Buy the Dip? Not So Fast

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Abstract
Buying after dips in prices has long been popular with both individual and institutional investors. However, evidence supporting the apparently obvious benefits of this strategy is scarce, and perhaps for a good reason. In fact, the evidence in this does not show much support for buying after dips. Two passive benchmarks are used here to evaluate several buy the dip strategies. Buying after dips tends to increase returns and risk relative to one benchmark, and to decrease both relative to the other, but in both cases it ultimately fails to enhance risk-adjusted returns.

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1. Introduction

The price of an asset may fall for at least two reasons. One is that the asset's prospects may have deteriorated and are not expected to improve in the foreseeable future; the other is that investors may have turned temporarily (and perhaps irrationally) pessimistic about the asset but sooner or later will correct their mistake. The first reason is based on fundamentals, the second is behavioral. Buy the dip (BTD) strategies largely rest on the belief that the price drop is temporary and is bound to resume its upward trend.

It may seem rather obvious that buying an asset at a 'low' price may lead to enhanced returns, but neither that is necessarily true nor is it enough of a reason to buy after a dip. First, it is always possible that a BTD investor may end up catching a falling knife; that is, an asset whose fundamentals have permanently deteriorated so that its upward trend in price will not necessarily resume anytime soon, if ever. Second, even if the price drop is temporary, there may be a mismatch between the period of time over which the price drop reverts and the investor's holding period. And third, even the first two reasons notwithstanding, it is possible that higher (lower) returns come with higher (lower) risk, and potentially with lower risk-adjusted returns.

BTD strategies may be viewed as an implicit bet against market efficiency, as well as an implicit bet on the existence of investors whose behavioral biases may temporarily push prices down. Seen from this perspective, this study does not take any preconceived view on which of these two scenarios predominates in financial markets. Rather, the goal of this inquiry is to assess the evidence on the performance of BTD strategies in order to help investors determine whether they would benefit from implementing them.

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The evidence discussed here, based on a very long-term history of the U.S. stock market is fairly clear. Relative to a passive buy-hold-rebalance strategy with the same asset allocation and rebalancing frequency, BTD strategies generally (but not always) increase returns, always increase risk, but rarely enhance risk-adjusted returns. Relative to a passive buy-and-hold investment in stocks instead, BTD strategies lower both returns and risk but again rarely enhance risk-adjusted returns. In the very few scenarios in which BTD strategies marginally increase risk-adjusted returns, they never do so in a statistically-significant way. These results stem from a base case and an extensive sensitivity analysis for different rebalancing frequencies, different asset allocations, different dip sizes, and different cash transfers from bonds to stocks to take advantage of dips.

The rest of the article is organized as follows. Section 2 introduces the issue and provides a brief overview of the relevant literature; section 3 discusses the evidence; and section 4 provides an assessment. An appendix with exhibits concludes the article.

2. Background

2.1. The Basics

Consider an asset whose price has gone down 10% in a month. If you liked the asset at the beginning of the month, should you buy it now that it has become 10% cheaper? In other words, should you buy the dip? The answer may seem obvious but in fact it is not. Sure, it may sound attractive to buy at a discount an asset that you liked in the first place, and yet a broader perspective is necessary.

First, the asset's price may be a reaction to a deterioration in fundamentals that are not expected to improve in the foreseeable future. The deterioration in fundamentals may be specific to the asset (think a decline in sales related to changing consumer preferences) or more broadly related to a sector or the economy (think the global financial crisis). Either way, implementing a BTD strategy may be akin to catching a falling knife, particularly in the short-term.

Second, in order to buy the asset, the capital must come from somewhere, which implies either selling one asset to buy another or having idle cash waiting for dips to happen. The former implies a less than trivial evaluation of the expected relative performance of the two assets; the latter, which is more typically associated with BTD strategies, bears an opportunity cost, which increases with the size of the cash allocation. In other words, implementing a BTD strategy may be neither trivial nor costless, and for those reasons it needs to be thoroughly evaluated.

Third, it is possible that the period over which the (presumably) temporary price drop reverts and resumes its upward trend is longer than the investor's holding period. For example, if a price drop is the beginning of a long drawdown, longer than the investor's holding period, buying the dip may imply adding weight to a sinking ship; that is, investing more capital in an

asset whose price will keep dropping during the holding period. In fact, Cao et al (2025) warn about the danger of making "… the right trade, but at the wrong horizon."

Fourth, buying after a dip seeking to enhance a portfolio's return is at best a limited perspective. Reallocating capital from relatively risk-free cash to largely any another asset is likely to increase the portfolio's risk, and possibly decrease its risk-adjusted return. In other words, a proper evaluation of BTD strategies requires a broader perspective than just focusing on returns, and should consider risk and risk-adjusted returns as well.

All this said, BTD strategies remain popular with many investors, both institutional and individual, as reflected by their extensive coverage in the financial press.[1] It appeals to contrarian investors who tend to believe that markets overreact to bad news but eventually correct their overreaction; to investors that feel the need of being proactive when markets decline; and to investors with low risk aversion, who tend to emphasize returns over risk. Ultimately, whether investors benefit from BTD strategies is an empirical question that this article aims to answer.

2.2. The Literature

Curiously, as much as the financial press very frequently discusses the opportunities to buy after dips, there is very little literature, particularly from academics, providing a thorough assessment of the BTD strategy. To be sure, there is a very extensive literature on momentum investing, which can be thought of as the opposite of BTD investing, particularly in the short term, but very little on the BTD strategy per se.

