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On Benefits of Augmented Dollar Cost Averaging

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Abstract

Dollar Cost Averaging (DCA) is a popular investment approach, where one invests funds in increments, at periodic intervals, rather than allocate funds all at once, in a lump sum. The idea behind averaging into the market is that it not only lowers average price of an asset, but also lessens volatility of that assets' performance. Despite theoretical criticisms, it is a widely prevalent investment technique. Kapalczynski and Lien (2021) augmented the traditional DCA approach by using conditional information to adjust aggressiveness of DCA. The Augmented Dollar Cost Averaging (ADCA) calls for allocating larger portion of funds into the market over shorter period of time, when economy is expanding, and allocating smaller amounts into the marker, when economy is receding. To determine expansions or recessions, Kapalczynski and Lien (2021) used changes in market volatility, unemployment and capacity utilization. Using Sharpe ratio and stochastic dominance criteria they showed statistically significant risk-reduction benefits of ADCA in the U.S. stock market between 1967 and 2018.

Keywords: Dollar-Cost averaging • Unemployment • Capacity utilization • Volatility • Economic indicator • Retirement investment

Introduction

Dollar Cost Averaging (DCA) is a popular investment approach, where one invests funds in increments, at periodic intervals, rather than allocates funds all at once, in a lump sum. For example, if one has $1,000 of investable funds, they could invest $100 per month for 10 months (DCA) or invest all at once (Lump Sum investment). The idea behind averaging into the market is that it not only lowers average price of an asset, but also lessens volatility of that asset's performance. DCA has been a go-to investment approach in retirement accounts for a very long time and has also been subject of academic research in the last forty years. While it has been criticized for its raw returns, when compared to Lump Sum (LS) investing [1-7], behavioral finance academics have praised DCA's suitability for risk-averse investors. Prospect theory of Tversky and Kahneman [8] explains that investors are more risk-averse in gains than in losses. Statman [9] posed that investors wanting to avoid experiencing regret can use DCA to lower risk of seeing their entire lump sum investment produce a poor return [9-17]. What is more, DCA approach has long shown risk-reduction benefits among different asset classes, particularly in volatile markets [14,16,18, 19,] therefore used economic indicators to predict recessions, when financial markets are typically more volatile, and expansions, when markets are less volatile on average.

Literature Review

Augment dollar-cost average

Kapalczynski and Lien's (2021) [18] Augmented Dollar-Cost Average (henceforth ADCA) adjusts the amount of investment during the initial investment period using fundamental market indicators. Using volatility changes, unemployment and capacity utilization rates, and the investor determines whether markets are expanding or receding. If markets are expanding, investor allocates larger percentage of funds over shorter period of time, and if economy if receding, investor allocates smaller percentage of funds over longer period of time. Namely, investor has $1,200 of funds to allocate. Under LS strategy, they would invest all $1,200 all at once. The traditional DCA method would call for splitting the $1,200 into equal chunks and investing them over some period of time. Kapalczynski and Lien (2021) followed a $100-for-12-months DCA approach. Their augmented version (ADCA) included investing $80 (or 6.7% of funds) over 15-month period, if economy was in recession, and $100 (or 8.3% of funds) over 12-month period if economy was in expansion. The goal here is to invest more, quicker, when markets are on the upswing, and spread investable time and funds, when market can possibly exhibit further losses during recession. This approach aims at minimizing average price paid for asset and volatility of returns. What is more, the risk-reducing properties of ADCA, and rule-based approach, lowers possibility that risk-averse investors would hold off from investing funds when markets are down, or further, withdraw funds prematurely during adverse market conditions [13, 20].

Market indicators

Market indicators were chosen guided by Campbell and Cochrane [21] habit formation model and the Lettau and Ludvigson [22] consumption-wealth ratio model. Those two models showed that market direction can be anticipated by examining variables that determine consumption and investment. Unemployment is one of the well-known business indicators as changes in labor supply can have a direct influence on the economy, and therefore, the stock market [23]. Capacity utilization is another indictor used in Kapalczynski and Lien's [18] ADCA, as it shows where the economy is in terms of utilization and production [24-27]. Additionally, given that markets are typically more volatile during recessionary periods, changes in market volatily, determined by comparing 60-month and 10-month standard deviations of monthly returns, and were used to indicate where financial markets were.

