

This report provides a 'reality check' on this portfolio with asset allocations shown below. The analysis is described in detail in the Notes at the end of this document. In this report:

- ❖ 'Historical' is for the period 1 Jan 1973 to 31 Dec 2016.
- ❖ 'Recent' is for periods that ended in the last 10 years.
- ❖ High/Good means a result which was higher than 95% of the results.
- ❖ Low/Poor means a result that was higher than only 5% of the results.



- Cash 10%
- Fixed Interest 20%
- Int. Fixed Interest 10%
- Equities 20%
- US Equities 25%
- Int. Equities 15%

Investor Expectations

This portfolio would be most relevant to investors in Risk Group 5 and may be relevant to investors in Risk Groups 4 and 6. Investor expectations for these risk groups with regard to 10-year annualised return rates and downside volatility are as shown opposite,

- ❖ return expectations expressed as a multiple of the rate from 1 year Guaranteed Investment Certificates,
- ❖ downside comfort being how far the value of all investments could fall before the investor began to feel uncomfortable.

The table opposite shows 10-year annualised nominal returns for monies invested in rolling 1 year Guaranteed Investment Certificates. The sections below provide a reality check on these expectations.

Risk Group	10 year Returns	Downside Comfort
4	2 to 2.5 times, more likely 2.	For most 20% but for some 33%.
5	2.5 to > 3 times, more likely >= 3.	For some 20% but for most 33%.
6	At least 3, more likely > 3.	For most 33% but for some 50%.

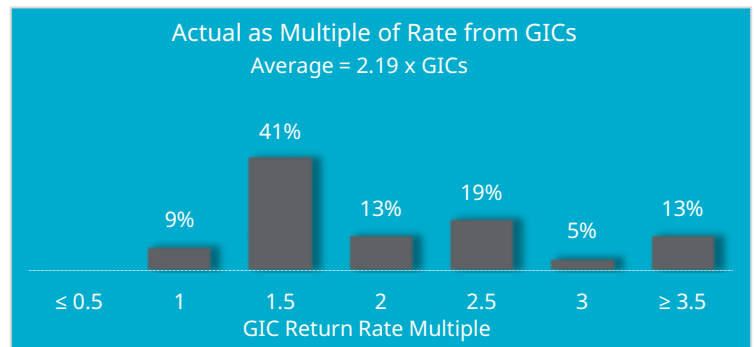
GICs 10 year Annualised Nominal Returns

	Historical	Recent
Best	10.6%	2.7%
Good	10.5%	2.6%
Average	5.8%	1.8%
Poor	1.4%	1.3%
Worst	1.1%	1.1%

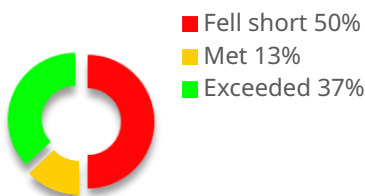
Returns: Actual vs Expectations

The actual annualised 10 year returns were expressed as multiples of the return from 1 year Guaranteed Investment Certificates over the same period. The bar chart opposite shows the frequency of the various multiples of actual returns. 41% of the time the portfolio achieved about one and a half times the return of 1 year Guaranteed Investment Certificates, and for 19% of the time it achieved two and a half times the

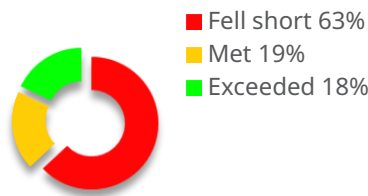
An investor's actual experience of this portfolio will depend upon his/her 10-year return expectations. The pie charts below show how actual returns compared with a range of expectations.



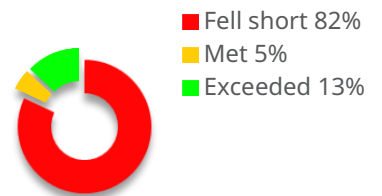
Compared with 2 x GICs



Compared with 2.5 x GICs



Compared with 3 x GICs



Volatility

The value of the portfolio was tracked month-by-month, with each month being categorised as Falling, Recovering or Rising.