Momentum strategies, which focus on buying recent winners and selling recent losers, have a long history, going back at least to Jegadeesh and Titman (1993). They find that stocks that perform best (worst) over the most recent 3-12 months tend to continue to perform well (poorly) over the subsequent 3-12 months. Jegadeesh and Titman (2001) find that momentum strategies continued to be profitable in the 1990s; and Jegadeesh and Titman (2023) report a similar finding focusing on the post-2000 performance of these strategies. Asness et al (2013) broaden the scope of the research and find that momentum strategies are profitable across four asset classes and four countries.

The literature that focuses on the BTD strategy itself is far more recent. Ning (2018) evaluates the impact of buying stocks that fell 10% more than the Russell 1000 index on a single day; she finds that cumulative excess returns after those dips were positive and significant over several periods ranging between one day and 240 days. Felix and Warwick (2021) consider six developed countries and two broader indexes and conclude that BTD strategies trail lump-sum investing by a large margin in terms of annualized return over ten-year holding periods.

[1] In fact, Ning (2018) refers to the BTD strategy as "… both a Wall Street maxim, and a widely used investment strategy."

Bonini et al (2024) focus on the SPY ETF (and to a lesser degree on ETFs representing the stock market of G7 countries) and find that BTD strategies do not necessarily maximize real terminal wealth; they also find that they are sensitive to market conditions at the beginning of the investing period. Mueller-Glismann et al (2024) find that, since 2010, buying after drawdowns 10% or larger produced higher-than-average subsequent returns over periods ranging between one month and 12 months. However, when considering longer sample periods, after 1990 and after 1928, they find that BTD strategies were less successful.

Delaloye (2025) considers a hypothetical asset and compares a BTD strategy to an alternative 'hedge the dip' strategy. He emphasizes that a successful implementation of the former depends on an investor's ability to time the market, an asset's reversion to the mean, and a low opportunity cost, ultimately favoring a hedge the dip strategy. Finally, Cao et al (2025) compare the performance of 196 BTD strategies to that of a buy-and-hold strategy; they find that the former underperform the latter in terms of risk-adjusted return, both on average and in more than 60% of the strategies they consider. Moreover, they emphasize that BTD investing is on the other side of momentum investing, which explains why the former does particularly badly in the short term.

3. Evidence

3.1. Data

The data for stocks, bonds, and inflation used in this article were downloaded from Robert Shiller's web page.[2] The data for stocks consist of prices and dividends for the U.S. stock market, proxied by the S&P 500. Monthly nominal stock returns are calculated considering only capital gains/losses (price returns) and considering both capital gains/losses and dividends (total returns). All the dips explored here are based on the former, and all cumulative returns after dips are based on the latter.

The data for bonds consist of a real bond index based on 10-year U.S. Treasury Notes, from which monthly real returns are calculated; they are then adjusted by inflation, based on the Consumer Price Index (CPI), to convert them into nominal returns. The yield on 10-year U.S. Treasury Notes, converted into a monthly rate, is used as a proxy for the risk-free rate in the calculation of Sharpe ratios. Panel A of Exhibit A1 in the appendix provides summary statistics for all the relevant variables over the Feb/1871-Dec/2025 sample period.

The events on which this article focuses are negative monthly returns, or dips (D), of different size (s), so let D_s denote a monthly return lower than $-s$%; that is, let D_0, D_3, D_6, D_9, D_{12}, and D_{15} denote monthly returns lower than 0%, –3%, –6%, –9%, –12%, and –15%, respectively,

[2] See http://www.econ.yale.edu/~shiller/data.htm.

in all cases based on price returns. Panel B of Exhibit A1 shows the number of events in the sample for each D_s considered; that is, 766 for D_0, 265 for D_3, 86 for *D6*, 37 for D_9, 18 for D_{12}, and 5 for D_{15}. Cumulative returns after dips are based on total returns and calculated over the 12, 36, 60, and 120 months after each dip considered.

3.2. Cumulative Returns After Dips

Exhibit 1 shows average cumulative returns over 12, 36, 60, and 120 months after the events considered in the first column. The second row (All) shows average cumulative returns after every month in the sample and can be thought of as the cumulative returns observed after the average month. Thus, after the average month, stocks returned 11.0%, 35.6%, 65.9%, and 168.8% over the subsequent one, three, five, and ten years, respectively. The third row (Positive) shows similar information after the average month with a positive return.

Exhibit 1: Cumulative Returns After Dips

This exhibit shows average cumulative returns over 12, 36, 60, and 120 months after the events considered in the first column. The second (All) and third (Positive) rows show average cumulative returns after the average month and after the average month with positive return, respectively. The rest of the rows show average cumulative returns after dips of size s (D_s), with s = 0% (D_0), –3% (D_3), –6% (D_6), –9% (D_9), –12% (D_{12}), and –15% (D_{15}). All returns in percent.

↓ Events | Months →	12	36	60	120
All	11.0	35.6	65.9	168.8
Positive	12.3	36.1	65.3	168.8
D_0	9.1	35.0	66.7	168.8
D_3	9.5	39.3	72.4	170.8
D_6	11.6	38.8	79.5	180.0
D_9	10.0	35.6	80.5	145.4
D_{12}	14.5	31.2	107.1	165.9
D_{15}	11.4	27.7	121.5	115.6

The rest of the rows in the exhibit show average cumulative returns after dips of different size. Interestingly, one year after the average month with a negative return (D_0), stocks returned 9.1%, significantly *less* than they returned after the average month (11.0%).[3] Over three, five, and ten years, stocks returned 35.0%, 66.7%, and 168.8%, which is slightly less, slightly more, and the same than they returned after the average month (35.6%, 65.9%, and 168.8%), but the differences are not statistically significant. In other words, relative to the average month, cumulative returns after dips of any size (that is, D_0) were not particularly high, and in fact were particularly low over the subsequent 12 months.