If difference between 60-month and 10-month standard deviations of returns was positive (long-term volatility was greater than short-term volatility), overall market volatility was decreasing and larger investment amounts of $100 were invested over 12 months. If, on the other hand, the difference between 60-month and 10-month standard deviation of returns was negative, market volatility was deemed as increasing and $80 over 15 months were invested. Kapalczynski and Lien [18] sourced U3 unemployment rate from Bureau of Labor Statistics [18]. A peak in unemployment rate indicated beginning of economic expansion and more aggressive investment of $100 over 12 months. Conversely, a trough in unemployment signaled economic peak and beginning of recession, therefore a more conservative investment of $80 over 15 months. Lastly, total capacity utilization rate was sourced from the Federal Reserve website. A peak in capacity utilization meant beginning of recession and more conservative, $80 investment over 15 months. A trough in capacity utilization meant beginning of economic expansion and time for more aggressive, $100 investment over 12 months [28, 29].

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Data and methods

Kapalczynski and Lien (2021) used Center for Research in Security Prices (CRSP) for total equity returns of Large Cap, Mid Cap, and Small Cap U.S. stocks, and Ibbotson Associates data for 10-year Corporate US bonds and 4-week U.S. Treasury Bill. All data were from January 1967 to December 2018. Lump Sum (LS) and traditional Dollar-Cost Averaging (DCA) of investing $100 over 12 months returns were compared to three Augmented Dollar-Cost Averaging (ADCA) strategies conditioned by market volatility, unemployment and capacity utilization. Each of these investments was held for 30-years, as this is an average investable period for retirement accounts. Total returns of Large Cap U.S. stocks, Mid Cap U.S. stocks, Small Cap U.S. stocks, 10-year Corporate Bonds, and portfolios composed of a mix of Large, Mid and Small cap equities, as well as stocks and bonds were calculated under each of the 5 strategies (benchmark LS, traditional DCA, and volatility ADCA, unemployment ADCA, and capacity utilization ADCA). Total returns of these investments were compared to benchmark LS on a risk-adjusted basis, using Sharpe ratios and stochastic dominance [18]. Funds not invested during the initial period were allocated into Treasury Bills earning risk-free rate. For example, if in month 1, investor allocated $100 of their $1,200 into Small Cap stocks, the remaining $1,100 would be invested in Treasury Bills. In month 2, additional $100 would be invested in Small Cap stocks and $1,000 would remain in Treasury Bills until funds invested at risk-free rate were depleted.

Implications

The ADCA strategy outperformed both the traditional DCA and LS investing in most cases. Unemployment, capacity utilization and market volatility did indeed consistently forecast business cycles, and therefore were reliable predictors for the augment investment approach. The main results are reprinted from Kapalczynski and Lien (2021) in Table 1. For example, the mean annual return of a 100% Small Cap portfolio using ADCA unemployment strategy was 12.75%, while the LS strategy yielded 12.63%. While the return difference itself may not be overwhelming, when factoring the risk-reduction of the strategy, the results are significant at 0.0001%. One can find similar comparisons across different portfolios examined. Consistent with Abeysekera and Rosenbloom [19] the ADCA was most advantageous for more volatile asset classes such as Small and Mid-Cap Stocks (Table 1).

Table1. Main Results reprinted from Kapalczynski in 2021.