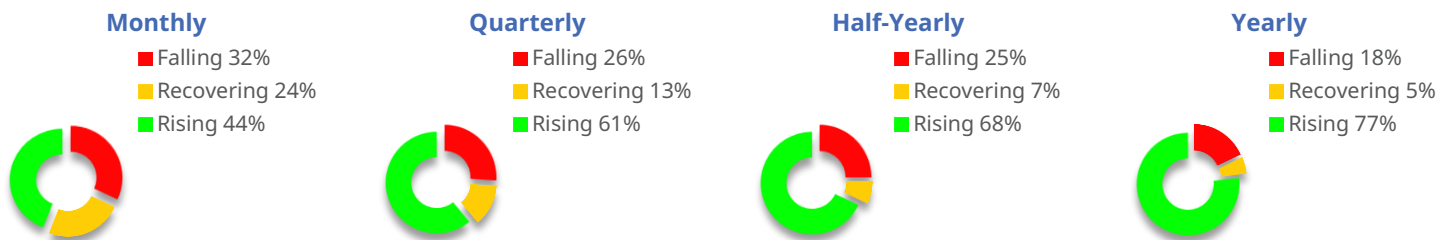
The value of the portfolio was below the most recent high.



The value of the portfolio was above the most recent high.

The value of the portfolio was above the most recent low point but not yet above the most recent high.

The first graphic below shows the portfolio was falling 32% of the time, recovering 24% of the time and rising 44% of the time. This is what an investor would have seen if they had looked at the portfolio monthly. However, if the investor had looked at the portfolio less frequently it would have appeared more attractive because some of the shorter falls would have disappeared and it would have been rising more often.



Rises and Falls

There were a total of 68 rises but 78% of these, 53 in all, were less than 10%. The ten biggest rises are shown to the right below.

Length (mths)	Percentage Rise					Total
	< 10%	10%-19%	20 -33%	33 -50%	>50%	
1	23					23
2	13					13
3	11					11
4-6	5	5				10
7-12	1	4	3	1		9
13-24		1	1			2
>24						
Total	53	10	4	1		68

Height of Rise	Started Rising	Months in Rise	End of Rise
36.7%	Jul-82	11	Jun-83
30.4%	Sep-85	9	Jun-86
29.7%	Jul-84	13	Aug-85
22.1%	Oct-92	10	Aug-93
20.8%	Nov-86	9	Aug-87
19.8%	Jun-13	14	Aug-14
19.8%	Feb-78	7	Sep-78
18.7%	Apr-80	7	Nov-80
13.4%	Nov-97	8	Jul-98
12.7%	Mar-97	4	Jul-97

There were 67 falls of one month or longer but nearly all were less than 10% and about three quarters of these lasted only a month. The ten biggest falls are shown to the right below.

Length (mths)	Depth of Fall					Total
	< 10%	10%-19%	20 -33%	33 -50%	>50%	
1	45					45
2	9					9
3	4	1				5
4-6	4					4
7-12		1	1			2
13-24		1				1
>24			1			1
Total	62	3	2			67

Depth of Fall	Started Falling	Months in Fall	Months to Recover	Recovery
-24.0%	Oct-73	11	8	May-75
-22.3%	Aug-00	31	25	Apr-05
-19.1%	Apr-07	22	18	Aug-10
-15.3%	Aug-87	3	16	Mar-89
-10.3%	Dec-89	9	4	Jan-91
-9.3%	Mar-81	6	10	Jul-82
-7.9%	Jul-98	1	2	Oct-98
-6.7%	Feb-80	1	1	Apr-80
-6.5%	Jun-75	3	3	Dec-75
-5.2%	Sep-79	1	1	Nov-79

Looking at the downside comfort zones for the three most relevant Risk Groups, as set out at the start of this section, none of the top ten falls would be expected to discomfort those in Risk Group 6. For the less risk tolerant in Risk Group 5, the top two falls would be expected to cause discomfort. For the less risk tolerant in Risk Group 4, the top two falls would be expected to cause discomfort.