Is it possible that this result follows from considering dips of any size rather than 'large' dips? The rest of the rows in the exhibit, which consider monthly dips between –3% and –15%, do not seem to support that hypothesis. To illustrate, cumulative returns one (9.5%), three

[3] Significance is evaluated with Welch's t-test for the difference between means, with degrees of freedom based on the Welch-Satterthwaite equation. Unless otherwise stated, all tests in this article are two-tailed and at the 5% level of significance.

(39.3%), five (72.4%), and ten (170.8%) years after months with return lower than –3% were not significantly different from those observed after the average month.

More generally, cumulative returns one, three, and ten years after dips of different sizes were somewhat higher or lower than those observed after the average month, but in no case the differences are statistically significant. Five-year cumulative returns after dips of different sizes, however, were consistently higher than those observed after the average month, but again the differences are not statistically significant.

In short, cumulative returns after monthly dips (ranging from D_0 to D_{15}) were not statistically higher than those observed after the average month over any of the holding periods (ranging from one year to ten years) considered. In fact, one year after months with a negative return, cumulative returns were statistically *lower* than they were after the average month. Only five years after monthly dips cumulative returns were higher than they were after the average month across all the D_s considered, albeit not statistically so.

3.3. Investment Strategies – BHR Benchmark – Base Case

The analysis in the previous section highlights that it is far from preordained that returns after dips are always favorable to investors. In fact, the evidence discussed suggests that cumulative returns after monthly dips are not much better, and could even be worse, than those observed after the average month, particularly in the short term. That analysis, however, does not consider the implications of actively managing a portfolio of stocks and bonds with a target asset allocation, and allowing the bonds to be used in an opportunistic way; that is, to be deployed to take advantage of dips. Such is the essence of the BTD strategy discussed in this section.

The general BTD strategy considered here consists of a portfolio of stocks and bonds, the latter being a consistent slice of the asset allocation *unless* the opportunity to buy stocks after a dip arises. Importantly, from this perspective the bond allocation should not be viewed as having an opportunity cost; rather, it can be thought of as a target (and consistent) slice of the portfolio, but one that is left open to the possibility of being deployed in an opportunistic way.

This BTD strategy is evaluated against a passive buy-hold-rebalance (BHR) benchmark strategy, with the same asset allocation and rebalanced at the same times, but that does not react to dips. Three rebalancing frequencies are considered, namely, every ten years, every five years, and every year. Both the BTD and the BHR strategies begin with $100 at the end of Jan/1871 and are evaluated through the end of Dec/2025; they both rebalance periodically as scheduled, depending on the rebalancing frequency.[4]

[4] Because rebalancing is critical for risk control (Jaconetti et al, 2010), the BTD strategy ignores December dips; that is, rebalancing in a disciplined fashion takes precedence over taking advantage of December dips.

In the base case, the allocation to bonds (B) is 40% of the portfolio, with the rest (60%) allocated to stocks; the dip is a monthly negative return of any size (D_0); and the transfer (T) from bonds to stocks after a dip occurs is 25% of the capital available in bonds at that time. Exhibit 2 shows results for this base case (B = 40%, D_0, and T = 25%) for all three rebalancing frequencies.

Exhibit 2: BHR Benchmark – Base Case

This exhibit shows summary statistics for buy the dip (BTD) and buy-hold-rebalance (BHR) strategies, both starting with 40% allocated to bonds (and the rest to stocks) and rebalancing every 10 years (10Y), every 5 years (5Y), or every year (1Y), at the same time. BTD strategies transfer 25% of the bond position to stocks after every month with a negative return. The statistics include the mean annual compound return (MR); the terminal value of $100 invested for 30 years at MR (TV30); annualized volatility (SD); maximum drawdown (MD); and Sharpe ratio (SR). TV30 in dollars; MR, SD, and MD in percent.

	10Y Rebalancing		5Y Rebalancing		1Y Rebalancing	
	BTD	BHR	BTD	BHR	BTD	BHR
MR	9.2	7.9	9.0	7.8	7.8	7.9
TV30	1,392	988	1,339	950	941	973
SD	13.6	8.8	13.4	8.5	11.3	8.5
MD	–79.7	–63.1	–79.6	–60.5	–75.1	–59.8
SR	0.113	0.121	0.112	0.120	0.096	0.121

Consider the ten-year rebalancing frequency first. The BTD strategy outperformed the BHR strategy by 1.2 points per year (9.2% versus 7.9%) in terms of mean compound return (MR). That difference can be expressed in dollars and cents by considering the terminal value of $100 invested at MR over 30 years (TV30), which yields $1,392 versus $988, or 41% more for the BTD strategy, clearly a sizeable difference.

Such a difference in compound return in favor of the BTD strategy had a counterpart in terms of risk, as measured by both annualized volatility (SD) and the maximum drawdown (MD). In fact, relative to the passive strategy, the BTD strategy had much higher volatility (13.6% versus 8.8%) and a substantially larger drawdown (–79.7% versus –63.1%). Moreover, in terms of risk-adjusted return as measured by the Sharpe ratio (SR), the BTD strategy did not outperform the passive strategy (0.113 versus 0.121). In this case, and unless otherwise stated throughout the rest of the article, the differences in Sharpe ratios are *not* statistically significant.[5]

The results are fairly similar if both strategies rebalance every five years, with the BTD strategy outperforming in terms of return (hence compounding power) and underperforming in terms of risk (higher) and risk-adjusted return (lower). With annual rebalancing, however, the BTD strategy underperforms in terms of return, risk, and risk-adjusted return, with the underperformance in terms of the latter being statistically significant.

