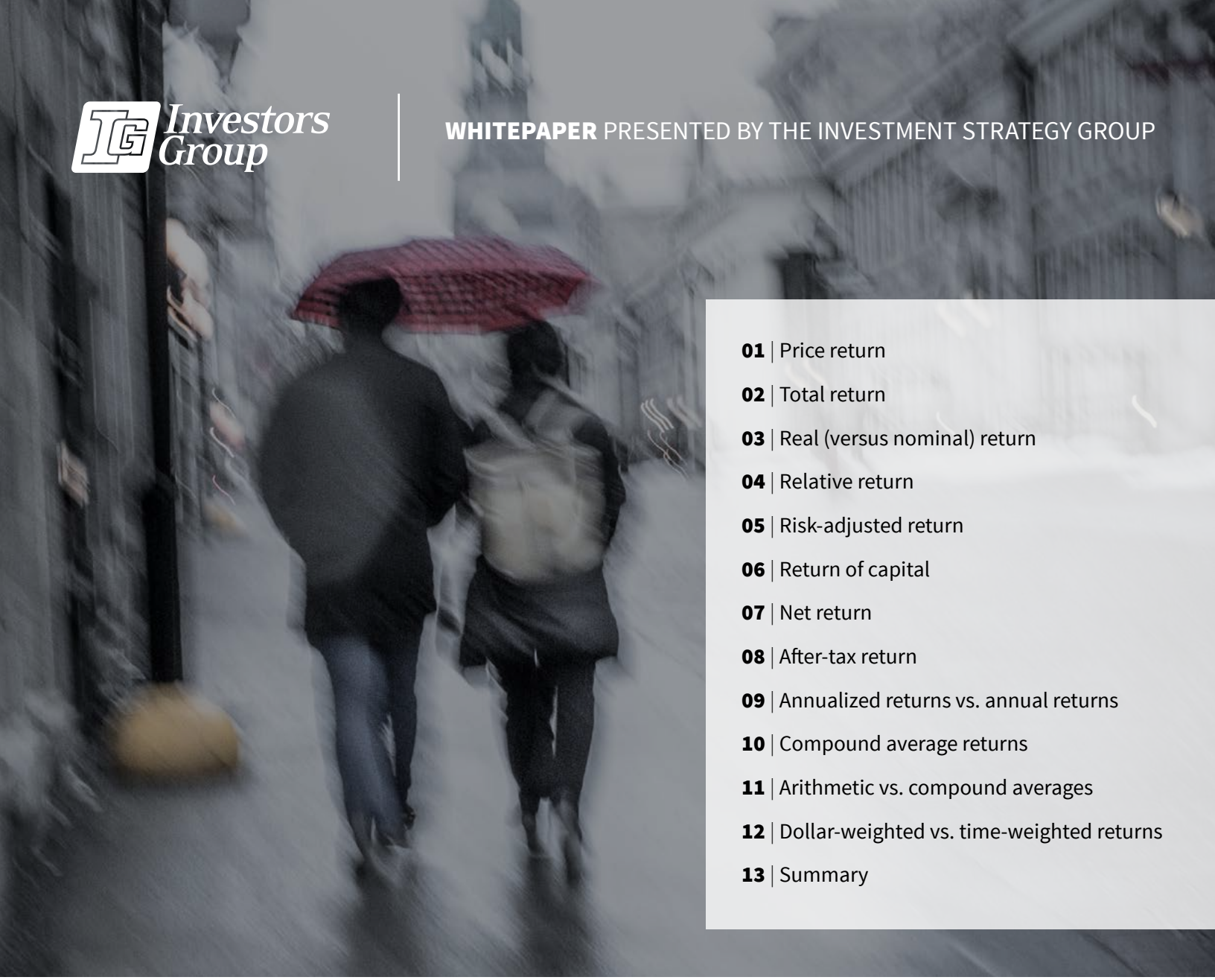

Investors Group

WHITEPAPER PRESENTED BY THE INVESTMENT STRATEGY GROUP

Your **comprehensive guide** to **investment returns**

STEPHEN ROGERS, INVESTMENT STRATEGIST, I.G. INVESTMENT MANAGEMENT, LTD.