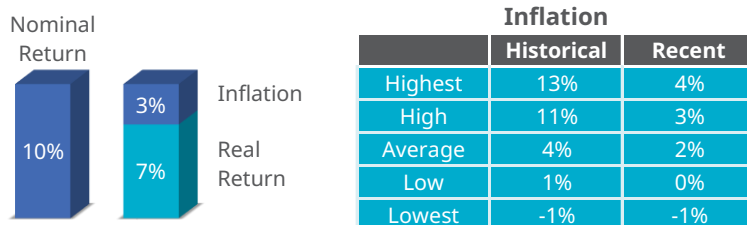
Historical Returns

Historical returns over the past 44 years for periods of 1 to 10 years are shown opposite. Over periods of five years, the average annualised return was 10.4% per annum with a good return being 18.3% and a poor return 1.7%. However, these are NOMINAL returns in that no allowance has been made for inflation.

Historical Annualised Returns

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	44.1%	31.6%	29.4%	26.5%	18.7%
Good	26.9%	22.2%	21.5%	18.3%	16.9%
Average	10.3%	10.4%	10.5%	10.4%	10.5%
Poor	-8.1%	-3.4%	-1.0%	1.7%	2.8%
Worst	-22.6%	-9.9%	-6.4%	0.3%	1.5%

Inflation eats into the value of returns achieved because \$1 has less purchasing power at the end of the period than it did at the start of the period. For example, if an investment had a nominal return of 10% in a year where inflation was 3%, the real return would have been 7%.



	Inflation	
	Historical	Recent
Highest	13%	4%
High	11%	3%
Average	4%	2%
Low	1%	0%
Lowest	-1%	-1%

When allowance has been made for inflation, the return is referred to as a REAL return. Historical real returns for the varying periods are shown opposite. Real returns are approximately 4% less than nominal returns for all periods. Looked at another way, the real returns are more than half of the nominal returns.

Historical Real Annualised Returns

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	36.6%	26.6%	24.1%	21.0%	12.6%
Good	22.8%	17.4%	16.9%	14.2%	10.6%
Average	6.1%	6.2%	6.3%	6.3%	6.5%
Poor	-12.6%	-7.5%	-4.3%	-0.9%	0.5%
Worst	-30.4%	-17.9%	-9.1%	-4.4%	-0.5%

Investment returns over the past decade have been disappointing, with the Recent Average returns about 2% less than historically. However, both the Poor and Worst returns were better.

Recent Real Annualised Returns

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	16.6%	14.9%	12.7%	9.5%	5.1%
Good	15.0%	13.1%	11.3%	8.8%	4.9%
Average	4.7%	4.8%	4.6%	4.0%	2.8%
Poor	-12.2%	-7.0%	-2.8%	-0.2%	-0.1%
Worst	-16.2%	-11.3%	-4.5%	-1.5%	-0.5%

End Values

While rates of return are relevant, the money value of the investment at the end of the period is what can be spent. This end value represents the accumulated account value and reflects the compounding effect of annual returns over time.

