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4 Dollar-Cost Averaging: Emotional Panacea or Logical Fallacy?

Talk to average Canadian investors about their approach to investing, and the expression "dollar-cost averaging" is sure to be mentioned in the first sentence or two. Indeed, it seems as if dollar-cost averaging has become synonymous with the process of investing itself.

For the record, dollar-cost averaging — or DCA for short — is a systematic investment strategy in which a fixed dollar amount is invested on a regular basis in a particular stock or mutual fund. An alternative to the DCA strategy is to invest the entire amount available in the stock or mutual fund immediately.

For example, consider an investor with $6,000 available to invest over the next year. Using a DCA strategy, $500 is invested every month in the same mutual fund, regardless of the value per unit of the fund. The remainder of the $6,000 of available funds is invested in a risk-free GIC or bank account until they are invested in the mutual fund.

According to the innumerable advocates of DCA, this method of investing has the benefit of getting more units when prices are lower, and fewer units when prices are higher. The cheaper the price, the more units you buy; conversely, the more expensive the price, the fewer units you acquire. Lo and behold, at the end of the year you will find that the average

cost of the fund units you've purchased is *lower* than the average price of the fund units during the year.

In our example, consider a situation where the value per unit of the mutual fund is $50 in January. In that case, the amount available for investment, $500, is divided by the value per unit, $50, to determine the number of units that are to be purchased. Hence, 10 units are purchased in January. If the value per unit drops to $25 in February, then 20 units are purchased in February, as $500 divided by $25 equals 20. Should the value per unit jump to $100 in March, then five units are purchased in March, as $500 divided by $100 equals five. The number of units purchased in each subsequent month is determined using a similar method.

The average value per unit over the three months is equal to $58.33. But by using the DCA strategy, 35 units are purchased over the three months, costing $1,500, with an average value of $42.86 per unit.

As we see, cost per unit is significantly lower using dollar-cost averaging — and therefore DCA is a superior investment strategy. So goes the steady pitch from financial planners, investment advisors, stockbrokers and, even, mutual fund companies themselves. Buy, continue to buy, and never stop buying. After all, with DCA, you can never go wrong: When prices are high, you buy. When prices are low, you buy. And in both cases, advocates argue, you're doing the right thing!

You may be surprised to learn that many finance professors, such as myself, have decried the inefficiency and outright abuse of this strategy for about as long as DCA has been preached as gospel.

That's right. In my opinion, DCA is *inefficient*, and is not a good idea. Sounds odd? Well, let me try to explain.

You should realize that DCA is essentially a "bearish" bet on the markets. You buy a few units

now, in the hope that you will be able to buy even more units when they become cheaper. That boils down to market timing, plain and simple. Why? Because purchasing fewer units when prices are higher suggests that the investor expects prices to go down. Similarly, purchasing more units when prices are lower suggests that the investor expects prices to rise.

But modern finance theory argues that market timing is not a rational investment strategy, as it requires the investor to have premonitions regarding the future values of the asset. While we *can* look back and determine what was the best time to buy and best time to sell assets, in an efficient market where prices quickly and accurately reflect all relevant information, there is no way to determine these times before the fact.

Further, if you truly are confident regarding the future direction of the asset value, why invest *any* money when value is high? After all, if you expect asset values to decrease, why not simply wait until the decrease in value occurs before investing? For example, if you believe that the unit price for a mutual fund you wish to invest in will decrease over the next month, you shouldn't purchase *any* units this month. Similarly, if you expect prices to go up, you should invest as much as possible immediately, and not spread your investment out over time. The suggestion that a fixed amount should be invested in any given month suggests that the investor is unsure about the future, and therefore hesitant. As a timing strategy, DCA is a half-hearted effort.

Proponents of DCA are quick to rebut that investing in the equity markets slowly, as opposed to all at once, reduces volatility. Any reduction in volatility is welcomed, as it reduces the risk associated with the investment strategy.

TABLE 4

*Allocated to Fund**	*Expected Wealth*	*Standard Deviation*
$10,000	$11,250	$2,000
$ 7,500	$11,062	$1,500
$ 5,605	$10,920	$1,121
$ 4,942	$10,871	$ 980
$ 2,500	$10,688	$ 500
$ 0	$10,500	$ 0
DCA	$10,871	$1,121

* The remainder — not allocated to the fund — is allocated to the GIC.