What do we mean by "return" when we talk about an investment? In its most basic form, the concept simply refers to the gain in value or wealth generated by an investment, usually expressed as a percentage of the amount initially invested. But a quick review of any investment literature, or of your statement of investments from any financial institution, quickly yields a plethora of terminology that can leave your head spinning. ***Continued...***

Monitoring and assessing your investment portfolio and its components, not to mention evaluating potential new investments, is a fundamental and critical element of the investment strategy in your financial plan. Gauging "return" is central to this exercise, so it is essential to understand just what is meant by "return" as it is referenced in its many forms.

This paper will walk you through the basics of calculated and reported returns that you are likely to encounter in your investing activities. These are ways of measuring and assessing historical returns generated within your personal investment portfolio.

Although the concepts discussed below apply to any type of investment asset (stocks, bonds, real estate), we will limit our illustrations to equity and mutual fund examples for the sake of simplicity.

01 | Price return

This is the most basic return number you will encounter. It refers to the change in the nominal market price of the asset (e.g., stock, bond, mutual fund unit) taking into account **only** the capital appreciation of the asset. It ignores any income that may have been generated (e.g., interest, dividends), and makes no further adjustments for factors such as inflation, taxation, or risk.

EXAMPLE 01	
Initial purchase price of Stock A, per share	**$10.00**
Price of Stock A at end of period, per share	**$11.00**
Gain per share	**$1.00**
Price Return = Gain ÷ Initial Value = $1.00 ÷ $10.00	**= +10.0%**

Returns on indices most referenced in popular media – such as the S&P 500 Composite and the S&P/TSX Composite – tend to be price returns, unless stated otherwise. This is almost certainly true (not just for indices but for individual stocks, etc.) when referring to changes over shorter time intervals, such as days or weeks.

Because most assets, including the "portfolio" of stocks described by an index, have other cash flows such as dividends involved, price return is usually a misleading representation of an investment's return.

02 | Total return

Total return of an investment over a given period expands upon the basic price return, capturing all of the investment's cash flows contributing to the change in its total value. For a benchmark index or an individual stock, this typically includes the change in the market price (as illustrated in Example 1) plus all dividends, interest payments, or other distributions over the same period. In calculating total return, it is usually assumed that all cash distributions were reinvested in additional units (e.g., shares) of the underlying asset at the time of the distribution.

EXAMPLE 02	
Buy 1,000 shares of Stock A at beginning and ending prices as above in Example 01.	
Beginning total value = 1000 x $10.00 per share =	**$10,000.00**
Stock A pays cash dividend per share, per quarter	**$0.10**
Annual total cash dividends = 1,000 x (4 x $0.10) = 1,000 x $0.40	**= $400.00**
Assume dividends are reinvested at an average cost per share of	**$10.81**
Additional shares purchased = $400.00 ÷ $10.81	**= 37 shares**
Total value at end of period = 1,037 shares x $11.00 per share =	**$11,407.00**
Total gain	**$1,407.00**
Total return = gain ÷ initial value = $1,407.00 ÷ $10,000.00	**= +14.07%**

When comparing your investment returns to indices, other benchmarks, or to alternative investments, you should always compare your total return to total returns of the alternatives. Be careful using online tools and calculators as many compare and plot relative performance using only simple price returns. Most popular indices, such as the S&P/TSX Composite, publish total return versions. Returns for both funds and benchmark indices as quoted in all Investors Group official materials will always be total returns.

03 | Real (versus nominal) return

So far, all of the return measures we have looked at are considered "nominal" because they measure only the stated changes in dollar values. They do not account for changes in the value, or purchasing power, of those dollars. Returns that are adjusted to reflect the impact of inflation are called **real returns**.