Historical Real End Values for \$1000 Invested

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	\$1,366	\$1,602	\$1,912	\$2,599	\$3,275
Good	\$1,228	\$1,378	\$1,596	\$1,942	\$2,738
Average	\$1,061	\$1,134	\$1,214	\$1,387	\$1,957
Poor	\$874	\$855	\$877	\$958	\$1,053
Worst	\$696	\$674	\$752	\$799	\$954

The real end values of \$1,000 invested is shown opposite. For a five year period, a Good result was \$1,942, the result of earning a Good real return, 14.2% per annum, compounded over the five

Recent Real End Values for \$1000 Invested

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	\$1,166	\$1,319	\$1,430	\$1,573	\$1,651
Good	\$1,150	\$1,280	\$1,380	\$1,525	\$1,613
Average	\$1,047	\$1,101	\$1,151	\$1,230	\$1,335
Poor	\$878	\$865	\$917	\$991	\$994
Worst	\$838	\$787	\$870	\$925	\$954

Investment returns over the past decade have been disappointing, with the Recent Average end values about 13% less than historically. However, the Poor end values were about the same and the Worst end values were better.

Savings Plans

Let's consider the results from a savings plan where a real \$100 was invested every month, i.e. the amount invested every month increased with inflation. So, if inflation was 3% in the first year, the amount invested in the first month of the second year would be \$103.

For a five-year savings plan the total amount invested would have been a real \$6,000 (60 months at a real \$100 per month.) The Historical Average result was accumulated savings of \$7,158. A Good result was \$8,902 and a Poor result was \$5,677, which was actually a loss on the \$6,000 invested.

Historical Real End Values for Savings of \$100 Real Per Month

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	\$1,454	\$3,201	\$5,095	\$10,002	\$24,315
Good	\$1,344	\$2,925	\$4,701	\$8,902	\$23,199
Average	\$1,239	\$2,567	\$3,991	\$7,158	\$17,327
Poor	\$1,102	\$2,195	\$3,301	\$5,677	\$12,908
Worst	\$952	\$1,908	\$3,026	\$5,086	\$11,017

Investment returns over the past decade have been disappointing, with the Recent Average end values about 5.5% less than historically. However, both the Poor and Worst end values were about the same.

Recent Real End Values for Savings of \$100 Real Per Month

	1 yr	2 yrs	3 yrs	5 yrs	10 yrs
Best	\$1,327	\$2,836	\$4,519	\$8,068	\$17,346
Good	\$1,311	\$2,759	\$4,324	\$7,657	\$16,848
Average	\$1,231	\$2,522	\$3,877	\$6,752	\$14,322
Poor	\$1,124	\$2,175	\$3,283	\$5,652	\$11,851
Worst	\$1,047	\$2,012	\$3,026	\$5,241	\$11,017

Drawdown Plans

Let's consider the results from a drawdown plan with a start value of \$100,000 and a real 3%, 5% or 7% annual drawdown rate, i.e. for a 5% annual drawdown rate, the monthly withdrawal amount of \$417 increased with inflation.

For a ten-year plan with a real 5% annual drawdown rate, the Historical Average result was an end value of \$123,456. A Good result was \$190,843 and a Poor result was \$52,601.

There's evidence that investors are likely to adjust their spending depending on market conditions and the value of their portfolio before the end of the ten-year period. Nevertheless it's worthwhile considering the End Values in the context of sustainable future withdrawals for comparative purposes. E.g. the average Real End Value of the original 5% annual drawdown will allow 24.7 annual payments.

Historical Real End Values of \$100,000 After 10 Years

	3%	5%	7%
Best	\$270,653	\$232,729	\$194,804
Good	\$221,936	\$190,843	\$156,453
Average	\$152,334	\$123,456	\$94,577
Poor	\$73,790	\$52,601	\$29,495
Worst	\$63,589	\$42,082	\$18,758

