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How We Evaluate Investment Performance
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Apples and Oranges

The famed idiom says it's difficult, "comparing apples and oranges." As insightful as this expression is, I find the efforts in trying to do so far too common with investments. In the finance world of seemingly infinite jargon, an adjustment would see the phrase read, "it's difficult comparing apples, oranges, kiwis, bananas, blueberries, strawberries, and watermelons." Similarly, I'd argue measuring liquid securities with illiquid vehicles, simple with compounded returns, net of fee with gross returns, and so on is a futile endeavor. Factor in dynamics such as tax implications, risk, and distributions versus reinvestment to holdings that span several years, and it's enough to make your head spin.

Funds have become as much marketing outfits as they are investment operations since management compensation is a function of assets under management (AUM) before making a single investment. The more capital a manager can raise, the more pay he takes home, regardless of how well he performs. Disparate metrics that were formulated to help critically analyze investment performance have since become optional disclosures, whereby a fund will posture with their best foot forward, disregarding figures that aptly tell the full story in preference for other metrics that put them in the best light. Investors should safeguard themselves against this by understanding how to adjust and evaluate these figures, and in effect, measure apples and apples, and oranges with oranges.

As Charlie Munger said in Berkshire Hathaway's 1994 Annual Meeting, *"We try to think as if we've never heard of Modern Finance Theory. **I really think that a lot of Modern Finance Theory can only be described as disgusting**."* With the growing popularity of Modern Portfolio Theory, Messrs. Buffett and Munger disregard many of these formulations that have been conceived in academia and brought into the mainstream due to their quantitative malleability. Instead, they have continued to do basic, tried and true discounted cash flow analyses of businesses they both own and seek to purchase, applying the risk-free yield on 30-Year U.S. Treasury bonds as the discount rate instead of some abstract cost of equity.

The men behind the greatest compounding investment performance in the history of capital markets would expound on the limited real world applicability of Modern Portfolio Theory in the 1996 Annual Meeting, as Mr. Buffett said, *"**It's elaborate, and there's lots of little Greek letters and all kinds of things to make you feel that you're in the big leagues, but there is no value added**."*

Mr. Munger followed, *"**What he's saying is much of what is taught in modern corporate finance courses is twaddle. You cannot believe this stuff. Modern Portfolio Theory, it has no utility**. I have great difficulty with it because I am something of a student of dementia, and I get ordinary classified dementia on some theory structure of models, but Modern Portfolio Theory, it involves a type of dementia I can't even classify. Something very strange is going on."*

Recalling one of GEICO's most popular ad campaigns (a company owned by Berkshire Hathaway), understanding the performance of any investment should be, "so easy, even a caveman can do it." Hyperbole, yes, but it is my goal in conveying a set of principles that can be applied time and time again in order to understand investment performance. Using the foundations exemplified by these superlative investors, Marchant has developed its own method of analyzing investments. The goal behind this development was to create a method that was easily understandable, reliable, and applicable to every opportunity we come across.

In this memo, I will discuss the framework through which Marchant assesses investment performance. This framework serves as a uniform method of understanding how well our current portfolio is performing, and is fundamental in delineating between investment opportunities given historical and prospective returns. I will introduce the concept of *True Returns*, which accounts for several confounding variables, and I will unpack what superior performance looks like in a True Return context. In effect, this method of assessing returns enables us to measure apples and apples.

Common Metrics and Their Common Problems

Before delving into how Marchant looks at investment performance, I'd like to dissect the prevailing methods of measuring investment profitability as a basis of comparison, and to convey their susceptibility towards skewed results. The following may seem elementary, but I cannot stress enough the importance of understanding the shortcomings of these popular metrics. Only through an exhaustively investigative lens can we begin to adjust and optimize these formulae in order to arrive at our True Return analysis. The question we should ask ourselves when looking at any investment is: *If I make an investment, how much money will I end up with as a result?* Let's see just how well these metrics stack up in accurately answering this question.