[5] Throughout this article differences in Sharpe ratios are evaluated using the Jobson-Korkie-Memmel (two-tailed) test at the 5% level of significance; see Memmel (2003). As already mentioned, Sharpe ratios are calculated after subtracting the 10-year yield of U.S. Treasury Notes, expressed in monthly terms, from the returns of both strategies.

3.4. Investment Strategies – BHR Benchmark – Sensitivity Analysis

The previous results show that when portfolios are rebalanced every five or ten years, BTD investors outperformed BHR investors in terms of return, and underperformed in terms of risk and risk-adjusted return. With annual rebalancing, however, BTD investors underperformed BHR investors in terms of both risk and return, and significantly underperformed in terms of risk-adjusted return. This section explores the sensitivity of these results to changes in some of the choices made for the base case.

Exhibit 3 considers changes in the portfolio's asset allocation, from the 40% of bonds considered in the base case, to 20% (panel A), 60% (panel B), and 80% (panel C) invested in bonds, in all cases with the rest invested in stocks. The results for 20% and 60% in bonds when portfolios are rebalanced every five or ten years are similar to those already discussed for the base case; that is, BTD strategies outperformed BHR strategies in terms of return, and underperformed in terms of risk and risk-adjusted return. With annual rebalancing, however, the BTD strategies underperformed in terms of return, risk, and risk-adjusted return, the latter in a statistically-significant way.

Exhibit 3: BHR Benchmark – Sensitivity Analysis – Asset Allocation

This exhibit shows summary statistics for buy the dip (BTD) and buy-hold-rebalance (BHR) strategies, both starting with an allocation to bonds (*B*) varying between 20%, 60%, and 80%, with the rest allocated to stocks, and both rebalancing every 10 years (10Y), every 5 years (5Y), or every year (1Y), at the same time. BTD strategies transfer 25% of the bond position to stocks after every month with a negative return. The statistics include the mean annual compound return (MR); the terminal value of $100 invested for 30 years at MR (TV30); annualized volatility (SD); maximum drawdown (MD); and Sharpe ratio (SR). TV30 in dollars; MR, SD, and MD in percent.

	10Y Rebalancing		5Y Rebalancing		1Y Rebalancing	
	BTD	BHR	BTD	BHR	BTD	BHR
A: B = 20						
MR	9.3	8.7	9.2	8.6	8.6	8.7
TV30	1,429	1,221	1,402	1,195	1,183	1,219
SD	13.8	11.2	13.7	11.0	12.6	11.2
MD	−80.7	−73.2	−80.7	−72.2	−78.6	−72.4
SR	0.114	0.119	0.114	0.118	0.107	0.119
B: B = 60						
MR	9.1	7.0	8.9	6.9	6.9	6.9
TV30	1,353	769	1,275	734	738	745
SD	13.5	6.6	13.1	6.3	10.2	6.2
MD	−78.7	−50.2	−78.5	−45.3	−71.0	−42.9
SR	0.112	0.116	0.110	0.114	0.080	0.117
C: B = 80						
MR	9.0	6.0	8.7	5.8	6.0	5.8
TV30	1,312	567	1,211	546	570	547
SD	13.3	4.9	12.9	4.6	9.1	4.6
MD	−77.7	−30.8	−77.4	−24.0	−66.3	−20.6
SR	0.111	0.091	0.107	0.088	0.058	0.089

For an 80% allocation to bonds, BTD strategies outperformed BHR strategies in terms of return and underperformed in terms of risk. In terms of risk-adjusted return, BTD strategies outperformed BHR strategies when portfolios are rebalanced every five and ten years, and

underperformed with annual rebalancing. In short, Exhibit 3 suggests that the overall results for the base case are largely valid regardless of the asset allocation considered.

Exhibit 4 shows the results of a sensitivity analysis on the size of the dips, going from D_0 in the base case to D_3 (panel A), D_6 (panel B), D_9 (panel C), D_{12} (panel D), and D_{15} (panel E). For dips between D_3 and D_9 the results are similar to those of the base case; that is, when rebalancing every five and ten years BTD strategies outperformed BHR strategies in terms of return and underperformed in terms of risk and risk-adjusted return; and when rebalancing annually BTD strategies underperformed BHR strategies in terms of return and risk, and significantly underperformed in terms of risk-adjusted return.

Exhibit 4: BHR Benchmark – Sensitivity Analysis – Dips

This exhibit shows summary statistics for buy the dip (BTD) and buy-hold-rebalance (BHR) strategies, both starting with 40% allocated to bonds (and the rest to stocks) and rebalancing every 10 years (10Y), every 5 years (5Y), or every year (1Y), at the same time. BTD strategies transfer 25% of the bond position to stocks after every dip of size s (D_s), with s = –3% (D_3), –6% (D_6), –9% (D_9), –12% (D_{12}), and –15% (D_{15}). The statistics include the mean annual compound return (MR); the terminal value of $100 invested for 30 years at MR (TV30); annualized volatility (SD); maximum drawdown (MD); and Sharpe ratio (SR). TV30 in dollars; MR, SD, and MD in percent.

