



CANADIAN FARMLAND BEHAVIOUR IN STAGFLATION

Response to Nominal
Interest Rate and GDP
Changes in the 1970s

Investments in farmland.

ABSTRACT:

Historically, farmland has had a very interesting asymmetric return structure when compared with nominal interest rates. Farmland returns have tended to increase when nominal interest rates both increased and decreased.

KEYWORDS:

Stagflation, nominal interest, kurtosis, correlation, skew, productivity adjusted pricing, Sharpe ratio, average farm size, return curves, inflation, farmland, Pearson distribution

INTRODUCTION:

The 1970s economy of North America and Western Europe gave rise to the term stagflation. In previous decades a macroeconomic relationship had held constant, a predictable trade-off between inflation and the unemployment rate. There are several underlying mechanisms purported to give rise to this relationship. Still, the simplest is that businesses are more likely to hire additional workers if revenues are increasing, even if the revenue increases are the result of loose monetary policy causing inflation.



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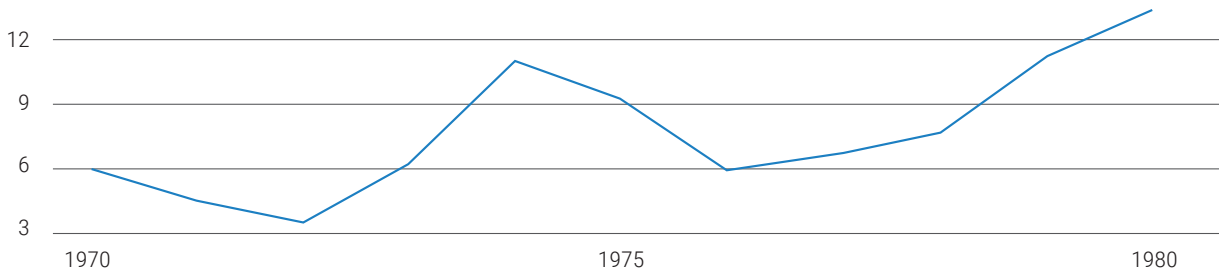


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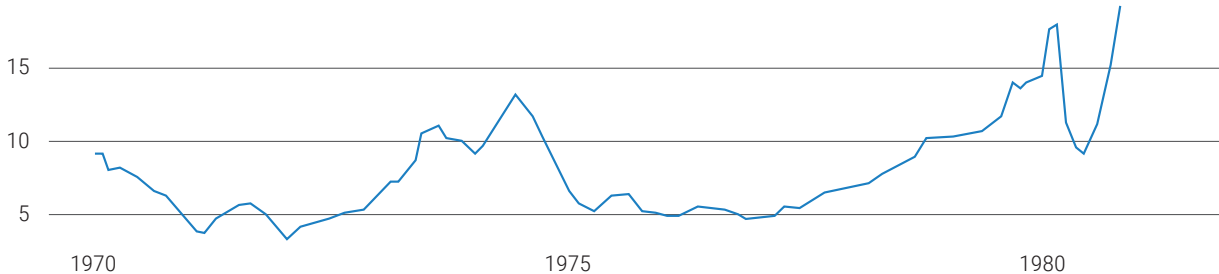


Chart 1: US CPI 1970 to 1980 (percent)



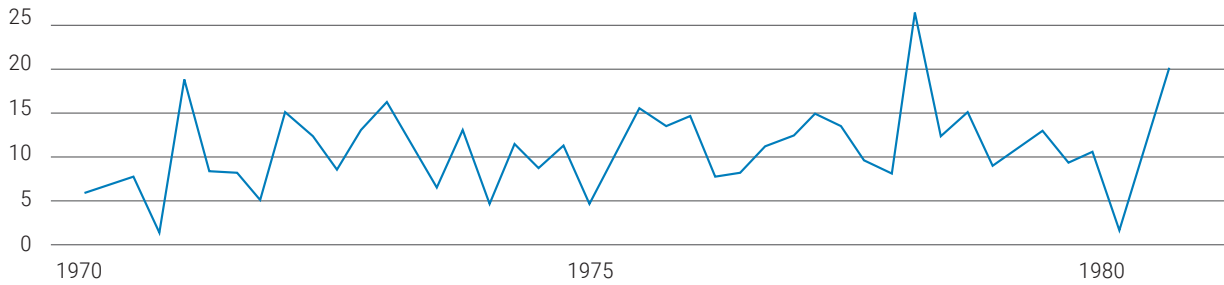
Sources: St. Louis Federal Reserve, Table: FPCPITOTLZGUSA

Chart 2: US Federal Funds Rate 1970 to 1980 (percent)



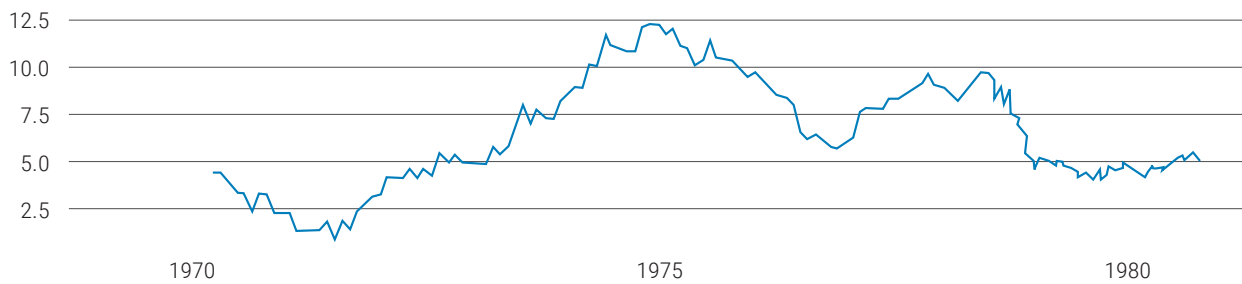
Sources: St. Louis Federal Reserve, Table: FEDFUNDS

Chart 3: US Nominal GDP Annual Change (percent)



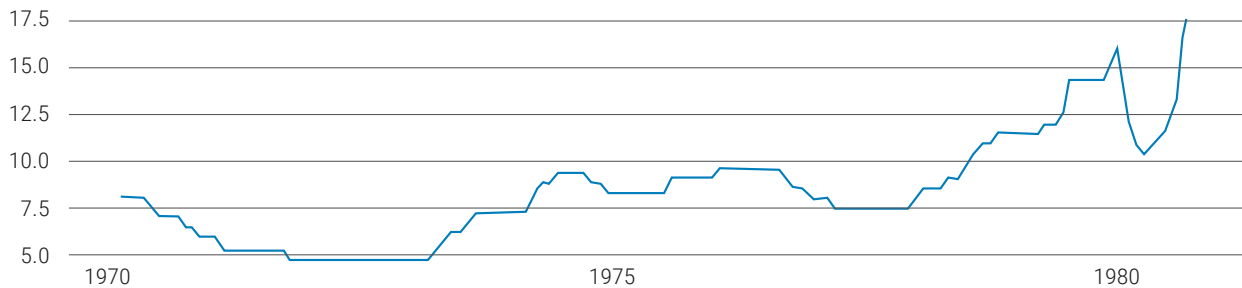
Sources: St. Louis Federal Reserve, Table: A191RP1Q027SBEA

Chart 4: Canada CPI 1970 – 1980 (percent)