<u>ROI</u>

ROI or Return on Investment represents the *percentage increase (or decrease) of an investment's value over the life of the investment*. ROI could also be viewed as the ROR, or the Rate of Return on an investment. It is a great back of the envelope way to understand if your investment could be profitable from start to finish. Its shortcoming however, is its inability to capture accurate performance in a dynamic portfolio over a time horizon greater than a year. ROI's ubiquity is due to its ease of calculation relative to IRR, CAGR, and other figures---its downfall is that it tends to overweight outlying returns and underweight the returns that are more consistently indicative of the investment's performance.

$$\text{ROI (\%)} = \left(\frac{\textit{Investment Gain} - \textit{Investment Cost}}{\textit{Investment Cost}}\right) \times 100$$

Problems arise with the ROI when trying to apply it to multi-year holdings. If an investment spans more than a year, the inclination would be to annualize the return by dividing by the number of years to get the average ROI per year. Often the trouble with averages, however, is that they don't accurately convey the most probabilistic outcome of a dataset. As Howard Marks of Oaktree Capital amusingly put it, *"Never forget the 6-foot tall man who drowned in a 5-foot deep river* ***on average****."*

To illustrate this notion, consider the following example: say we make an investment of $1MM. In the first year our investment gains 80%, and then loses 10% in two subsequent years. At first glance we might say that the resultant ROI was 60%, and thus the average annual return over the three years would be 20%. However, looking closely and calculating each year separately, we would really have a total ROI of 45.8%, or 15.27% annualized. This represents an almost 5% margin that the average ROI model overstates, and is therefore incorrect relative to the accurate annualized ROI by a phenomenal deviation of 31%.

Year	ROI	Balance	Gain
0	N/A	$1,000,000	N/A
1	80%	$1,800,000	$800,000
2	-10%	$1,620,000	-$180,000
3	-10%	$1,458,000	-$162,000
Total ROI	60%	Actual	45.80%
Average	20%	Actual Annualized	15.27%

Arithmetic and Geometric Averages

The problem with averages in looking at Returns on Investment is not because averages are inherently deceiving, but rather that the tendency to use arithmetic means over geometric means leads the observer astray. While averages are relied on to predict rates of return and growth of investment portfolios, average rates of return can fluctuate vastly depending on which method is used to calculate it.

Whereas arithmetic means are great for understanding averages when each data point is independent of another (take exam scores for a class of students for instance), geometric means are required for calculating investment performance since each successive period is dependent on the previous period's outcome. Geometric means consider the compounding that occurs from period to period, which can also be understood as serial correlation, where there is a relationship between a given variable and itself over various time intervals. The longer the time horizon of an investment, the more important compounding becomes, and the more necessary it is to use geometric means.

It is important to note that the geometric average takes volatility of returns into account, whereas normal (arithmetic) averages tend to underweight volatility. Arithmetic averages thus only do justice when there is no volatility of returns, and thus each return is the same year-over-year---something that is seldom the case in the investing world. Arithmetic averages will always overstate your returns. This can have huge implications over time.

The arithmetic mean is the average that we are all accustomed to using, which is arrived at by adding up the values of all the elements and then dividing by the number of elements in the dataset. The effect is that the arithmetic mean or average spreads the total value across all the cases, thereby making all the cases the same. The geometric mean is similar to that of the arithmetic mean, but combines the values of the elements with a product instead of a sum, and then takes the root of the number of elements in the dataset.

$$\text{Arithmetic Mean} = \frac{1}{n}\sum_{i=1}^{n} a_i = \frac{\textit{Sum of values of all elements}}{\textit{\# of elements}}$$

$$\text{Geometric Mean} = \left(\prod_{i=1}^{n} a_i\right)^{\frac{1}{n}} = \sqrt[\text{\# of elements}]{\textit{Product of values of all elements}}$$

The utility in using the geometric mean over the arithmetic mean is that it more accurately reflects real world circumstances, whereby a large outlier could significantly alter the arithmetic average, and thus fail to describe the central tendency of the dataset. The geometric mean more accurately computes central tendencies of small sample sizes, and when looking at investment returns, the number of elements in the dataset is almost always sure to fall inside the range of a *small sample size*. In calculating average investment returns, the geometric mean is far superior in arriving at an accurate number over a multi-period holding: the rate that all the rate of returns would have to be if they were the same and produced the same final value.