In a period of low inflation, like we have experienced in recent years, many individuals might not make such distinctions. But during periods of high inflation, expressing returns in real rather than nominal values provides a clearer, more useful picture or understanding of how an investment is contributing (or not) to growing your wealth.

Furthermore, since even low rates of inflation can compound to significant differences in end values if applied over a sufficiently long time period, returns measured over longer time frames such as five years or more are perhaps best viewed in real terms. (Note: in periods of deflation, or negative inflation, real returns will be higher than nominal returns.)

The usual method of calculating real returns is to adjust measurements such that the purchasing power of a given level of capital (e.g., $100.00) is kept constant over time, typically by using a broad price index such as the CPI (Consumer Price Index) for such adjustments. A simple rule of thumb involves subtracting the annual inflation rate from the nominal annual rate of return (e.g., + 14.07% return - 2% inflation = + 12.07% real return).

More precisely:
Real Return = [(1 + nominal rate) ÷ (1 + inflation rate)] - 1.

EXAMPLE 03	
Total (nominal) return from Example 2:	**+14.07%**
Annual inflation rate:	**2.0%**
Real Return:	**= [(1 + nominal rate) ÷ (1 + inflation rate)] - 1** **= [(1.1407) ÷ (1.020)] - 1** **= 1.1183 - 1** **= +11.83%**
Alternatively, inflation-adjusting initial investment to keep its purchasing power constant:	
Inflation-adjusted initial investment = $10,000 x 1.020	**= $10,200.00**
Adjusted gain = $11,407.00 - $10,200.00	**= $1,207.00**
Real Return:	**= adjusted gain ÷ adjusted initial value** **= $1,207.00 ÷ $10,200.00** **= +11.83%**

In this example, with an inflation environment of 2% per year, a return of $200 is required on the initial investment just to break-even in purchasing power terms. Thus only the portion of nominal gains above and beyond $200 ($1407 - $200 = $1207) are considered real gains.

The higher the inflation environment, the more misleading are nominal returns. For example, during the years of high inflation in the late 1970s, savings accounts and investment certificates were offering double digit returns. But because inflation was also running in double-digits, real returns for many of these instruments were in fact significantly lower than their nominal returns, and in many cases even negative, despite the extraordinarily high nominal rate.

04 | Relative return

Relative return usually refers to the return generated by an investment or portfolio, compared to a return achieved by a specified benchmark or index. So if a hypothetical large cap diversified Canadian equity portfolio delivers an absolute return of 10%, when its benchmark S&P/TSX Composite Index returned 6%, its relative return would be 4%.

05 | Risk-adjusted return

A well-accepted principle of investing is that one should be adequately compensated over a reasonable period of time for the degree of risk assumed. In order to accept more risk, for a given expected return, a rational investor would demand a lower purchase price. Or put another way, for a given investment, you should be compensated for accepting higher risk by being offered a higher expected return. No measure of investment performance is complete without an attempt to measure the riskiness of the portfolio and its components.

Therefore, risk-adjusted returns refine or modify a measure of an investment's return to account for the degree of risk taken to produce that return. If two or more investments deliver the same rate of return over the same time period, the one with the lowest risk measure is said to have the better risk-adjusted return.

Risk can be thought of in a number of ways, but in investing (whether at the individual security or portfolio level) it is usually measured in terms of volatility or variability of results. And the most common measure of variability is standard deviation, a statistical construct measuring the dispersion of the set of realized returns from the data set mean. A higher standard deviation results from data points being more scattered or diffused relative to their mean (or average). Conveniently, securities with high degrees of what investors consider fundamental riskiness (e.g., poor market liquidity, high financial leverage, etc.) tend to have higher standard deviations.

The most common risk measure used in comparing mutual funds is the "Sharpe ratio" – the amount of the fund's excess return, above the risk-free rate, per unit of standard deviation. The base assumption is that an investor always has as one alternative, a risk-free investment – typically considered to be the Government Treasury Bill rate of return for the period. In that sense, every assessment of investment returns should include a consideration of what return was available in the risk-free space.