	10Y Rebalancing		5Y Rebalancing		1Y Rebalancing	
	BTD	BHR	BTD	BHR	BTD	BHR
A: D_3						
MR	9.0	7.9	8.9	7.8	7.6	7.9
TV30	1,345	988	1,285	950	895	973
SD	13.1	8.8	12.4	8.5	10.2	8.5
MD	–79.2	–63.1	–78.2	–60.5	–71.0	–59.8
SR	0.114	0.121	0.114	0.120	0.098	0.121
B: D_6						
MR	8.6	7.9	8.5	7.8	7.8	7.9
TV30	1,198	988	1,144	950	951	973
SD	11.9	8.8	11.1	8.5	9.5	8.5
MD	–76.9	–63.1	–75.9	–60.5	–68.8	–59.8
SR	0.112	0.121	0.114	0.120	0.109	0.121
C: D_9						
MR	8.2	7.9	8.0	7.8	7.8	7.9
TV30	1,061	988	1,012	950	946	973
SD	11.2	8.8	10.4	8.5	9.3	8.5
MD	–76.0	–63.1	–75.0	–60.5	–68.7	–59.8
SR	0.107	0.121	0.108	0.120	0.111	0.121
D: D_{12}						
MR	8.1	7.9	8.0	7.8	7.9	7.9
TV30	1,028	988	996	950	966	973
SD	10.5	8.8	10.0	8.5	9.1	8.5
MD	–71.9	–63.1	–70.2	–60.5	–64.0	–59.8
SR	0.109	0.121	0.110	0.120	0.115	0.121
E: D_{15}						
MR	8.0	7.9	7.9	7.8	7.9	7.9
TV30	1,016	988	983	950	978	973
SD	9.6	8.8	9.1	8.5	8.7	8.5
MD	–67.2	–63.1	–65.1	–60.5	–60.9	–59.8
SR	0.116	0.121	0.117	0.120	0.120	0.121

There are not many monthly returns lower than –12% and –15% in the sample, which renders the results for D_{12} and D_{15} somewhat more limited. For D_{15}, in particular, there are only five events in which BTD strategies deploy bonds to take advantage of dips, which implies that the results for both types of strategies are very similar. In any case, the overall results from Exhibit 4 largely confirm the results for the base case, regardless of the size of the dips considered.

Finally, Exhibit 5 shows the results of performing sensitivity analysis on the size of the cash transfer from bonds to stocks in order to take advantage of dips, from the 25% of the position in bonds in the base case to 50% (panel A), 75% (panel B), and 100% (panel C). Once again the overall results largely hold, with BTD strategies outperforming BHR strategies in terms of return and underperforming in terms of risk and risk-adjusted return, the latter in a statistically-significant way with annual rebalancing in all three panels.

Exhibit 5: BHR Benchmark – Sensitivity Analysis – Cash Transfers

This exhibit shows summary statistics for buy the dip (BTD) and buy-hold-rebalance (BHR) strategies, both starting with 40% allocated to bonds (and the rest to stocks) and rebalancing every 10 years (10Y), every 5 years (5Y), or every year (1Y), at the same time. BTD strategies transfer a proportion T of the bond position to stocks after every month with a negative return, with T = 50%, 75%, and 100%. The statistics include the mean annual compound return (MR); the terminal value of $100 invested for 30 years at MR (TV30); annualized volatility (SD); maximum drawdown (MD); and Sharpe ratio (SR). TV30 in dollars; MR, SD, and MD in percent.

	10Y Rebalancing		5Y Rebalancing		1Y Rebalancing	
	BTD	BHR	BTD	BHR	BTD	BHR
A: T = 50						
MR	9.1	7.9	9.1	7.8	7.9	7.9
TV30	1,376	988	1,345	950	975	973
SD	13.8	8.8	13.7	8.5	12.6	8.5
MD	–81.5	–63.1	–81.5	–60.5	–79.9	–59.8
SR	0.111	0.121	0.110	0.120	0.092	0.121
B: T = 75						
MR	9.1	7.9	9.1	7.8	8.0	7.9
TV30	1,370	988	1,354	950	1,010	973
SD	13.9	8.8	13.8	8.5	13.2	8.5
MD	–81.8	–63.1	–81.8	–60.5	–81.9	–59.8
SR	0.111	0.121	0.110	0.120	0.092	0.121
C: T = 100						
MR	9.1	7.9	9.1	7.8	8.1	7.9
TV30	1,367	988	1,359	950	1,024	973
SD	13.9	8.8	13.9	8.5	13.4	8.5
MD	–82.0	–63.1	–82.0	–60.5	–82.7	–59.8
SR	0.111	0.121	0.110	0.120	0.092	0.121

To summarize, the sensitivity analysis performed in this section largely confirms and in fact reinforces the results of the base case. More precisely, when portfolios are rebalanced every five or ten years, relative to BHR strategies, BTD strategies generally outperformed in terms of return and underperformed in terms of risk and risk-adjusted return, although the latter not in a statistically-significant way. When portfolios are rebalanced annually, in turn, BTD strategies had mixed results in terms of return, but did underperform in terms of risk and risk-adjusted return, in the latter case more often than not in a statistically-significant way.

3.5. Investment Strategies – B&H Benchmark

The analysis of the previous two sections evaluates BTD strategies against passive BHR strategies with the same asset allocation and rebalancing frequency. As already mentioned, in such set up the bond allocation should not be viewed as having an opportunity cost; rather, it should be thought of as being a target (and consistent) slice of the portfolio, but one that is open to be deployed to take advantage of dips in stocks.