IRR

The next commonly used metric is the Internal Rate of Return, which factors cash outlays and inflows. The major distinction between the IRR and ROI is that the IRR takes into account the time value of money, while the ROI does not.

An investment with a total ROI of 90% over 20 years is not desirable relative to an investment with an IRR of 10% over the same period. Conversely, an investment with an ROI of 90% that lasts 3 years is better performing than an investment with an IRR of 10% over the same period. The biggest difference between ROI and IRR is that ROI tells the investor about the total growth of an investment from start to finish, but IRR tells the investor what the annual growth rate is. Looking at one year, these figures should be the same, but they diverge over longer periods of time.

Year	ROI	IRR
0	N/A	N/A
1	80.00%	80.00%
2	-10.00%	38.99%
3	-10.00%	21.75%
Annualized	15.27%	21.75%

IRR quite simply is the discount rate at which the Net Present Value of cash inflows and outflows of an investment is zero. If the IRR on a proposed investment is greater than a desired performance figure, or hurdle rate, than the investment is considered attractive. IRR tells you what the annualized rate of return will be for a given investment, no matter how far into the future, and an expected future cash flow.

$$\text{NPV} = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_0$$

$$\text{IRR} = \text{r, if NPV} = 0 = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_0$$

In short, ROI is good for a single-year investment, and IRR is better for multi-year investments. However, if this is the case, then if we were to analyse a single-year investment with ROI and a multi-year investment with IRR, wouldn’t that be like comparing apples and oranges? That’s where the Compound Annual Growth Rate (CAGR) comes in.

CAGR

Lastly, we have the Compound Annual Growth Rate or CAGR of an investment. The CAGR is the year-over-year growth rate of an investment if it is assumed that it grew over a steady rate over a particular period. Although there might be fluctuations or volatility of returns over the period of time you are examining, the CAGR smooths it out to provide the average compounded growth rate per year. This figure can be used to measure or compare returns provided by investments spanning several years. CAGR takes the value at the end of the investment period, divides it by the beginning investment value, and then takes that number to the exponent of 1 divided by the number of years of the investment holding, all minus 1.

$$\text{CAGR (\%)} = \left[\left(\frac{Ending\ Value}{Beginning\ Value}\right)^{\left(\frac{1}{\#\ of\ Years}\right)} - 1 \right] \text{x } 100$$

Year	Cash Flows	ROI	IRR	CAGR
0	-$1,000,000	N/A	N/A	N/A
1	$1,458,000	45.8%	45.8%	45.8%

CAGR is the most useful metric to use in evaluating investment performance for investments into funds or assets on a lump sum basis that fluctuate in value over the life of the investment. Considering the types of investments our investors, and Marchant alike typically make, CAGR is the most comprehensive metric we can use to assess investment performance. Because of this, CAGR is the foundation of the concept of our True Return, and it is superior to averaging returns because it considers the assumption that an investment holding of more than one year is compounded over time.

Year	ROI	IRR	CAGR
0	N/A	N/A	N/A
1	80.00%	80.00%	80.00%
2	-10.00%	38.99%	27.28%
3	-10.00%	21.75%	13.39%
Annualized	15.27%	21.75%	13.39%

The compounding effect of an investment in an illiquid vehicle is a means of effectively compensating investors for taking a long view on a given opportunity. The reason that CAGR doesn’t fall victim to the troubles that arise from averages is that CAGR utilizes the geometric average of an investment’s returns, not the arithmetic average. You should notice that CAGR and IRR are one in the same if an investment is a lump sum allocation and has constant returns. While IRR does offer more flexibility in that you can account for periodic investments instead of a lump sum investment, for the asset classes we invest in, the CAGR is the preferred figure since it details the geometric average that is returned on an investment that has fluctuations in asset values.