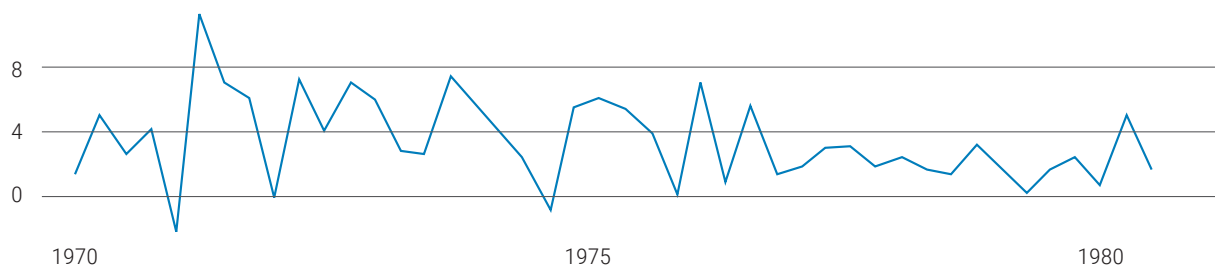
Sources: Statistics Canada, Table 18-10-0256-01

Chart 5: Canada BOC Policy Rate 1970-1980 (percent)



Sources: Statistics Canada, Vector v122530

Chart 6: Canada Nominal GDP Annual Change (percent)



Sources: Statistics Canada, Table 35-10-0104-01

The concept of a Phillips curve trade-off is exemplified in the US Federal Reserve's dual mandate to maintain price stability at the highest possible employment rate. The validity of the Phillips curve is debatable and certainly in the 1970's the relationship broke. There was persistently high inflation at the same time as high unemployment. What had changed in the 1970s to create these unique conditions? First was an overly accommodative monetary policy that increased the money supply in response to weakening GDP growth. At the same time, the OPEC oil embargo caused a negative aggregate supply shock; oil being a major input in all economic activity was suddenly more expensive and scarcer, which increased the cost of production across the economy. A readily expanding monetary base combined with an energy price shock in real terms caused the allegedly impossible situation of rising prices and contracting economic activity.

DISCUSSION:

Against this backdrop, we examine the returns of farmland and other assets versus changes to the nominal interest rates during this period of stagflation. The inflation caused by an increase in the money supply and/or sustained fiscal deficits is not limited to changes in the prices of goods and services, financial asset prices may also see upward price movements depending on their features.

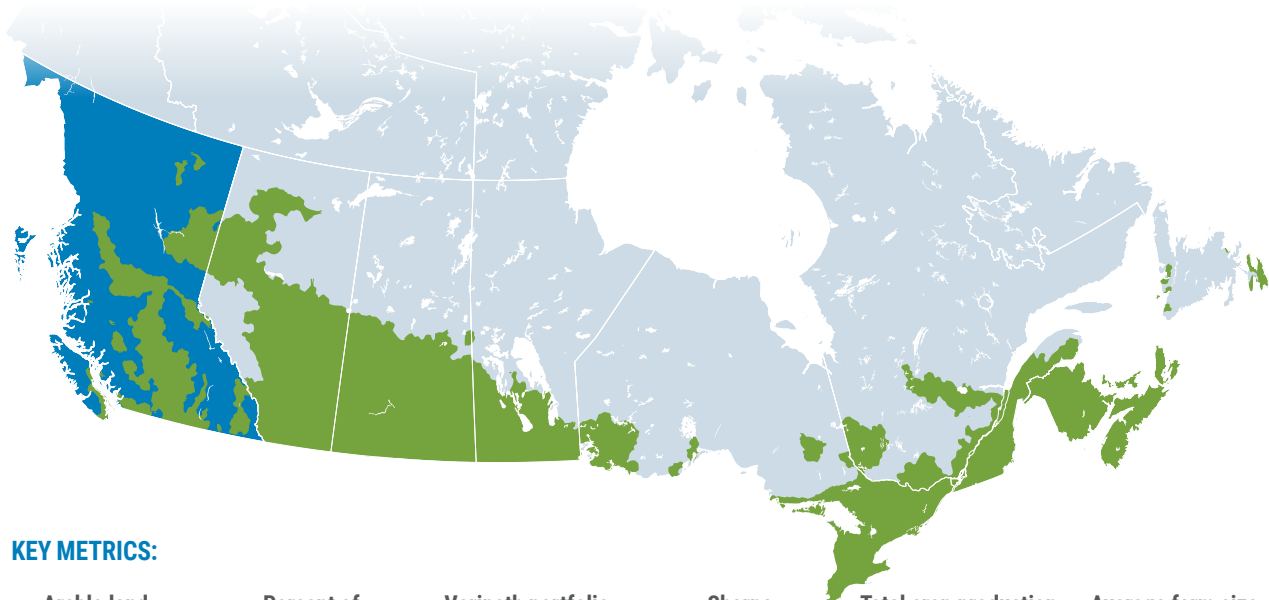
Recasting different financial assets into their cashflow and duration, we can compare the relative impacts of changes in nominal interest rates and inflation. Examples of short duration assets include floating rate bonds and dividend paying common stocks. Short duration assets have less inflation risk associated with them because there is less duration for inflation to erode their face value. Moreover, these shorter duration investments tend to show more constructive and less volatile price behavior when interest rates appreciate. We have seen that shorter duration assets performed relatively better in 2022 – once the U.S. Federal Reserve started embarking on a restrictive monetary policy mandate.

When nominal interest rates rise most assets tend to realize downward revisions in their market price, and in particular, longer duration assets tend to exhibit more volatility. The reason for this statistical behavior of longer duration assets, is not only rooted in present value mathematics, but also due to the market's fear of rising future nominal inflation rates. Non-dividend paying common stocks, commercial real estate, and long dated treasury bonds are examples of longer duration assets.

“It does not matter who you are, or how smart you are, or what title you have, or how many of you there are, and certainly not how many papers your side has published, if your prediction is wrong then your hypothesis is wrong. Period.”

– Richard P. Feynman

BRITISH COLUMBIA



KEY METRICS:

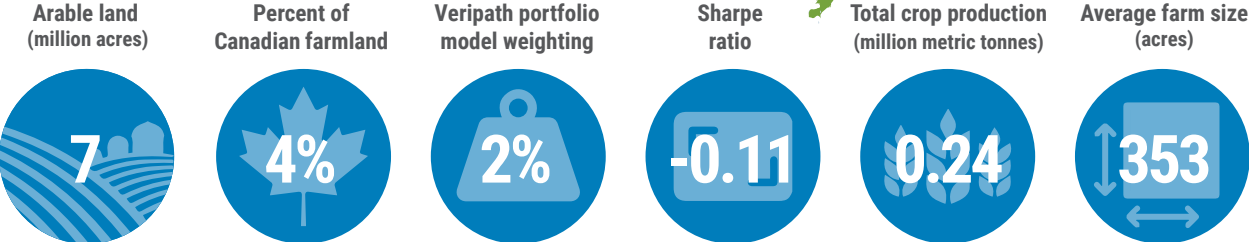
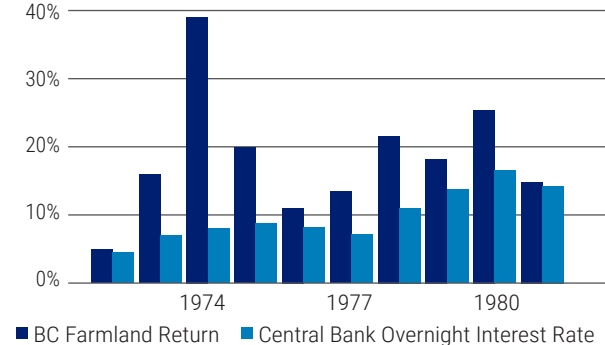
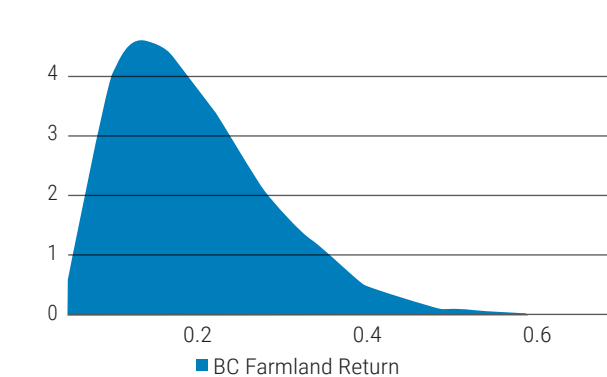


