Shire Capital Management

Evaluating Farmland Investments

2024

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Introduction

This paper seeks to explain the drivers of farmland returns and thus provide some clarity regarding both the investment benefits of the asset class, and potential sources of excess return.

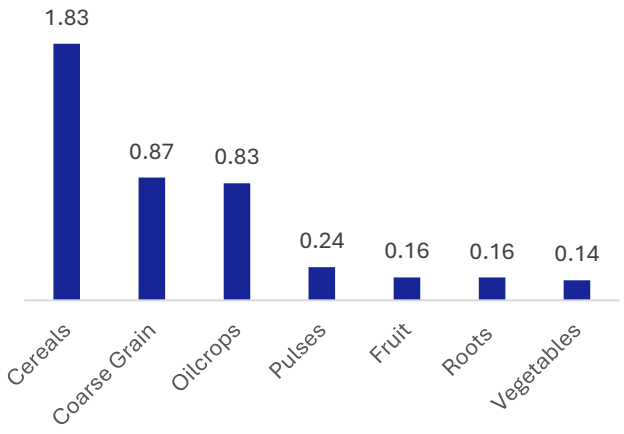
Diversification, inflation protection, and capital preservation have been the often-cited benefits of North American farmland investments since the 1980s, when institutional investors first turned their attention to the asset class. We organise a discussion of these benefits and their drivers using the simple capitalization model with reference to aggregate data from the US and Canada. Although we refer throughout to the extensive literature formally testing the descriptive and prescriptive validity of various valuation models, we only use these models as a framework. The internal limitations of the data, and external inapplicability to actual farmland investment projects, limit the value of formally testing these models (see appendix for more details). Aggregate data are only used to demonstrate the use cases of these models and highlight nuances for discussion.

We start by outlining the major trends in global farmland markets and background on the North American market structure. Many global trends pertain to local farmland returns: demographic changes, state subsidies, and the commodification of cereal crops. The capitalization model can endogenize these trends as it incorporates expected returns and the opportunity cost of capital. The model is also based on the reality that banks, lending to farm-buyers, will use an asset pricing model in some form to assess the applicability and terms of farm loans. We conclude by highlighting potential sources of excess returns from specific farmland market strategies.

Macro Context

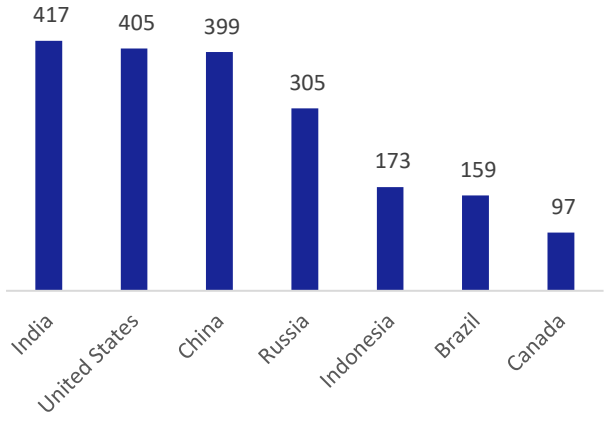
Global farmland occupies close to 12 billion acres, or in other words, half of the world's habitable land.[1] The majority of this area (69%) is used as pastureland, for grazing and raising livestock. The remaining land can be categorised by crop type, either row crops, e.g. wheat, corn, rice (28%) - or permanent crops, e.g. blueberries, cherries, apples (3%). Climate, regulation, and history influence the crop-mix and farmland market dynamics in each region.

FIGURE 1. GLOBAL FARMLAND - CROP TYPE
2022 (acres, billions)



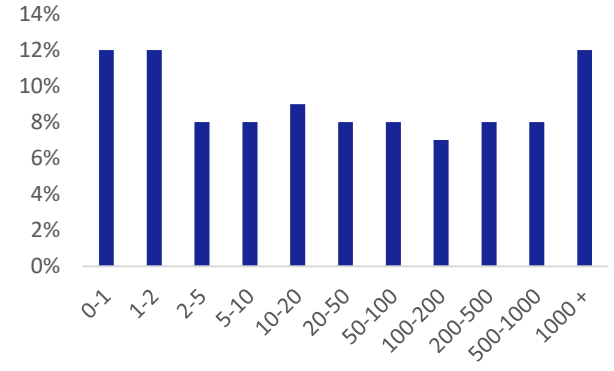
UN Food and Agriculture Organisation ("FAO")

FIGURE 2. NATIONAL CROPLAND AREA
2023 (acres, millions)