Source: M.A. Milevsky and S. Posner, "A Continuous-Time Analysis of the Risks and Rewards from Dollar-Cost Averaging," forthcoming, *International Journal of Theoretical and Applied Finance*, World Scientific Publishing, 2003.

But the truth is the exact opposite. A far more efficient alternative to DCA is to split your money and put half of it into an equity fund *right now* and the other half into a GIC *right now*. In other words, if you have a choice, don't wait to invest.

Table 4 — extracted from a research paper that I wrote with Steven Posner a few years ago — should give you a sense of the reward-and-risk tradeoff from the two different methods of investing. As I will demonstrate, our results clearly show that the DCA strategy does not result in superior returns, even after adjusting for risk.

The table considers a number of investment strategies that an investor with $10,000 may choose. The first six strategies are a variety of immediate investments in a mutual fund, ranging from the entire

$10,000 available to zero. The final strategy is the DCA strategy, where one-twelfth of the available cash is invested in the fund each month. Available cash not allocated to the fund is allocated to the investor's bank account that earns 5%.

In our study, we ask the following questions: What is the investor's expected wealth after one year? And what is the risk associated with each strategy? We measure risk using a statistical measure called *standard deviation*, which is a common measure of asset volatility. The higher the standard deviation, the riskier the strategy.

As displayed in the table, we calculate year-end wealth and standard deviation. For example, if you invest $10,000 in a Canadian equity fund, at year-end you can *expect* — no guarantees — to have $11,250. This is because the long-term appreciation rate of the Canadian equity market has been, roughly, 11.25% per year. There is absolutely no guarantee this will persist. Rather, this is what you *would have* received on *average*.

Of course, equity returns are variable, which means that at year-end, your investment may be in the region of $11,250. The standard deviation value is $2,000. The $2,000 corresponds with a 20% volatility, which is typical of a diversified Canadian equity fund. To be statistically precise, two-thirds of the time your investment will be worth between $9,250 and $13,250 (i.e., $11,250 +/– $2,000) at year-end. One-third of the time, your investment will be either lower or higher than this range.

Now, let's consider the DCA alternative: What happens if you put the money in a savings account and gradually, *slowly*, using the dollar-cost averaging approach, invest your $10,000 into the Canadian equity fund on a monthly basis, one-twelfth at a time?

The table indicates that you can *expect* to have $10,871 at year-end. But in this case, the standard deviation is $1,121. Technically speaking, two-thirds of the time you will have between $9,750 and $11,992, and one-third of the time you will have less than or more than this range of values.

It's difficult to compare these two strategies. While the strategy of investing the entire $10,000 up front results in greater expected wealth, it is also associated with greater standard deviation. Because risk levels are different, comparing these two strategies is like comparing apples and oranges.

But the inefficiency of dollar-cost averaging should become evident through considering the following two strategies: a strategy that results in the same expected wealth at the end of the period, and a strategy that results in the same standard deviation.

Let's first consider a strategy that results in the same expected wealth at the end of the period. As you will notice, from the table, if you allocated $4,942 to the mutual fund, and the remainder to the GIC, you could *expect* to receive the same $10,871 as DCA. Yet, the variability of your investment would be much lower; *plus or minus* $980, versus *plus or minus* $1,121.

This should tell you that you can generate the same expected return as DCA — namely the $10,871 — but with lower risk, by splitting your money roughly in half: one part going into the equity fund, the other going into the GIC.

Let's next consider a strategy that results in the same standard deviation. The table indicates that if you invest $5,605 into the mutual fund, you will have $10,920 at year-end, with a standard deviation of $1,121. This is the same variability as the DCA strategy. But it provides a better return; here, you can *expect* to earn $10,920, which is $49 more than the $10,871 you would have received from DCA.

As the example displayed in the table demonstrates, DCA is an inferior strategy. Alternative strategies result in greater expected wealth for the same level of risk, or identical wealth for lower risk.

In sum. Replacing one major investment decision with many smaller ones does not make the final outcome any safer. Therefore, if you have the money now and you have the choice, it is best to pick an asset allocation that you are comfortable with — and live with it. If you don't have the money now, invest it as soon as it is available, without using an averaging strategy.

One final point worth noting is that if you use DCA as a *saving* strategy, as opposed to an *investment* strategy, then you are essentially investing when you have the money, and forcing yourself to save, which is a good thing. The conscious decision to split your investments over time is the problem.

Saving money on a regular basis is a wonderful idea; unfortunately, investing it isn't!