Real End Values as a Multiple of Annual Drawdowns

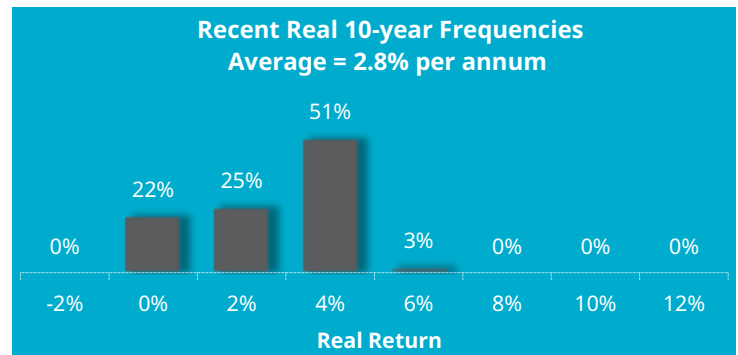
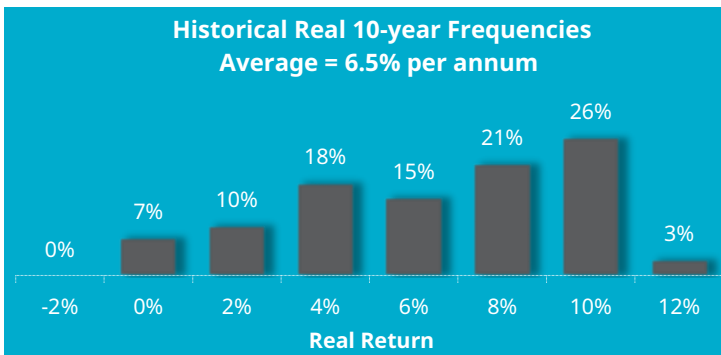
	3%	5%	7%
Best	90.2	46.5	27.8
Good	74.0	38.2	22.4
Average	50.8	24.7	13.5
Poor	24.6	10.5	4.2
Worst	21.2	8.4	2.7

Variability of Results

The discussion so far has examined the range of possible outcomes by highlighting some specific outcomes: Good, Average and Poor.

A more detailed picture of the variability can be obtained by looking at the frequency of specific rates of return. The graphics below show the frequencies of specific annualised rates of return over 10 year periods. For example, the historical return was about 10% per annum in 26% of the periods, and about 8% per annum in 21% of the periods.

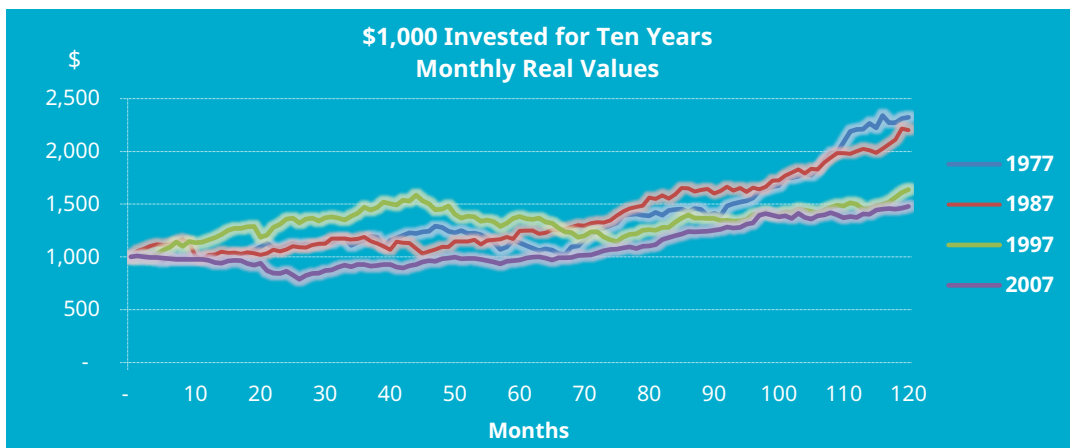
Over the past decade, returns have been generally lower but more tightly grouped.



The Investment Experience

An investor's actual experience will depend very heavily upon investment market conditions during the period of the investment and these can vary widely between periods. The graphic shows the month-by-month values of \$1,000 invested for 10 years on the 1st January of each of 1977, 1987, 1997 and 2007.

The end value of the 1977 investment was 1.6 times that of the 2007 investment.