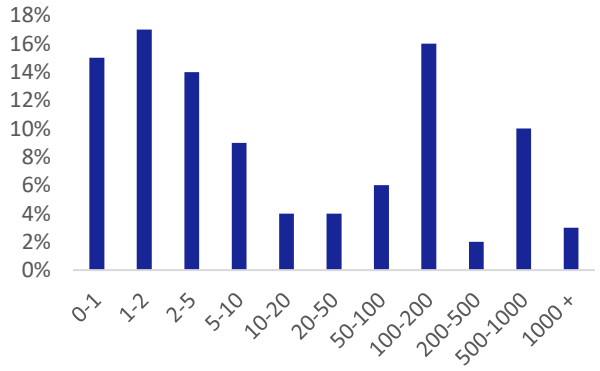
FAO

FIGURE 3. % GLOBAL FARMLAND - FARM SIZE
2015 (hectares)



FAO

FIGURE 4. % FOOD PRODUCTION - FARM SIZE
2015 (hectares)



FAO

Crops vary in their use, value and land requirements. For example, corn is the primary source of animal feed in the US but can also be used to make ethanol and food products such as corn-syrup. Corn is cultivated on 6 continents, requires relatively low upfront costs and can be grown multiple times a year. The long shelf life and homogeneity of many grains has facilitated their commodification, with centralised commodity exchanges functioning internationally. The market dynamics for many permanent crops are different due to higher input costs, specific land requirements and a short shelf life. Market dynamics of specific crops will be further complicated by the role of the state, with subsidies and international trade restrictions imposed due to farming output's importance to national culture and security.

[1] Ourworldindata.org/land-use

North American Farmland Market

North America farmland is the most productive in the world on a per capita basis. The region produces 10% of global agricultural output, but is responsible for over 50% of global maize exports and over 30% of soybean, pig and wheat exports. Given the sector's strategic and cultural importance, government subsidies and policies have a significant impact on the market structure.

Farmland accounts for 80% of the total value of farm sector capital. The sector-wide debt/equity ratio is 15% in the US and 20% in Canada, with there being a well-established lending market against farmland. Farmland prices therefore can have a large impact on the welfare of the sector.

In both Canada and the US a dichotomy exists between small and large farms. In the US, 89% of all farms are categorised as 'small family farms', the remaining 11% of farms produce 79% of farm output. Economies of scale are driving the major industry trends:

- Market concentration
- Vertical integration
- Product and operational differentiation

Small family farms occupy 46% of US farmland, and with only 23% of expected land sales in the next five years expected to be sold to a non-relative, the market remains largely illiquid and hard to access. The market for institutional farmland investment has emerged in part to facilitate the consolidation and vertical integration of an otherwise illiquid and informationally asymmetric market.

History of Institutional Farmland Investment

Since the emergence of early farmland investment funds in the 1980s, the industry has grown rapidly.[2] Food and Agriculture is now an established asset class with over $200 Billion of assets under the management of over 700 organisations allocating to the sector. Farmland asset managers, focused on production, control more than 50 million acres globally.[3]

1981 – John Hancock Mutual Life Insurance Company launched the Agricultural Capital and Real Estate (ACRE) Fund. John Hancock later sponsored the development of Pacific Coast Farms which would become Hancock Agricultural Investment Group, one of the largest US-focused managers.

1980s – The 'farm crisis' of the late 1980s led to a period of industry consolidation. Prudential bought Capital Agricultural Property Services (CAPS), Met Life bought Farmers National. The Westchester Group (now Nuveen) was founded in 1986.

1980s – This period of farmland price volatility promoted many of the foundational papers in the field of farmland investment analysis. Studies testing the capitalization model and implications of Modern Portfolio Theory on farmland return series include (Melichar, 1979), (Barry, 1980), (Burt, 1986) and (Irwin et al., 1988).

1990s – Pension plans diversify into farmland following the lead of Illinois State Board of Investment that invested with Westchester in 1989. In 1995 a small group of managers worked with the National Council of Real Estate Investment Fiduciaries (NCREIF) to develop the first farmland returns index.

2000s to Present – Global managers turn their attention to new markets in Australia, Ukraine and South America. Retail-investor oriented funds emerge such as the public Gladstone land REIT in 2013.