EXAMPLE 04	
Total (nominal) return from Example 2: (for a "Fund A", rather than "Stock A")	**+14.07%**
Assumed one-year risk-free rate	**2%**
Assume Standard Deviation of monthly returns for Fund A is	**6%**
Sharpe Ratio	**= (excess return above risk-free rate) ÷ standard deviation = (14.07% - 2%) ÷ 6% = 2.0**

If Example 4 were to use a Fund B with the same return but with higher volatility (e.g., 10%), it would have a Sharpe ratio of 1.2 [(14.07% - 2%) ÷ 10%)]. In this case, Fund A would be considered to have a higher risk-adjusted return because it achieved the 14.07% while taking on less risk than Fund B (i.e., it gained more per unit of risk). The Sharpe ratio difference highlights this outcome.

More sophisticated approaches to risk measurement partition risk into component parts, such as systematic risk (the portion of the volatility related to the market in general) and unsystematic risk (residual variability related to the specific security). Thus, another common ratio used to compare risk-adjusted returns is the Treynor ratio which, instead of using standard deviation, uses an investment's "Beta" (a measure of systemic risk), but is otherwise calculated in a similar manner to the Sharpe ratio. As with the Sharpe ratio, a higher Treynor ratio indicates more return being generated per unit of risk taken.

06 | Return of capital

A return of capital is not a return on investment. Rather than a capital gain or income generated by the investment, a return of capital occurs when the investor receives back a portion of the original investment, reducing the portion of the original capital considered to be invested.

07 | Net return

Net return extends our adjustment to yet another level, this time accounting for not just the security's additional cash flows, but for other cash flows experienced by the investor that influence the net result of having made the investment. These typically include trading costs or commissions and fees, interest paid on margin accounts or loans taken out in order to buy the security, perhaps the cost of a safety deposit box, possibly other managerial or custodial fees, etc. These costs obviously vary from investor to investor.

For the purposes of calculating the net return, most of these costs are usually used to adjust the reported cost base, or initial value of the investment, although elements that are clearly associated with the disposition of asset, such as commissions paid on the asset's sale, may be deducted from the reported proceeds rather than added to the cost of purchase.

08 | After-tax return

After-tax return quantifies the actual final financial benefit derived by the investor from an investment. As with net return, after-tax return will vary by individual investor because even if receiving the same nominal net return, different individuals will pay different amounts of tax depending on factors like the investors' tax brackets, the type of investment, the type of gain received, province of residence, etc.

An investor with gains as described above in Example 2 (and assuming no additional costs such as commissions) would have received $400.00 dividend income and capital gains of $1,007.00 ($1,000.00 gain on initial shares purchased, plus $7.00 gain on additional shares acquired through reinvestment of dividend income). Tax payable on these gains will depend on tax provisions such as capital gains inclusion rates, dividend gross-up and tax credit rates, as well as other individual factors such as province of residence and the individual's marginal tax rate based on total income.

09 | Annualized returns vs. annual returns

Annual returns are simply returns computed for individual one-year periods (e.g., 2015, 2016, etc.). Annualized returns, however, are time-weighted returns that characterize as an annual rate the results of periods that are either shorter or longer than one year (see **Compound average returns** and **Time-weighted rate of return**).

10 | Compound average returns (geometric rate of return)

Compounding is the effect of interest or other returns stacking on top of one another. For example, if an investment returns +10% in one year, then at end of year one $100 has become $110, a gain of $10. Thus year two starts with $110 (rather than $100) so that the next year's

10% gain is earned on the higher figure of $110 x 10% = $11. Year three then starts with $121 and so on. The continuing annual gain in this example remains at 10%, however with each passing period the base amount has grown and thus the annual gains grow as well. Effectively, the return each year relative to the original investment is increasing.

The compound average annual return over a given number of periods is equal to the nominal annual rate of return that, if applied in each of the compounding periods and results allowed to "stack", would result in the actual ending value.