Chart 7: BC Farmland Change in Price vs. Change in BOC Policy Rate



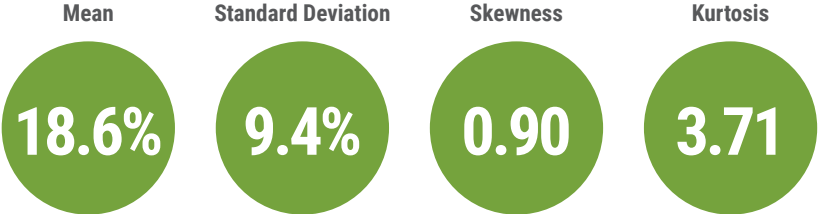
Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 7a: Return Distribution Curve

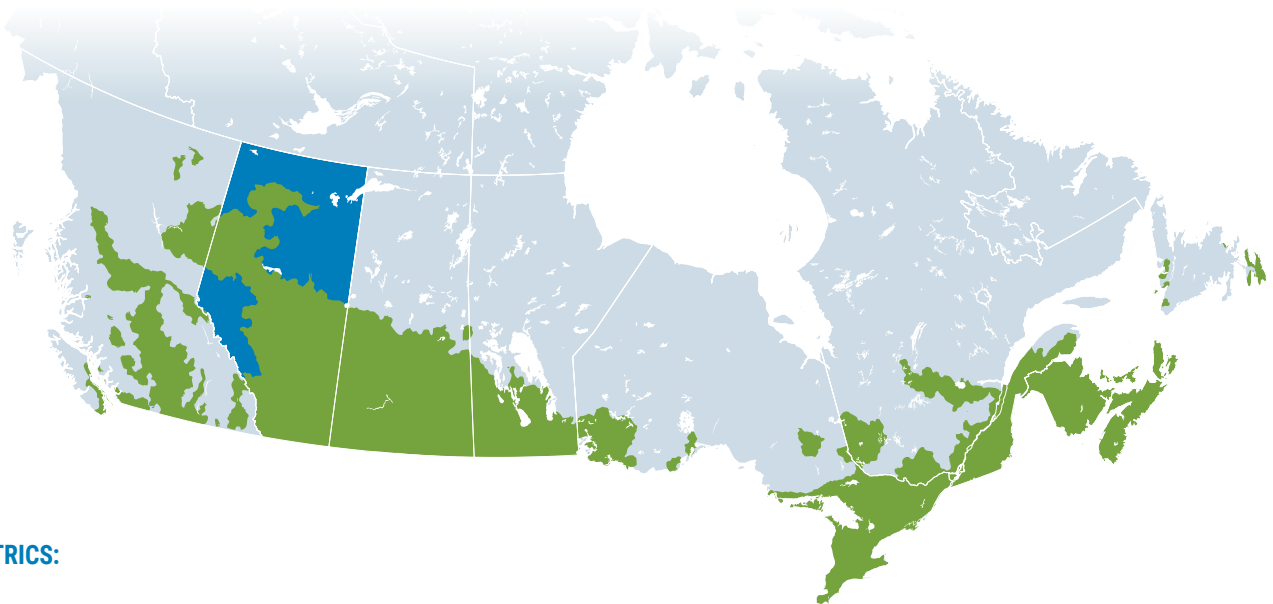


Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

STATISTICAL MOMENTS:



ALBERTA



KEY METRICS:

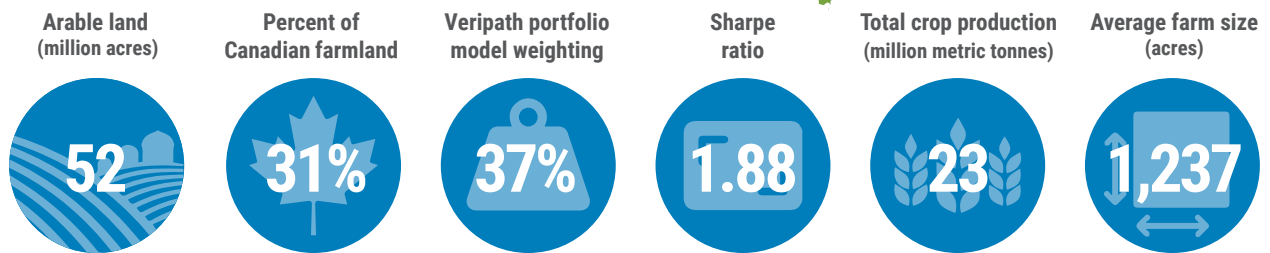
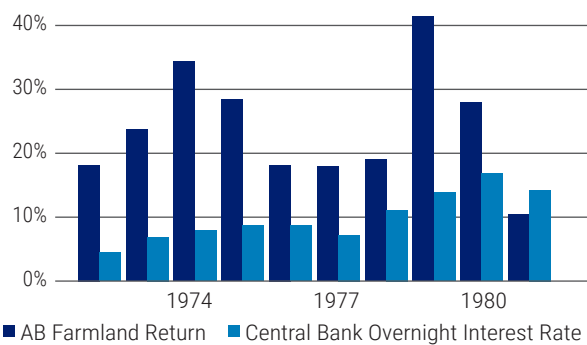
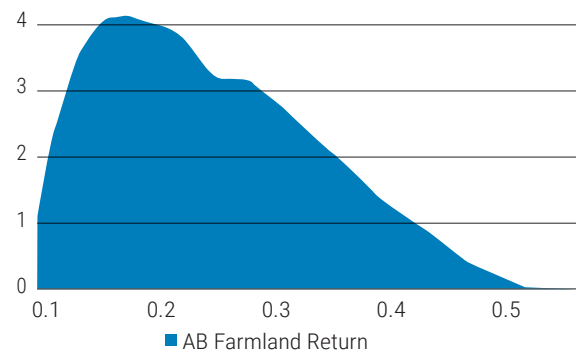


Chart 8: AB Farmland Change in Price vs. Change in BOC Policy Rate



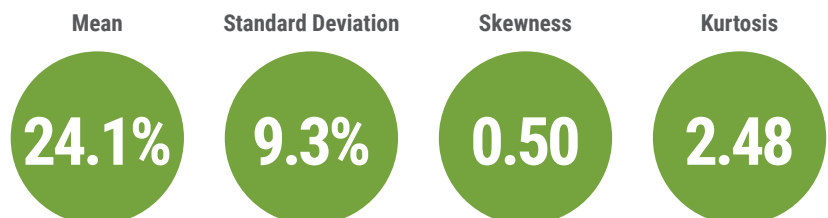
Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 8a: Return Distribution Curve