Portfolio allocation	Statistic	Buy and hold LS benchmark $1,200	DCA 12 12 months 100 a month	ADCA volatility 12 or 15 months $100 or $80	ADCA unemployment 12 or 15 months $100 or $80	ADCA capacity utilization 12 or 15 months $100 or $80
100% Large cap	Mean	11.37%	11.39%	11.40%	11.42%	11.39%
	St.Dev	1.05%	1.07%	1.04%	1.04%	1.08%
	Sharpe	5.749	5.614	5.824	5.812	5.583
	FSD pval	-	0.016	0.01	0.0599	0.1299
	SSD pval	-	0.4745	0.4625	0.6953	0.6503
100% Mid cap	Mean	11.80%	12.45%	12.46%	12.45%	12.43%
	St.Dev	1.32%	0.51%	0.51%	0.51%	0.51%
	Sharpe	4.889	13.869	13.904	13.911	13.956
	FSD pval	-	0	0.0769	0.0929	0.038
	SSD pval	-	0.992	0.8222	0.7582	0.7193
100% Small cap	Mean	12.63%	12.73%	12.74%	12.75%	12.74%
	St.Dev	1.77%	1.74%	1.72%	1.72%	1.72%
	Sharpe	4.098	4.237	4.286	4.287	4.277
	FSD pval	-	0.006	0.013	0	0.001
	SSD pval	-	0.5904	0.6623	0.4296	0.6763
100% Government bonds	Mean	9.26%	9.26%	9.27%	9.26%	9.27%
	St.Dev	0.76%	0.76%	0.75%	0.76%	0.76%
	Sharpe	5.129	5.153	5.181	5.165	5.142
	FSD pval	-	0.1648	0.032	0.0749	0.045
	SSD pval	-	0.9311	0.7053	0.9101	0.8691
100% Corporate bonds	Mean	9.25%	9.24%	9.24%	9.24%	9.24%
	St.Dev	0.68%	0.67%	0.66%	0.66%	0.67%
	Sharpe	5.746	5.825	5.844	5.851	5.818
	FSD pval	-	0.1119	0.1558	0.0519	0.1339
	SSD pval	-	0.7692	0.8182	0.6124	0.8142
100% Equity	Mean	11.81%	11.82%	11.90%	11.89%	11.88%
	St.Dev	1.15%	1.17%	1.12%	1.12%	1.13%
	Sharpe	5.608	5.52	5.818	5.834	5.747
	FSD pval	-	0	0.2328	0	0
	SSD pval	-	0.8382	0.6374	0.5524	0.4466
50% Equity/50% Bonds	Mean	10.76%	10.78%	10.80%	10.79%	10.78%
	St.Dev	0.84%	0.85%	0.69%	0.69%	0.69%
	Sharpe	6.451	6.403	7.874	7.925	7.832
	FSD pval	-	0.0396	0.041	0.0929	0.1469
	SSD pval	-	0.9371	0.7383	0.7972	0.9061
80% Equity/20% Bonds	Mean	11.44%	11.45%	11.47%	11.49%	11.48%
	St.Dev	1.03%	1.05%	0.93%	0.92%	0.93%
	Sharpe	5.87	5.791	6.601	6.65	6.561
	FSD pval	-	0	0.035	0.2597	0.01
	SSD pval	-	0.99	0.7303	0.9311	0.6104
Risk-free rate 3.34%	N	265	265	265	265	265

These results can help risk-averse investors improve their risk-adjusted returns and bring ease to investing into more volatile, higher return asset classes. If unemployment, capacity utilization or asset volatility changes suggest recession, investors may enter the market less aggressively, while they can enter more quickly, if markets are expanding. This strategy can be easily adapted to different investment situations [30]. For example, Kapalczynski and Lien (2021) outline how a full $6,000 Roth IRA contribution can be augmented by evaluating one of ADCA indicators, and choose money allocation accordingly. Similarly, 401-K or even individual investment account contributions can benefit from the same approach. Kapalczynski and Lien (2021) further stress that, while their analysis was done on 12- and 15-month spans, ADCA can work on other time-frames and perhaps further research can optimize returns under investable time frames [31,32].

Conclusion

While Dollar Cost Averaging has been criticized for inefficiencies for decades, Kapalczynski and Lien show that adjusting entry time-frame depending on economic conditions, can not only improve returns, but also lower portfolio volatility. Using asset volatility changes, unemployment and capacity utilization to assess where financial markets are going, can aide risk-averse investors in making market-entry decisions, particularly when considering volatile assets such as Mid Cap and Small Cap stocks.

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