11 | Arithmetic vs. compound averages

An arithmetic average (or mean) is a simple average of a set of numbers. But the usefulness of arithmetic average returns are limited in investing. They can be helpful in describing a typical period of some sort, such as the average return for the month of December, or the average return in a presidential election year. But they are not appropriate in analysing returns over consecutive time periods.

A simple example would be a $100 portfolio that grows +100% to $200 in period one, then contracts by -50% in period two resulting in an end value of $100, exactly where it started. There has clearly been no net change in the value of the investment, yet an arithmetic average of the period returns is (+100 -50) ÷ 2 = +25%. Because as investors we use rates of return as tools to describe the rate at which wealth is actually growing (or shrinking) over time, compound (or geometric) rates of return are the appropriate measure, not arithmetic returns.

12 | Dollar-weighted vs. time-weighted returns

All of our examples so far take a simplified approach of comparing beginning and end values of a one- time investment. This is certainly easy enough when assessing a singular and well defined investment, such as a mutual fund share or unit. But things get somewhat more complicated in most real world scenarios when investors attempt to assess the performance of their overall portfolio (as opposed to that of individual components) because of additional contributions or partial withdrawals from the account during the period being measured. The two most common approaches to assessing returns of a portfolio when intra-period cash flows have to be considered, are dollar-weighting and time-weighting those returns.

Dollar-weighted rate of return

This method partitions the overall investment period into sub periods that are defined by different levels of contributions (i.e., new sub periods begin each time the investor makes an additional contribution or withdrawal, but all sub periods have the same end point). After the return is calculated for each sub period to their common end time point, the overall final return result is then weighted by the size of the investment in each sub period. Dollar weighting is not considered the most accurate measure of returns involving external cash flows.

Time-weighted rate of return

The preferred alternative to dollar weighting is the even more complex time weighting. In theory, as with dollar weighting, a new sub period is said to begin each time the portfolio experiences a new contribution or withdrawal, but the start of each new sub period ends the preceding period. Returns are calculated for each of the shorter time segments, then compounded (chain-linked) to get a return for the total period, with compounding formula accounting for the differing lengths of the sub periods.

In practice simplifying assumptions are made, such as standardizing the sub period length and

assuming half of all contributions within the sub period are made at the beginning of the period and half at the end. Most simplifying algorithms then assume midpoint compounding.

While most investment professionals and institutions prefer time-weighted reporting of returns, results can vary depending on the algorithm used, and in particular on the length of assumed time intervals (daily, weekly, monthly and quarterly). There is no doubt shorter time intervals result in more accurate computations, especially when contribution or withdrawal cash flows are frequent. But for most investors, computations based on monthly intervals is likely sufficient for a reasonably accurate assessment.

13 | Summary of recommended return measurements

CHOOSING WHICH "RETURN" TO FOCUS ON MAY VARY WITH CIRCUMSTANCES	
Where-ever possible, **total returns are preferred over simple price returns**, but price returns may be adequate proxies for measuring stock or index movements over short time periods (daily or weekly).	Comparison of an investment or potential investment to alternatives or benchmarks **should always be done on a total return basis**, but can safely ignore inflation adjusting if both alternatives are viewed over the same time period, and are subject to the same inflation environment.
Performance spanning **multi-year time periods is best evaluated using compound average annual rates of return**, and time-weighted returns are preferred for portfolios with irregular cash flows.	**Use risk-adjusted returns** when comparing the performance of two alternative investments, or comparing an investment to a benchmark index, thus evaluating the magnitude of the risk undertaken relative to the performance results achieved.

When evaluating investment performance from the perspective of your financial planning, you should further **consider net or after-tax returns**, **as well as real as opposed to nominal results**, because the point of your investing activity is to build, preserve and grow your capital in a way that contributes to greater wealth in your future. Only by measuring your success in generating real benefits, after all costs have been accounted for, can you gain a clear understanding of your progress toward your goal. Your Investors Group Consultant can help you navigate the abundance of jargon and performance measures on the path to that understanding.