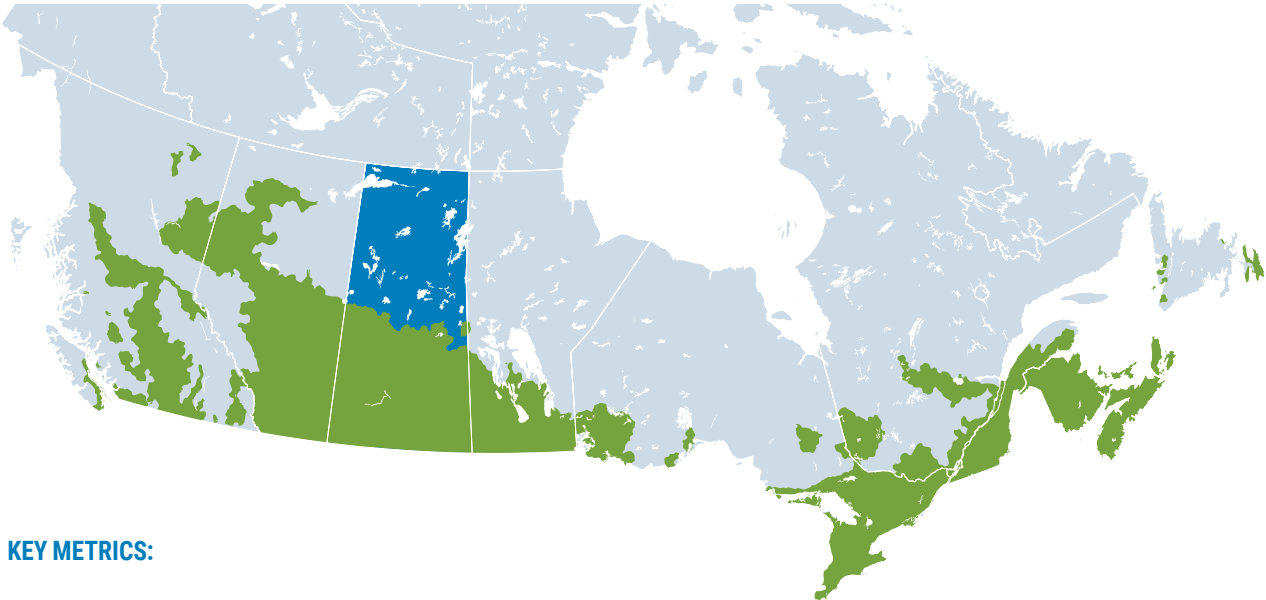


Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

STATISTICAL MOMENTS:



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KEY METRICS:

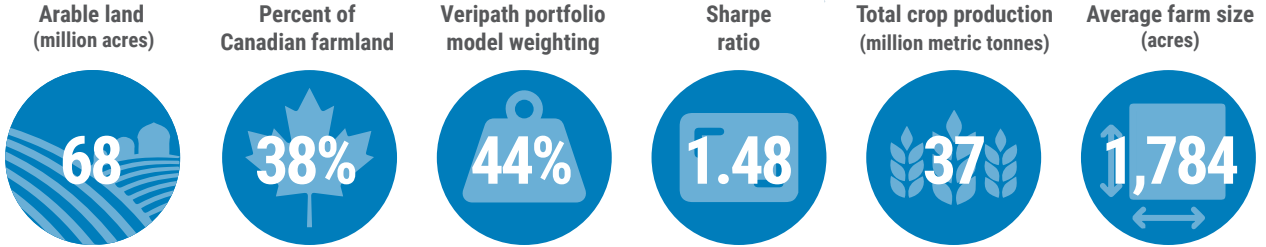
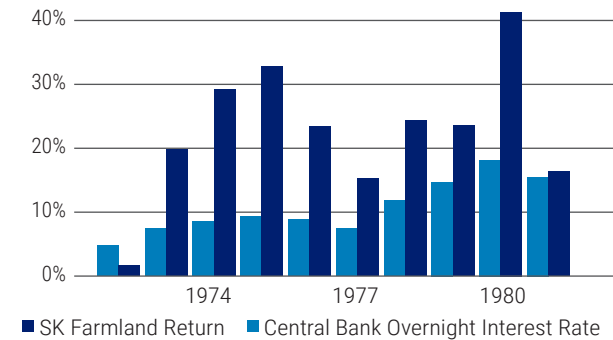
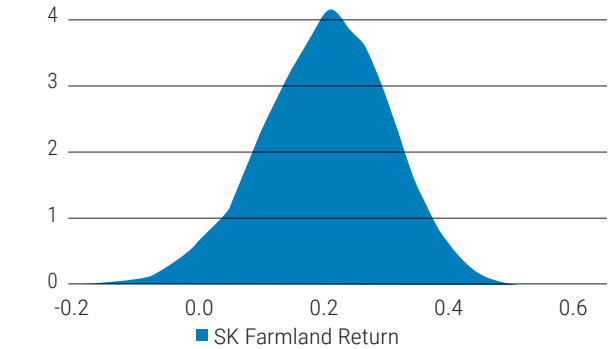


Chart 9: SK Farmland Change in Price vs. Change in BOC Policy Rate



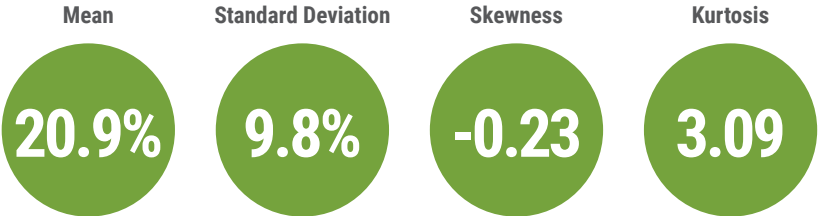
Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 9a: Return Distribution Curve

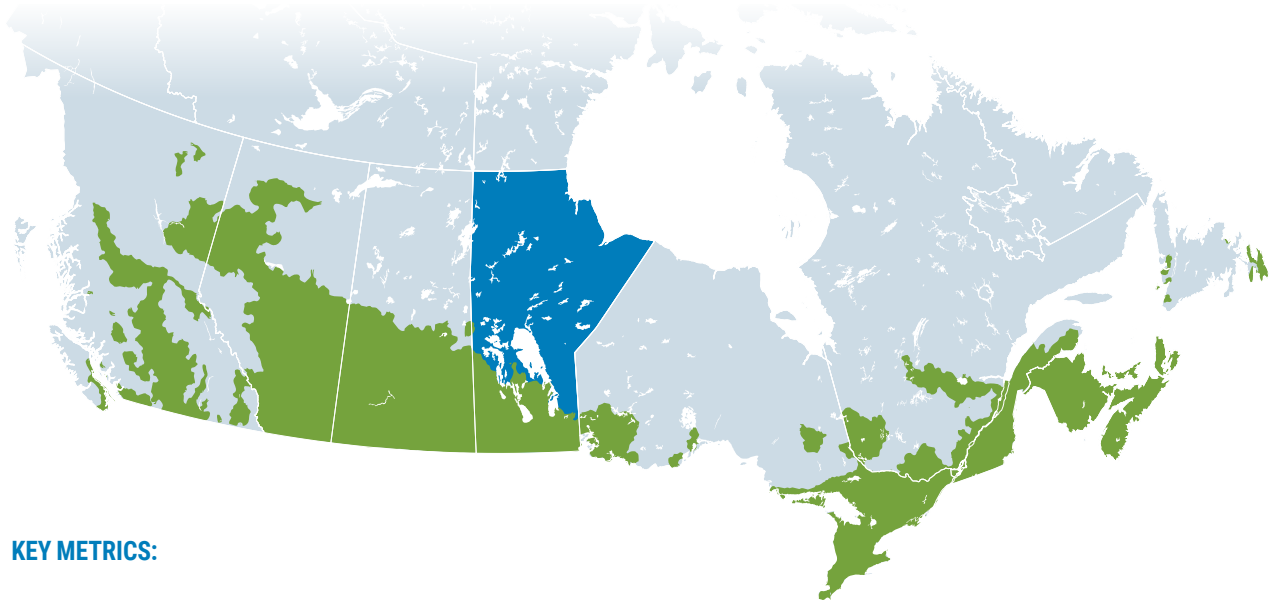


Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

STATISTICAL MOMENTS:



MANITOBA



KEY METRICS:

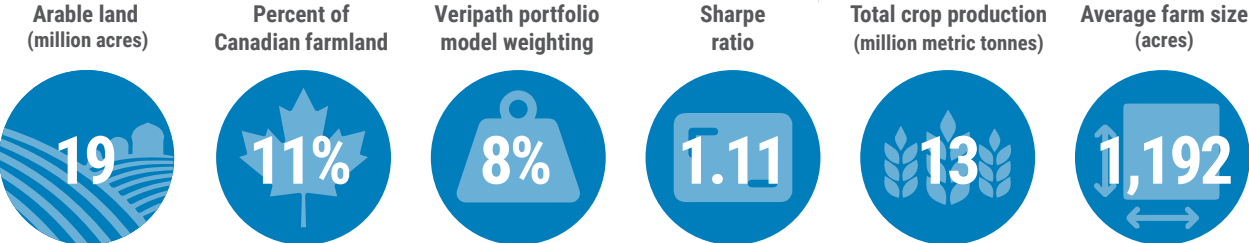
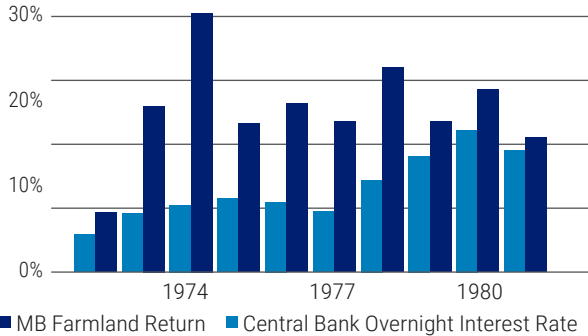
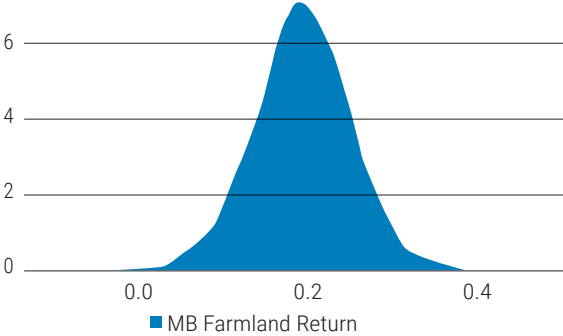


Chart 10: MB Farmland Change in Price vs. Change in BOC Policy Rate



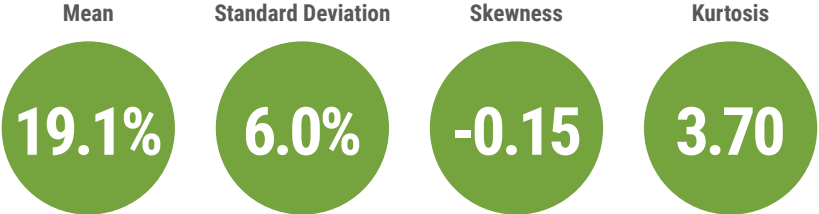
Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 10a: Return Distribution Curve

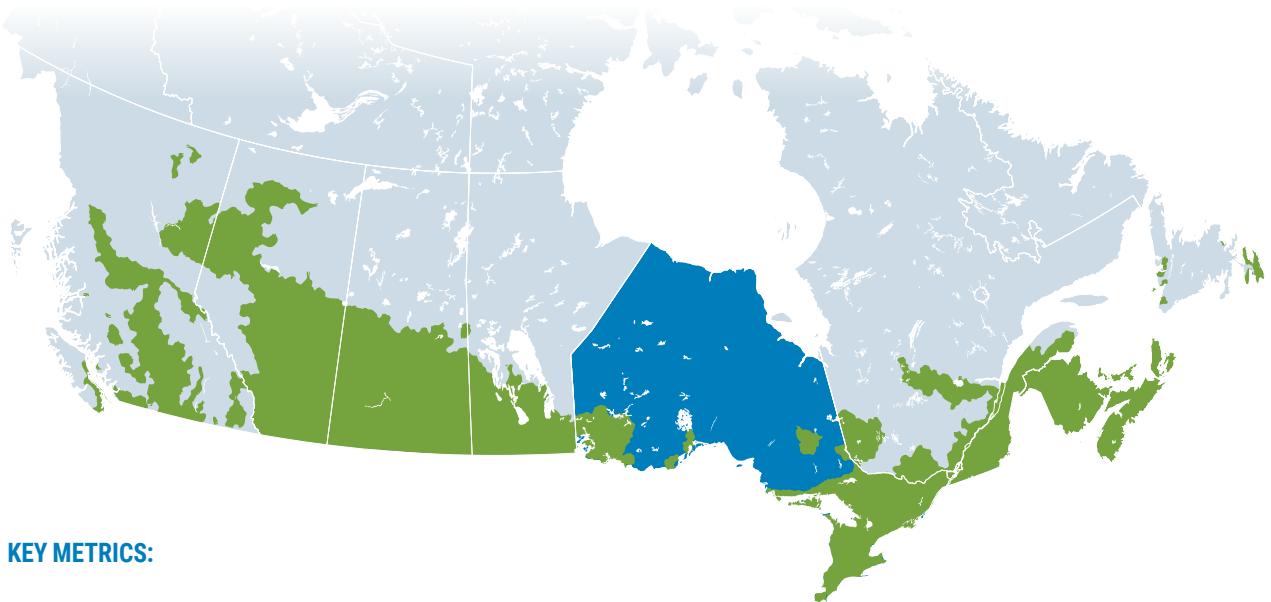


Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

STATISTICAL MOMENTS:



ONTARIO



KEY METRICS:

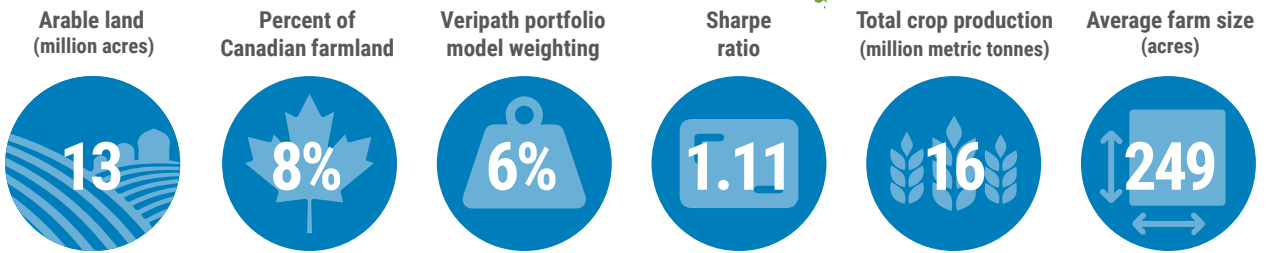
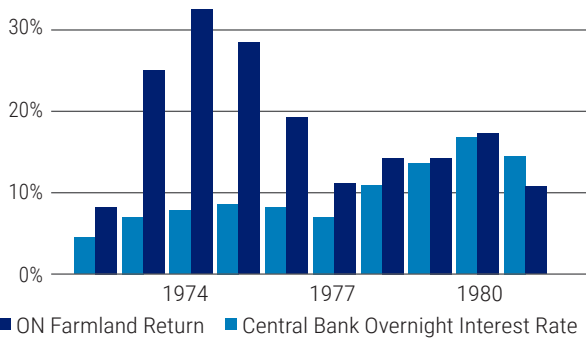
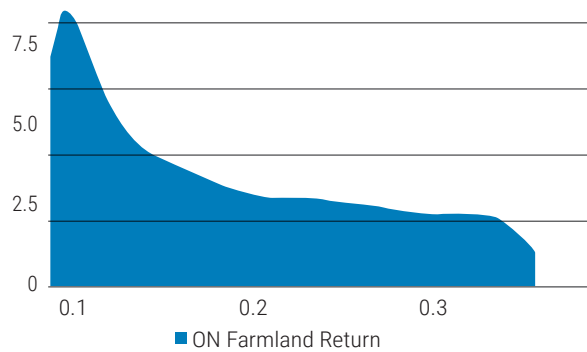


Chart 11: ON Farmland Change in Price vs. Change in BOC Policy Rate



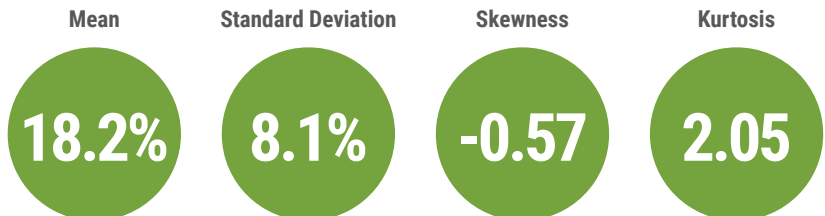
Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 11a: Return Distribution Curve

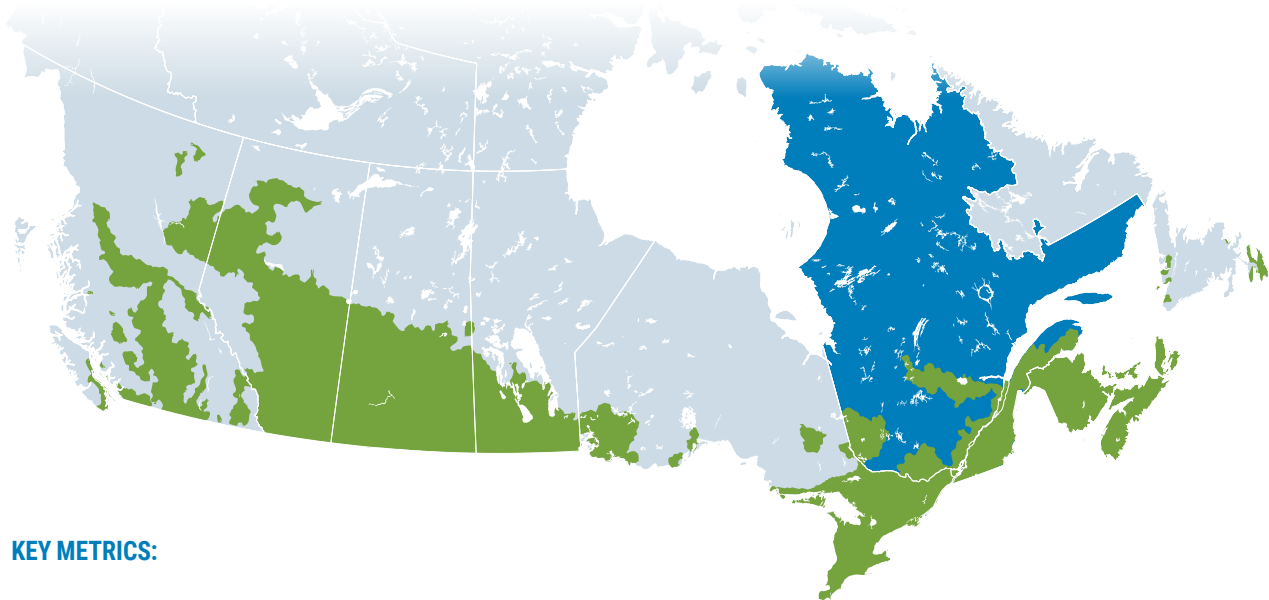


Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

STATISTICAL MOMENTS:



QUEBEC



KEY METRICS:

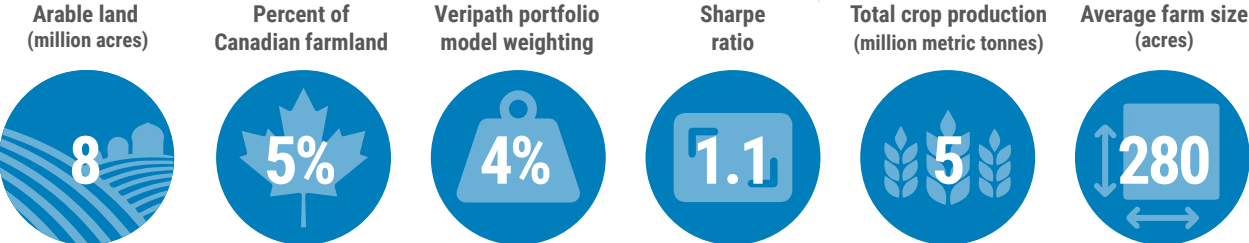
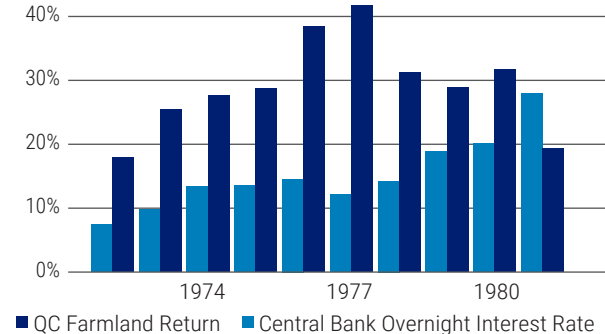
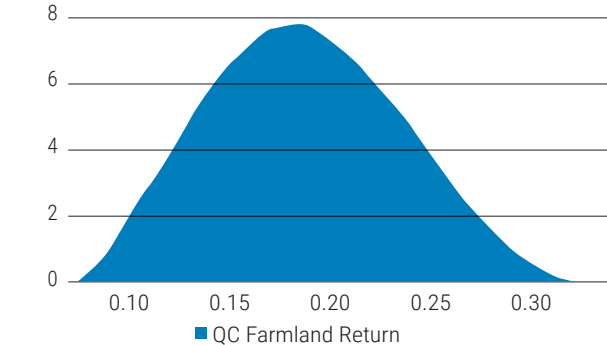