An alternative way of assessing BTD strategies is to compare them to a passive buy-and-hold (B&H) portfolio of stocks. In this case, the goal is to be fully invested in stocks *except* for a slice of the portfolio that is stashed away in bonds (a 'war chest') ready to be deployed after dips in stock prices.[6] Importantly, from this perspective the bond allocation of the BTD strategies does have an opportunity cost because it is there *only* waiting for the opportunity to be deployed. In other words, bonds are not a target and consistent slice of the portfolio's asset allocation, as was the case with the BHR strategies; rather, they are a low-return investment only waiting for the opportunity to buy stocks after a dip in their price.

Also importantly, note that unless a BTD strategy delivers exceptional results, it would be expected to underperform the B&H strategy in terms of return, simply because the former bears the opportunity cost of the bond allocation whereas the latter is always fully invested in stocks. Similarly, the BTD strategy would be expected to be less risky than the B&H strategy simply because the former is partially invested in bonds and the latter is always fully invested in stocks. Risk-adjusted returns, in turn, could go either way depending on the relative magnitude of the decrease in return and risk.

Exhibit 6 shows the results for some BTD strategies and the B&H strategy. The results of the BTD strategies are those for the base case, as well as those for the sensitivity analysis but limited to the rebalancing frequency with the highest Sharpe ratio.[7] Panels A and B show that, relative to the B&H strategy, the base case (BC) of the BTD strategy delivered a lower annual return (9.2% vs. 9.4%) with lower annual volatility (13.6% vs. 14.0%) and a smaller drawdown (–79.7 vs. –81.8). But ultimately, the BTD strategy did not outperform the B&H strategy in terms of risk-adjusted return (0.013 vs. 0.015).

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[6] Alternatively, this set up can be thought of as having a target asset allocation of 100% in stocks, except for a 'war chest' ready to be deployed when the opportunity (a dip) arises.

[7] To clarify, the exhibits of the previous section show, for each changing variable in the sensitivity analysis, results for three rebalancing frequencies. Exhibit 6, in turn, reports results only for the 'best' of the three rebalancing frequencies as determined by the highest Sharpe ratio.

Exhibit 6: B&H Benchmark

This exhibit shows summary statistics for a buy-and-hold (B&H) strategy that is fully invested in stocks in panel A. It also shows results for the base (BC) of the buy the dip strategy in panel B; sensitivity analysis for dips of different size in panel C, different bond allocations in panel D, and different cash transfers from bonds to stocks to take advantage of dips in panel E. The statistics include the mean annual compound return (MR); the terminal value of $100 invested for 30 years at MR (TV30); annualized volatility (SD); maximum drawdown (MD); and Sharpe ratio (SR). Panels B through E show only the rebalancing frequency with the highest SR. All figures in percent except for TV30 (in dollars) and SR.

	A: B&H	***B: BC***	***C: Dips***				
			–3	–6	–9	–12	–15
MR	9.4	9.2	8.9	8.5	7.8	7.9	7.9
TV30	1,465	1,392	1,285	1,144	946	966	978
SD	14.0	13.6	12.4	11.1	9.3	9.1	8.7
MD	–81.8	–79.7	–78.2	–75.9	–68.7	–64.0	–60.9
SR	0.115	0.113	0.114	0.114	0.111	0.115	0.120
		D: Bond Allocation			***E: Cash Transfer***		
		20	60	80	50	75	100
MR	9.4	9.3	9.1	9.0	9.1	9.1	9.1
TV30	1,465	1,429	1,353	1,312	1,376	1,370	1,367
SD	14.0	13.8	13.5	13.3	13.8	13.9	13.9
MD	–81.8	–80.7	–78.7	–77.7	–81.5	–81.8	–82.0
SR	0.115	0.114	0.112	0.111	0.111	0.111	0.111

The sensitivity analysis in terms of different dip sizes (panel C) shows similar results; that is, relative to the B&H strategy, the BTD strategies delivered lower return with lower volatility and smaller drawdowns, but did not manage to outperform in terms of risk-adjusted return, except in the case of 12% dips. In this case, the Sharpe ratio of the BTD strategy is very marginally higher than that of the B&H strategy (0.1149 vs. 0.1148).

The sensitivity analysis for different bond allocations (panel D) and different cash transfers from bonds to stocks to take advantage of dips (panel E) again confirms that relative to the B&H strategy, the BTD strategies delivered lower return with lower volatility and smaller drawdowns (except for cash transfers of 75% and 100%, in which case the drawdowns are very slightly larger than those of the B&H strategy), but again did not outperform in terms of risk-adjusted return.

In short, then, the results of evaluating BTD strategies relative to a different benchmark (than that used in the previous two sections), yields both different and similar results. Different results because relative to a B&H benchmark BTD strategies delivered lower return with lower risk, rather than higher return with higher risk as was the case relative to BHR benchmarks. But ultimately similar results in the sense that BTD strategies did not outperform the B&H strategy in terms of risk-adjusted return, as was also the case relative to the BHR benchmarks.

3.6. Further Thoughts

This section rounds up the inquiry with some caveats and further analysis. Beginning with caveats, as is fairly standard in the literature, the analysis here ignores transaction costs and taxes. Regarding the former, they are bound to be higher for the BTD strategies than for both

benchmark strategies. Therefore, transaction costs would marginally shrink the positive differential return of the BTD strategies relative to the BHR strategies, and marginally enlarge the negative differential return of the BTD strategies relative to the B&H strategy.

When BTD strategies are evaluated relative to the B&H strategy, another potential caveat is the use of 10-year U.S. Treasury Notes to park the capital to be deployed after dips. This is because the higher return of these notes relative to shorter-term maturities (more typically used as proxies for cash) mitigates the opportunity cost of BTD strategies. As already mentioned, the use of 10-year notes is due to its long history, which enables a longer-term analysis, but their impact on the opportunity cost of BTD strategies invites further analysis.