Year	Balance	CAGR
0	-$1,000,000	N/A
1	$1,133,929	13.39%
2	$1,285,795	13.39%
3	$1,458,000	13.39%

Year	Balance	ROI
0	-$1,000,000	N/A
1	$1,152,700	15.27%
2	$1,305,400	15.27%
3	$1,458,100	15.27%

Year	Balance	IRR
0	-$1,000,000	N/A
1	$1,217,500	21.75%
2	$1,435,000	21.75%
3	$1,652,500	21.75%

As evident by these charts, only the Compound Annual Growth Rate applied to each period of our investment holding accurately details the final balance that we, the investor would walk away with (gross, not net of fees and taxes). **The IRR applied to the balances year-over-year overstates the profitability of our investment by an astounding deviation of 13.34%.** In a $10 Million investment, the IRR would tell us we were walking away with an extra $1,334,000. I need not tell you the ramifications this would have to a pension or endowment fund that makes allocations in the billions.

Consulting giants McKinsey & Company released a paper in 2004 entitled, *Internal Rate of Return: A Cautionary Tale* that details the risks of relying on IRR. Here's an excerpt:

> Maybe finance manager just enjoy living on the edge. What else would explain their weakness for using IRR to assess capital projects? For decades, finance textbooks and academics have warned that typical IRR calculations build in reinvestment assumptions that makes bad projects look better and good ones look great. Yet as recently as 1999, academic research found that three-quarters of CFOs always or almost always use IRR when evaluating capital projects...We believe that managers must either avoid using the IRR entirely or at least make adjustments for the measure's most dangerous assumption: that interim cash flows will be invested at the same high rates of return.

There are metrics that can capture the reinvestment at more realistic interim investment rates, like the modified internal rate of return (MIRR). However, these formulae serve more utility in capital budgeting for intra-firm projects than they do in assessing investment performance in a dynamic portfolio. I should also make mention of the Dietz Method of measuring the performance of an investment portfolio that accounts for net flows of capital in a portfolio (inflows and outflows) during the period of returns being measured.

While the Dietz Method is not without merit, it is not ideal for indicating the resultant growth of capital from an individual investor's point of view. Our True Return serves as the best overall way to portray how a single investment in isolation performed or should perform. We do occasionally, however, use the Dietz Method, applying the CAGR as the rate of return, as a measure of our diversified portfolio performance in aggregate.

Liquidity

The underlying premise of liquidity is the assumption that, "Cash is King." Liquidity is not just the ability to buy or sell an asset or security in a timely manner, but rather it is the ability to transact an asset or a security in a timely manner without affecting the asset price. In effect, liquidity is the ease of converting one's investment into cash. While nearly everyone in the investing public has an understanding of liquidity, few actually endeavor to assign a value to it. *I argue that liquidity must be valued to accurately understand and compare investments since liquidity is optionality, and optionality is valuable.*

For instance, in our above investment holding with a gross compound annual return (CAGR) of 13.39%, or nominal returns of $438,000, an investor might prefer to hold an asset that yields 10% CAGR or $330,000 over the three years if it has daily liquidity.

Because of this, there are two major takeaways when factoring liquidity into investment performance: **1) liquidity preference is heterogeneous and should be individualized**

based on the investor's financial goals, and **2) the value of liquidity should always be taken into consideration when assessing an investment's performance**. It is not until we quantify liquidity that we can effectively compare different investments and make informed decisions for allocations accordingly.

Investors can generally fit into one of three categories: long term capital growth, wealth preservation, and opportunistic or income seeking. The long term capital growth investor intends to put their money to work, hoping to take advantage of wealth accumulation via compounding returns over the long haul. This investor has the lowest liquidity factor, meaning the smallest implied premium to be earned from an investment that is not as liquid as another opportunity.