Chart 12: QC Farmland Change in Price vs. Change in BOC Policy Rate



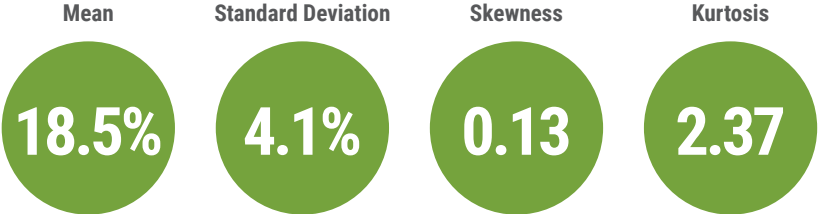
Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 12a: Return Distribution Curve

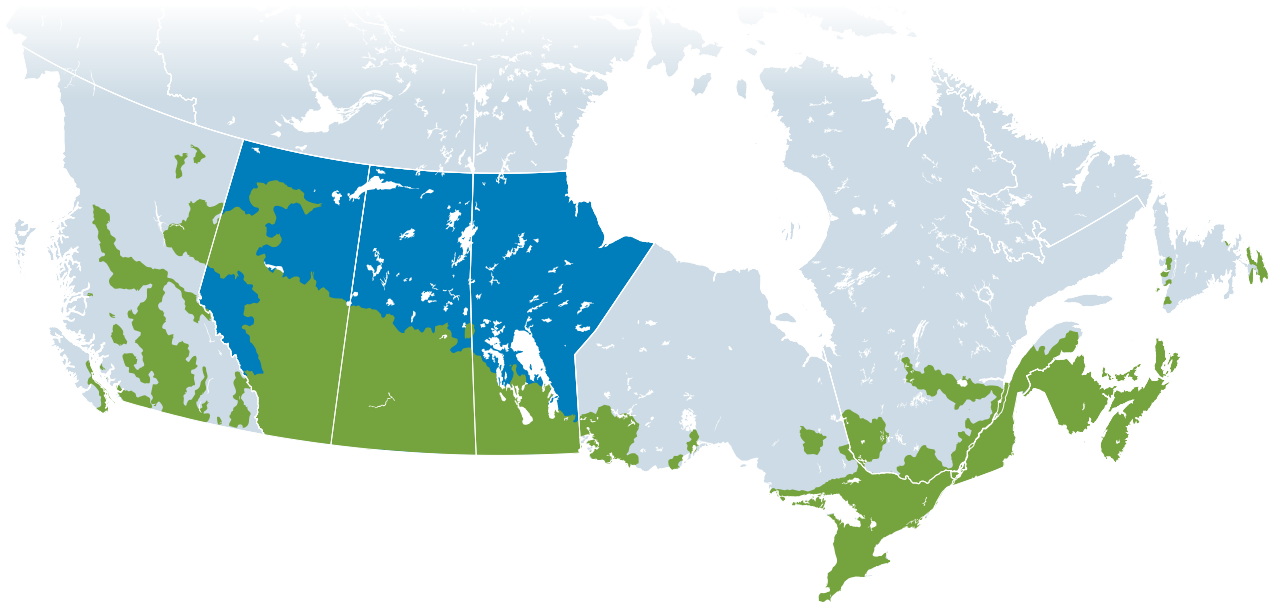


Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

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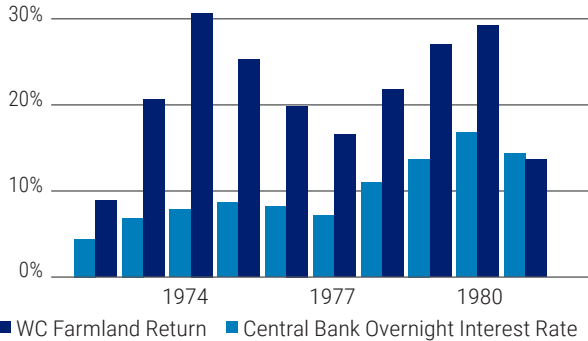


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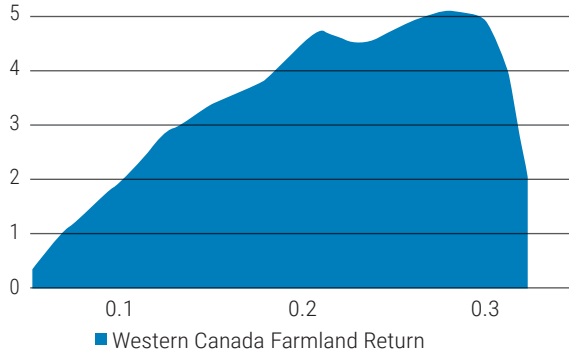
The prairie provinces of AB, SK and MB represent approximately 80% of Canada’s farmland by area and are worth considering as a single asset for the purposes of this analysis. We have performed the same interest rate sensitivity plotting as well as the calculation of the risk moments.

Chart 13: Western Canada Farmland Change in Price vs. Change in BOC Policy Rate



Sources: Statistics Canada, Table 32-10-0047-01, Vector: v122495

Chart 13a: Return Distribution Curve



Sources: Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

STATISTICAL MOMENTS:

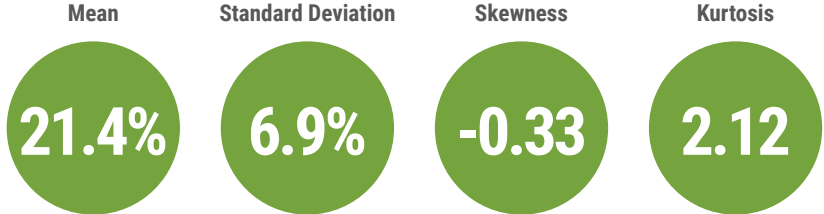
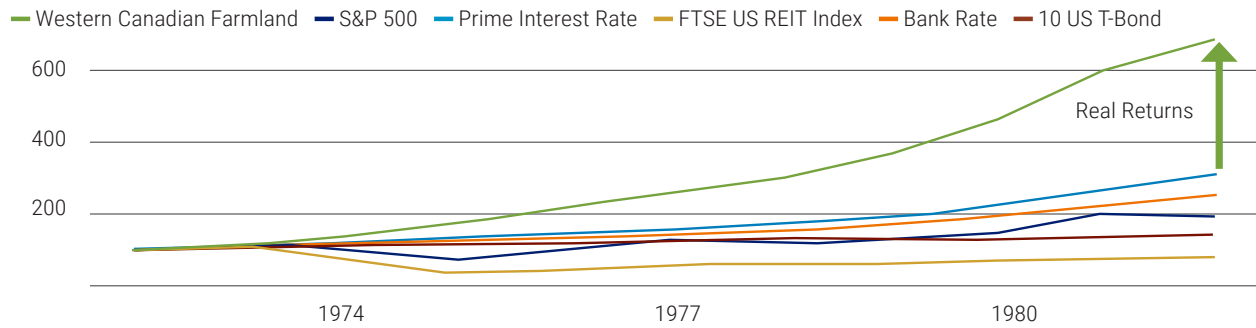


Chart 14: Stagflation Era Cumulative Return to Western Canadian Farmland



Sources: A. Damodaran Historical Returns, Nareit REIT Indexes, Statistics Canada, Table 32-10-0047-01 and Vector: v122495

It is clear in the chart above that western Canadian farmland outperformed a number of large, traditional asset classes during the stagflation of the 1970s. Keep in mind that the Bank of Canada raised the overnight rate during this period from 4.5% in 1972 to a maximum of 16.75% in 1980 to try and tame inflation. These higher interest rates were successful in pushing down the returns of other asset classes but Western Canadian farmland was more resilient, outpacing inflation and generating material real returns. While an investment in farmland would have been the prudent investment in 1972, the return distribution is also an important consideration.