Exhibit A2 in the appendix considers a case biased in the opposite direction; that is, it assumes that the capital parked to be deployed after dips earns a 0 nominal return, or, put differently, it is simply stashed under the mattress. As the figures in the exhibit show, the overall results generally point again in the same direction, with BTD strategies delivering lower return and risk relative to the B&H strategy, but ultimately failing to enhance risk-adjusted returns. Therefore, the use of 10-year notes to temporarily park the capital to be deployed after dips does not determine the main results of the analysis.

Finally, because BTD strategies tend to increase return and risk relative to BHR strategies, and do the opposite relative to the B&H strategy, an interesting issue to explore is the level of risk aversion an investor would need to have so that the utility obtained from BTD strategies is higher than that obtained from BHR and B&H strategies. To elaborate, consider the standard mean-variance utility function given by the expression

$$U_p = R_p - (\lambda/2)\cdot V_p \quad (1)$$

where U_p, R_p and V_p denote the utility, mean return, and variance of portfolio p, and λ is the coefficient of relative risk aversion. Therefore, the issue is what values of λ imply that

$$U_{BTD} = R_{BTD} - (\lambda/2)\cdot V_{BTD} > U_{BHR} = R_{BHR} - (\lambda/2)\cdot V_{BHR} \quad (2)$$

$$U_{BTD} = R_{BTD} - (\lambda/2)\cdot V_{BTD} > U_{B\&H} = R_{B\&H} - (\lambda/2)\cdot V_{B\&H} \quad (3)$$

Exhibit A3 in the appendix, which shows monthly arithmetic mean returns (AM) and volatility (SD), as well as the λs implied by the expressions above, aims to answer this question for the base case of BTD strategies.

Panel A focuses on the comparison between BTD and BHR strategies. The λs implied by expression (2) for rebalancing frequencies of ten and five years are similar (3.10 and 3.14) and fairly different from that for annual rebalancing (0.59); this is because in this last case the BTD

strategy barely increases returns.[8] Importantly, because BTD strategies are riskier than BHR strategies, the former outperform the latter in terms of utility when λ is *lower* than the figures in the exhibit.

Panel B of the same exhibit focuses on the comparison between BTD and B&H strategies. The λs implied by expression (3) for the ten-year (4.15), five-year (4.39), and annual (5.39) rebalancing frequencies are all fairly high. Importantly, because BTD strategies are less risky than the B&H strategy, the former outperform the latter in terms of utility when λ is *higher* than the figures in the exhibit.

For some perspective on the value of the coefficient of relative risk aversion, consider that early work by Friend and Blume (1975) finds that the λ for the typical household is higher than 1, and likely higher than 2. This is broadly consistent with the findings of Paravisini et al (2017), who estimate λ from the actual financial decisions of investors and find a median of 1.62 and an average of 2.85. And it is also broadly consistent with Choukhmane et al (2026), who estimate λ from the asset allocation of 401(k) plans and find an implied value of 2.54. Estrada and Kritzman (2019) find no differences in the asset allocations selected by investors with λ higher than 3.

Other researchers tend to argue in favor of somewhat lower values for the coefficient of relative risk aversion. Gandelman and Hernández-Murillo (2014) estimate λ at the aggregate level for 75 countries and obtain a value close to 1 for most countries and a cross-sectional average of 0.98. Thomas (2016) reports that the UK Treasury recommends using λ=1. And Levy (2024) argues that λs outside the 0.75-1.15 range yield paradoxical choices that very few individuals would make, thus concluding that λ must be close to 1 (a value consistent with log utility).

Note that, as the AM and SD figures in Exhibit A3 show, BTD strategies are evaluated here relative to two different benchmarks, one that delivers relatively lower return and risk (BHR) and the other that delivers relatively higher return and risk (B&H). This explains why, in terms of utility, BTD strategies would be preferred over BHR strategies by investors with relatively 'low' risk aversion (lower than the λs in panel A) and over the B&H strategy by investors with relatively 'high' risk aversion (higher than the λs in panel B).

4. Assessment

It may seem plain common sense that buying a desired asset after its price declined is a beneficial strategy for investors. And yet some reflection suggests that such thinking is preliminary at best; in fact, it rests on some assumptions that may or may not be true. First, it

[8] For annual rebalancing, Exhibit 2 shows that the BTD strategy underperforms the BHR strategy in terms of return, which is the opposite of what Exhibit A3 shows, but there is no contradiction. Exhibit 2 shows *geometric* mean returns (in annual terms) and Exhibit A3 shows *arithmetic* mean returns (in monthly terms). Geometric returns are typically used to describe performance and arithmetic returns are typically used in mean-variance utility.

assumes that the dip in price is not based on permanent or fundamental reasons but on an overreaction to some negative event that the market will soon correct. Needless to say, that may or may not be the case; it is possible that an investor may be either profitably buying a dip or detrimentally catching a falling knife.

Second, it assumes that if the asset price does resume its upward trend it does so within the investor's holding period, which of course may or may not be the case. Third, it assumes that the opportunity cost of the capital to be deployed to take advantage of dips, which may stem from selling an asset or keeping a cash reserve, is lower than the benefits obtained from buying after dips. And fourth, focusing just on returns provides a limited perspective relative to the broader (and correct) focus on both return and risk, and ultimately on risk-adjusted return.