The wealth preservation investor has a slightly higher implied liquidity premium that they would need to earn to compensate them accordingly, since they want to preserve wealth, and therefore be able exit a bad investment, or have the ability to redeem for cash on hand.

Lastly, the income seeking investor has the highest implied liquidity premium since they seek to have maneuverability in their allocations, and thus need to be greatly compensated for tying their money up. These implied liquidity premiums are a function of risk free rates of return and inflation. Besides the wonders of compounded returns, investors must be effectively compensated for delaying gratification and holding allocations in illiquid vehicles.

Implied Liquidity Premiums	
Investor Type	ILP
Long Term Growth	RFR
Wealth Preservation	RFR + CPI
Income Seeking	2RFR + CPI

Implied Liquidity Premiums	
Investor Type	ILP
Long Term Growth	3%
Wealth Preservation	5%
Income Seeking	8%

A note on the above charts: the *Implied Liquidity Premiums* are derived from the risk-free rate of capital and inflation, or the yield on a 30-year U.S. Treasury bond and the Consumer Price Index, respectively. The risk-free rate of capital right now (Q2 of 2018) is hovering around 3% per year, while the annualized inflation rate is somewhere between 1.5 and 2%.

The long term capital growth investor therefore has the lowest implied liquidity premium (3% annually), equaling the risk-free rate of return on capital from the 30-year bond (RFR), which is the required increase in annual gross returns of their multi-year holdings to compensate them for lack of liquidity. The wealth preservation investor has a slightly higher implied premium for illiquid investments (5%). Lastly, the income seeking investor has the highest implied liquidity premium to be required for investing in an illiquid vehicle (8%). These are simple return figures, whereas compounded return premiums would look like the following, depending on the life of the investment and required holding period.

It is important to note that investments with daily liquidity, like public market securities such as stocks and bonds have an implied liquidity factor of 2%, due to the inclusion of inflation in the True Return calculations. Although theoretically a perfectly liquid investment should have no implied liquidity premium assigned to it, our True Return formula must always include real returns (accounting for inflation) in order to accurately measure "apples and apples."

1-3 Yr Holding Compound ILPs	
Investor Type	ILP
Long Term Growth	2.88%
Wealth Preservation	4.67%
Income Seeking	7.19%

3-5 Yr Holding Compound ILPs	
Investor Type	ILP
Long Term Growth	2.80%
Wealth Preservation	4.47%
Income Seeking	6.75%

5-10 Yr Holding Compound ILPs	
Investor Type	ILP
Long Term Growth	2.63%
Wealth Preservation	4.06%
Income Seeking	5.89%

As referenced in the above, the long term growth investor must attain an extra compounded annual return of 2.88% for an investment holding of one to three years for it to make sense in holding an illiquid asset. The wealth preservation investor requires an added 4.67% for the same parameters, and an income seeking investor requires a return premium of 7.19%. At Marchant, the majority of our holdings fit the two latter charts, whereby investments are typically held for three to upwards of seven years. Thus, we do not pursue transactions that do not have the plausibility of achieving a compound annual growth rate in excess of 5% greater than public market and more liquid alternatives. This serves to properly compensate investors for the lack of daily liquidity, and to also provide for a great margin of safety should the investment not perform as we had anticipated.

True Returns

We have finally arrived at the point where we can break down and discuss our concept of *True Returns*. This metric is essentially an all-inclusive return on invested capital that an investor achieves, taking into account the length of time of the investment, the net of fee compound annual growth rate, attainable risk-free returns, inflation, liquidity, and effective tax treatment. The reason we feel *True Returns* to be the best applicable metric is that it aligns with our mandate that:

1. **Investments must achieve superior returns relative to overall market benchmarks net of fees.**
2. **Investors must be compensated for a lack of liquidity on top of outperformance.**

Below you will find the formulaic expression of the *True Return*.