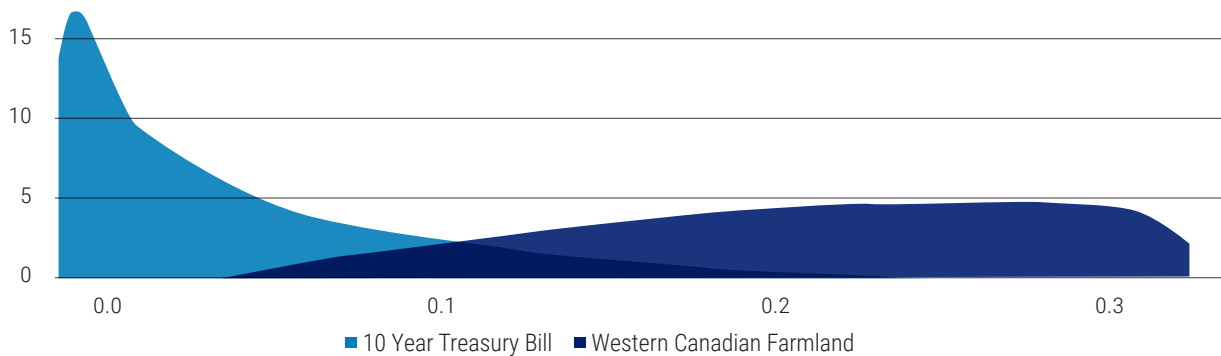
Table 1: Statistical Moments – Bonds, Stocks, CRE and Western Canadian Farmland 1970s

	Western Farmland	S&P 500	10 US T-Bond	FTSE US REIT Index
Mean	21.4%	8.4%	3.4%	1.0%
Variance	0.50%	4.3%	0.3%	6.7%
Skewness	-0.331	-0.214	1.329	-0.719
Kurtosis	2.120	1.816	4.237	2.664
Standard Deviation	6.9%	20.9%	5.3%	26.0%

Farmland in Western Canada had far superior returns against 10 Year US Treasury Bills, the Standard & Poor's 500, and the FTSE US REIT index. It is worth noting that while farmland beat equity markets it did so with a variance similar to US Treasury bonds which are also considered to be one of the worlds' safest assets in periods of economic uncertainty. In effect, a low allocation to farmland provided a large inflation/stagflation insurance policy – with an symmetric payout.

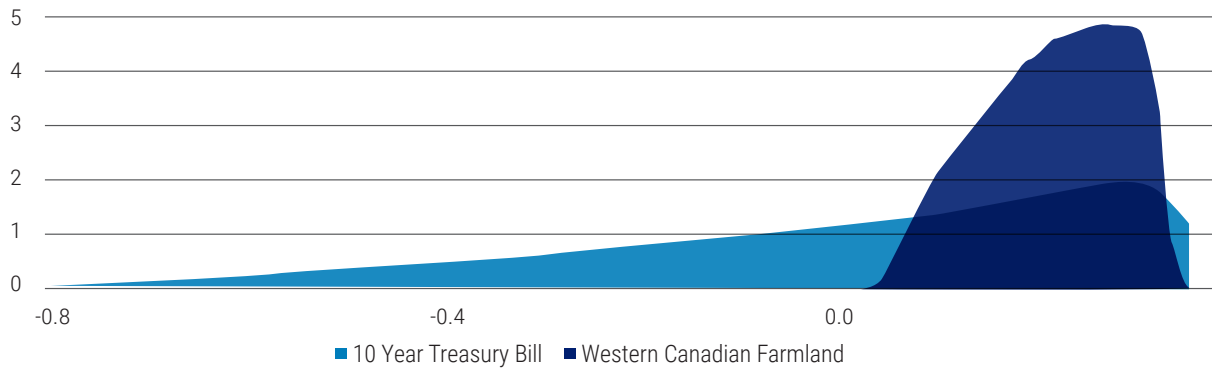
Below, we use the Pearson distribution to ingest the values in the table and show an estimate of the return density for each asset. Visually, it is even more apparent how western Canadian farmland outperformed other benchmark assets in this inflationary/stagflationary period.

Chart 15: 10 year Treasury Bill vs. Western Canadian Return Curves



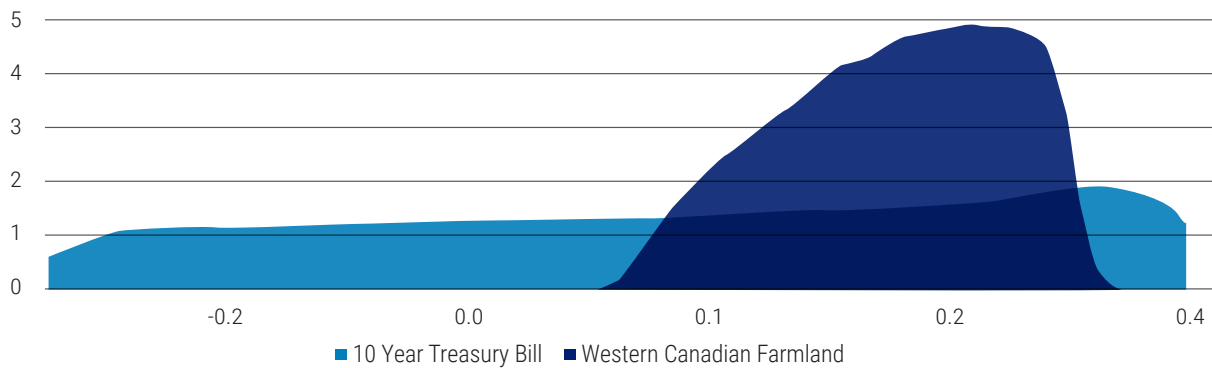
Sources: A. Damodaran Historical Returns, Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

Chart 16: UR REIT vs. Western Canadian Farmland Return Curves



Sources: Statistics Canada, Table 32-10-0047-01, Nareit REIT Indexes, Omnigence Analytics

Chart 17: S&P 500 vs. Western Canadian Farmland Return Curves



Sources: A. Damodaran Historical Returns, Statistics Canada, Table 32-10-0047-01, Omnigence Analytics

CONCLUSION:

Omnigence and its partner fund Veripath believe farmland has a unique return structure. At a high level, it is because it is effectively in fixed if not diminishing and is a non-depleting commodity production asset that discounts an infinite series of commodities, with long-term inelastic demand, low stock to flow and which are consumed. In times of loose monetary policy and economic stagnation farmland has tended to outperform.

REFERENCES & SOURCES:

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- Nareit REIT Indexes: www.reit.com/sites/default/files/returns/AnnualReturns.xls
- St. Louis Federal Reserve, Tables: FPCPITOTLZGUSA, FEDFUNDS, A191RP1Q027SBEA
- Statistics Canada, CANSIM Database Table: 18-10-0256-01, 36-10-0104-01, 32-10-0047-01, Vector: v122495
- Statistics Canada, CANSIM Database Table: 3210-0359-01 (formerly CANSIM 001-0017)
- Health of our Soils, Sharpe ratio = (2008-2018) Veripath analytics, using Risk Free Rate = 3%, Veripath portfolio model weighting is as of 2021, average farm size as of 2016, crop production data is 2020 in million metric tonnes, BC census of Agriculture 2006, Alberta Agriculture and Forestry, Statistics and Data Development Section



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