The analysis here evaluates BTD strategies against two different passive benchmarks. Relative to BHR strategies with the same asset allocation and rebalancing frequency, the bulk of the evidence suggests that BTD strategies deliver higher return and risk but do not enhance risk-adjusted returns. Moreover, frequent rebalancing, particularly in annual terms, tends to mitigate the return advantage and to amplify the risk-adjusted return disadvantage. Relative to a B&H strategy instead, BTD strategies tend to deliver lower return and risk, but again, no superior risk-adjusted return. These results are largely robust across different asset allocations, dip sizes, and cash transfers from bonds to stocks to take advantage of dips.

Although BTD strategies generally underperform the two passive benchmarks considered here in terms of risk-adjusted return, their impact on risk and return separately does depend on which benchmark is used. Given that most investors combine stocks and bonds in their portfolios, the BHR benchmark seems to be the more appropriate of the two. For this reason, the more practical conclusion from the evidence here is that, for the typical investor, BTD strategies tend to increase return and risk, but ultimately fail to enhance risk-adjusted return. Therefore, only those investors with relatively 'low' risk aversion, largely focusing on return and downplaying risk, would tend to prefer BTD strategies over BHR strategies.

To conclude, and importantly, this article does *not* suggest that investors should not buy on dips. Rather, it suggests that investors should carefully consider, first, whether the dip is likely to be permanent or temporary; second, the impact of buying on dips not just on the return but also on the risk and risk-adjusted return of their portfolios; and third, the impact of transaction costs, particularly in the case of investors that engage in this practice often. Given the right conditions, buying after dips is in fact likely to enhance returns and benefit investors who largely focus on them, but then again, a broader evaluation is generally desirable.

Appendix

Exhibit A1: Data – Summary Statistics

This exhibit shows in panel A summary statistics for the monthly series of price returns (capital gains/losses) and total returns (capital gains/losses plus dividends) for stocks, bond returns, and the 10-year yield of U.S. Treasury Notes; and in panel B the number of dips of size s (D_s) in the sample. The statistics include the number of monthly observations (Obs), the arithmetic (AM) and geometric (GM) mean return, the standard deviation (SD), and the lowest (Min) and highest (Max) monthly return. The sample period is Feb/1871 through Dec/2025. All figures but Obs in percent.

A: Summary Statistics	Obs	AM	GM	SD	Min	Max
Price Return	1859	0.48	0.40	4.05	–26.47	50.30
Total Return	1859	0.83	0.75	4.05	–26.19	51.31
Bond Return	1859	0.38	0.38	1.28	–8.26	10.90
10-Year Yield	1859	0.36	0.36	0.18	0.05	1.19
B: Dips	D_0	D_3	D_6	D_9	D_{12}	D_{15}
Obs	766	265	86	37	18	5

Exhibit A2: Sensitivity Analysis – No Return on Bonds

This exhibit shows summary statistics for a buy-and-hold (B&H) strategy that is fully invested in stocks in panel A. It also shows results for the base (BC) of the buy the dip strategy in panel B; sensitivity analysis for dips of different size in panel C, different bond allocations in panel D, and different cash transfers from bonds to stocks to take advantage of dips in panel E. The return on bonds and the risk-free rate set at 0. The statistics include the mean annual compound return (MR); the terminal value of $100 invested for 30 years at MR (TV30); annualized volatility (SD); maximum drawdown (MD); and Sharpe ratio (SR). Panels B through E show only the rebalancing frequency with the highest SR. All figures in percent except for TV30 (in dollars) and SR.

	A: B&H	***B: BC***	***C: Dips***				
			–3	–6	–9	–12	–15
MR	9.4	9.0	8.6	7.3	6.0	6.0	6.0
TV30	1,465	1,343	1,204	831	569	573	579
SD	14.0	13.6	13.1	11.2	9.1	8.9	8.5
MD	-81.8	-79.8	-79.4	-76.4	-69.8	-65.4	-62.5
SR	0.205	0.204	0.202	0.199	0.197	0.202	0.211
		D: Bond Allocation			***E: Cash Transfer***		
		20	60	80	50	75	100
MR	9.4	9.2	8.9	8.7	9.1	9.1	9.1
TV30	1,465	1,404	1,282	1,220	1,352	1,353	1,353
SD	14.0	13.8	13.5	13.3	13.8	13.9	13.9
MD	-81.8	-80.8	-78.9	-77.9	-81.5	-81.9	-82.1
SR	0.205	0.205	0.202	0.200	0.202	0.201	0.201

Exhibit A3: Risk Aversion and Strategy Selection

This exhibit shows summary statistics for the series of monthly returns of buy the dip (BTD), buy-hold-rebalance (BHR), and buy and hold (B&H) strategies. BTD and BHR strategies are rebalanced every 10 years (10Y), every five years (5Y), or every year (1Y), at the same time. The statistics include the arithmetic mean return (AM), volatility (SD), and coefficient of relative risk aversion (λ) implied by expressions (2) and (3) in the text. Figures for BTD strategies are for the base case. AM and SD in percent.

	10Y Rebalancing		5Y Rebalancing		1Y Rebalancing	
A: BTD vs. BHR	BTD	BHR	BTD	BHR	BTD	BHR
AM	0.81	0.67	0.80	0.66	0.68	0.66
SD	3.93	2.54	3.86	2.45	3.28	2.47
Implied λ	3.10		3.14		0.59	
B: BTD vs. B&H	BTD	B&H	BTD	B&H	BTD	B&H
AM	0.81	0.83	0.80	0.83	0.68	0.83
SD	3.93	4.05	3.86	4.05	3.28	4.05
Implied λ	4.15		4.39		5.39	

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