$$\text{True Return (\%)} = \left[\left[\left(\frac{Ending\ Value}{Beginning\ Value}\right)^{\left(\frac{1}{\#\ of\ Years}\right)} - 1\right](\text{1-Tax Rate}) - (\text{ILP + fees} \times \text{\# of years})\right] \text{x } 100$$

or

$$\text{True Return = After-Tax CAGR - ILP - Fees}$$

The *True Return* is the real net of fee compounded annual growth rate after discounting the value of liquidity and tax liability on an annualized basis. Bear in mind, the *implied liquidity premium* is inclusive of risk-free rates of return on capital and inflation. The following chart shows the final result of our investment example when applying the True Return formula. For this example, we are using our wealth preservation investor’s implied liquidity premium of a holding of up to three years at 4.67% per year. We also apply our typical fee of 1% on allocated capital and 10% of profits over our effective hurdle.

It is noteworthy that for the purposes of our investments in private businesses, which assuredly span greater than one year, the typical effective tax rate on an investment gain is the long-term capital gains tax rate of 20%, realized only when the asset or position is sold. This is a far cry from the short-term capital gains rate of 37%, which applies to assets purchased and sold in the same year.

This delta of 17% in taxation on net proceeds from an investment is another way besides compounded growth that we believe investing in private businesses and inefficient markets over a longer holding period yields superlative returns. While taxes are only attributable to the last period of an investment, we spread the liability equally over each year of the holding.

Year	ROI	IRR	CAGR	True Return
0	N/A	N/A	N/A	N/A
1	80.00%	80.00%	80.00%	68.67%
2	-10.00%	38.99%	27.28%	16.01%
3	-10.00%	21.75%	10.71%	6.24%
Return	15.27%	21.75%	10.71%	6.24%

Now that we have gone through the theoretical approach to the True Return, let's put it to practice. Below, we measure the True Returns that an investor would attain investing in the S&P 500 index from 2016 to present (through Q2 2018), compared to that of one of Marchant's own investments.

Year	S&P 500	Marchant
2016	11.76%	29.14%
2017	21.63%	36.18%
Q1 - Q2 2018	5.34%	27.47%
True Return	8.01%	17.90%

The returns for the S&P 500 and the Marchant investment from 2016 through the second quarter of 2018 take into account fees assignable to gross returns. For an investment in an S&P 500 tracking index fund, a low-cost way for an investor to achieve the same gross returns as the market index, the attributable fee was .2% per year. This is the median fee charged to investors for these types of products at the time of this publication. The fees of the Marchant investment parallels the aforementioned fee structure that we have used in our vehicles.

While the True Return of the S&P 500 with dividend reinvestment was 8.01% for the three-year holding, the Marchant investment yielded a True Return of 17.90%. The implied liquidity premium applied to each year of the Marchant holding was 2.88%. Even if we applied the implied liquidity premium required for the income seeking investor, the Marchant investment would have a True Return of 12.16%---still greater than the performance of the liquid S&P 500 index fund.

After applying the True Return to both of these cases, it is evident that the Marchant investment, regardless of liquidity preference, is the objectively better opportunity. In longer holding periods, the compounding effect of this outperformance should result in an even greater difference between the ending value of the Marchant holding, and the ending value of the S&P 500 holding (assuming both starting capital outlays were the same). We have effectively compared two completely different asset classes and investments by adjusting them with our True Return metric. At last, we have measured apples and apples.

In closing, while I concur with Buffett and Munger's critique that many modern formulae used to assess investments contain complex Greek letters to convey accuracy and legitimacy, the True Return formula is fundamentally simple. I think these two wise men would agree that our metric is useful in helping investors delineate between investment opportunities and in thinking about all of the cogs in the return machine that are worth factoring in. As Sir Warren himself often says, **"It's better to be approximately right than precisely wrong. A good investment should jump out at you."** It is my belief that the True Return analysis makes these factor-based investment decisions a lot more apparent and obvious.

Wishing you a prosperous summer,

Matthew Goldberg
June 25, 2018

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