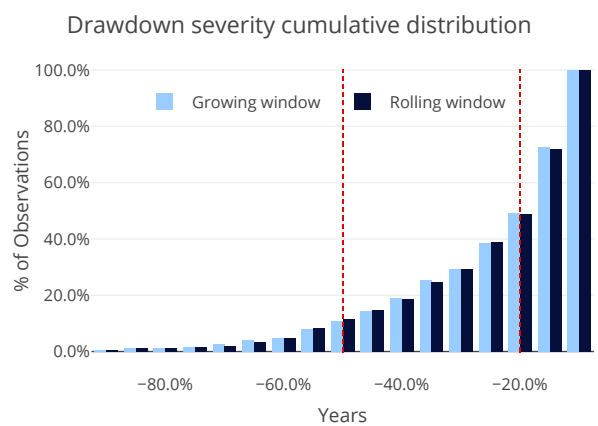
Unsurprisingly, as shown in Figure 7, the depth and length of the declines are correlated. We regressed the former of market declines on the time in days it took the markets to recover from the pullback. This regression yields a highly significant R^* of 0.63 for the drawdowns determined using our rolling window method and an R^* of 0.7 using the standard definition. In three quarters of all cases, recoveries took less than one year and in 86% of cases less than two years. We examined the sample further and looked at the average

(median) length of the declines and time to recovery grouped by severity. Interestingly, there is a bit of a kink in this statistic, with declines of more than 40% and subsequent recoveries taking significantly longer. Most likely, it is this increase in drawdown length that expresses the difference between mere technical corrections and a real crisis characterized by a significant and sustained deterioration in economic data and company profits. The distribution of recovery periods is not significantly influenced by the choice of methodology for measuring drawdowns, as can be seen in Figure 7. This is due to the fact that very long drawdowns such as in Japan after the 1990s or in the US market after the Great Depression are relatively rare events.

Looking at the data, we can derive several heuristics for the aforementioned “game plan”. First of all, patience is key. Stock markets experience significant setbacks at irregular intervals and often at unexpected moments for surprising reasons. As soon as markets become shaky, investors should resist the temptation to panic as well as the urge to act immediately. A setback of 5% may become a quickly forgotten non-event, but could just as easily lead to a fall of 20% or 30%. Our view is that it is usually better to ignore the first case and keep



Source: Source: Amadeus Capital
Figure 5



Source: Source: Amadeus Capital
Figure 7

dry powder for the second. This can admittedly be difficult when the media is full of frenzy about supposedly dramatic events unfolding. That's why we believe a systematic game plan based on reliable event classifications and quantitative indicators is crucial. Finally, for investors who seek to use drawdowns to make tactical adjustments or deploy capital (e.g. after a sizable cash event), it is important to find the right balance between a strategic allocation that is dynamic enough to avoid succumbing to FOMO when a bear-market is waiting to happen, but sufficiently defensive to allow for heightened risk taking in challenging times, both from an economic and an emotional perspective.

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