Notes

1. The analysis was done on a monthly basis for an asset allocation comprising 10% Cash, 20% Fixed Interest, 10% Int. Fixed Interest, 20% CAN Equities, 25% US Equities and 15% Int. Equities. Total return indices, shown below, were used as proxies for asset sector performance. No allowance was made for tax or fees. The asset allocation was rebalanced annually.
2. The term 'annualised return' is used here to mean the rate of return that would have had to be earned in each year of a multi-year period to arrive at the overall return for the period. Over periods of more than one year, the annual return will invariably differ from year to year. For example, over a two-year period the first year's return could be +20% and the second year's return -10%. For \$100 invested, the value at the end of the first year would be \$120 and at the end of the second year \$108. Note that while the average annual return was 5%, $(+20\% + -10\%)/2$, the value at the end of two years is less than what it would have been if the return had been 5% in both years. If the return had been 5% in the first year, the value at the end of the first year would have been \$105. If the return in the second year was also 5%, the value at the end of the second year would have been \$110.25. The annualised return in the fluctuating return example was, in fact, 3.92% ($1.0392 \times 1.0392 = 1.08$). The volatility of returns means that the annualised return - the return achieved over the period, will always be less than the average of the returns for the individual years.
3. When comparing Nominal and Real returns it must be remembered that, for example, the Best Nominal return and the Best Real return have probably been for different periods. A Best Nominal return of 40% in a period where inflation was 15% would mean a Real return of 25%. However a Nominal return of 35% in a period where inflation was 5% would mean a Real return of 30%.
4. Historical is the period from 1 January 1973 to the present.
5. References to Recent are references to results for periods which terminated in the last decade, i.e. from January 1, 2007 to December 31, 2016. For example, if we are looking at 12 month periods, the first Recent period commenced on January 1, 2007 and the last on January 1, 2016. However, if we are looking at 120 months periods, the first Recent period commenced on January 1, 1997 and the last on January 1, 2007.
6. In comparisons of Recent with Historical results, the term 'about the same' is taken to mean that the Recent result is within 5% of the Historical result. That is if the Historical average result was 5%, then a Recent result between 4.75% and 5.25% would be regarded as about the same. A Recent result between 5% and 10% higher or lower than the Historical is regarded as slightly better or slightly worse, and if it was more than 10% higher or lower it is regarded as better or worse.
7. Where annualised ten-year returns are expressed as a multiple of the rate earned from Guaranteed Investment Certificates, the actual results are grouped in multiples of 0.5 so that, for example, a multiple of 1.5 times represents multiples ranging from 1.25 to less than 1.75.
8. Where frequency of returns are expressed as a histogram, each bar represents the frequency of returns centred on the x-axis label. For example if the X-axis labels are 0%, 2%, 4%, 6% etc, then the 4% bar covers returns from 3% to less than 5%.
9. Where a portfolio is falling in value but experiences a temporary increase in value before continuing to fall, the whole period is considered to be a Fall.
10. Refer to the Risk and Return Guide available at www.riskprofiling.com for more information on how to use this report.

The indices chosen were:

Cash	3-month Treasury Bills (Source: Bank of Canada)
Bonds	From Jan 97, Bank of America Merrill Lynch Canadian Governments 7-10 Years Total Return Index From Jan 73 Ten Year Canadian Government Bond Total Return Index (Source: Global Financial Data, Inc.)
Int. Bonds	JP Morgan Global Government Bond Index From Jan 73 Lehman composite (USD); From Jan 86: J.P. Morgan Global Govt Bond Index (USD)
CAN Stocks	S&P/TSX Composite Total Return Index
US Stocks	S&P 500 Total Return Index
Int. Stocks	MSCI EAFE Total Return Index
GIC	From Nov 80 1-year Guaranteed Investment Certificates (Source: Bank of Canada) From Jan 73 a proxy based on 5-years Guaranteed Investment Certificates (Trust Companies)
Inflation	Canadian Consumer Price Index

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