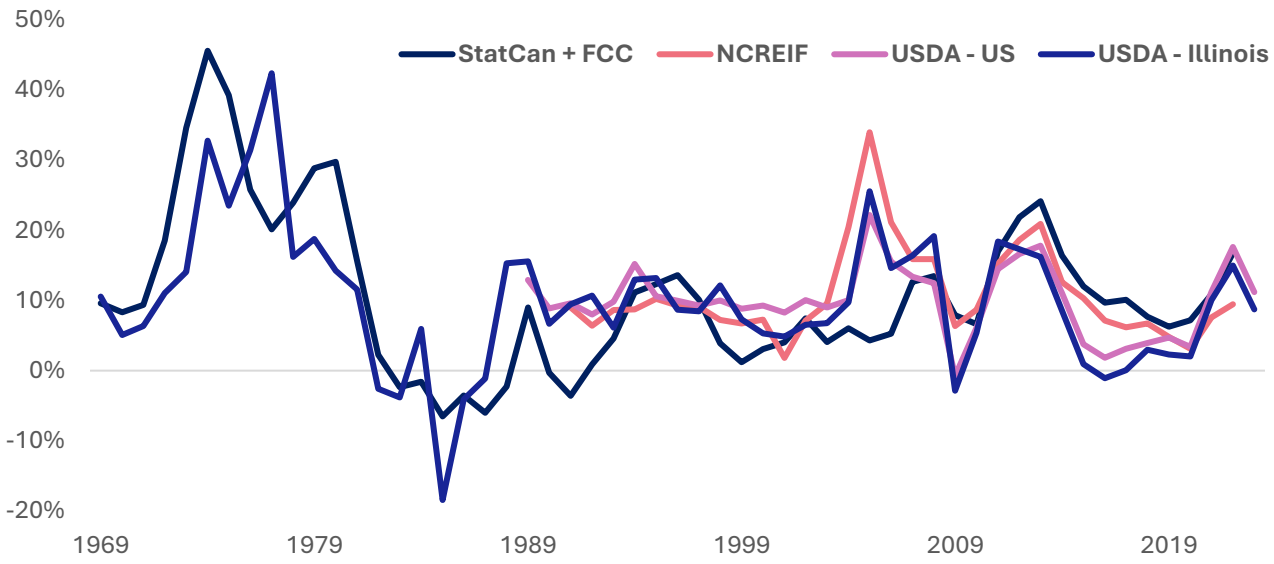
Despite the expanding reach of institutional agricultural investment managers, the North American farmland market remains largely fragmented, with opportunities for alpha.

[2] Farmland Investment History. Koeninger, 2017
[3] Global Ag Investing Report, 2019

Financial Returns

Since the 1970s, average total nominal returns to farmland have been approximatly 10%.[4]

FIGURE 7. TOTAL NOMINAL RETURNS (INCOME + CAPITAL APPRECIATION)
1969-2023 (North American Farmland)



Total nominal farmland returns calculated using American (NCREIF, USDA) and Canadian (Statistics Canada, FCC) survey data.[4]

	NCREIF	USDA - US	USDA - Illinois	StatCan + FCC
Mean Return 1960-2023	-	-	11.39%	10.87%
Mean Return 1991-2022	10.82%	9.98%	10.44%	9.03%

Total returns to farmland consist of two components: income, and capital gains:

$$Total\ Return = Income\ (\%) + Capital\ Gains = R_t = \frac{I_t}{P_t} + \frac{P_{t+1} - P_t}{P_t} \quad (1)$$

With R_t being the one period total return, I_t being the asset's net income between t and t+1, P_t being the price at time t and P_{t+1} the price the following period.

[4] See appendix for more details on the data used

Inflation

As the Fisher equation states: the nominal interest rate equals the real interest rate plus inflation. The market sets the price of an asset such that its expected nominal return equals the equilibrium expected real return plus expected inflation. If we believe the real economy is largely independent of monetary influence, we should expect to see an asset's expected nominal returns moving proportionally with expected inflation.[5]

Being a real asset, farmland should also hedge against unexpected inflation. If rent is linked to product prices (as would be the case in a crop-share agreement), then rent will rise as the price of crops sold rises that period with unexpected inflation.

Food accounts for over 16% of the Canadian Consumer Price Index (CPI)[6] and the growth rate of food prices has been higher than that of the average basket of goods since the 1940s.

Supporting the common assertion that farmland is a good hedge against inflation, Baker et al. (2014)[7] found Iowa Farmland to have been a near-perfect hedge against inflation between 1911-2012.

RESULTS OF BAKER, BOEHLJE AND LANGE (2014)[7]

Regression of Nominal Returns on Expected and Unexpected Inflation, 1911-2012

	Intercept	Expected Inflation	Unexpected Inflation
Iowa Farmland Return	7.64	0.96	1.18
S&P 500 Return	10.12	-0.27	0.47

The negative relationship between the S&P 500's nominal return and expected inflation was first highlighted in Fama and Schwert's 1977 paper.[2] If significant, this clearly brings the quantity theory of money into question, suggesting inflation impacts real returns. This could be true for real farmland returns for the following reasons:

- As a known inflation hedge, if expected inflation suddenly rises (as in the 1970s) real farmland prices may rise as investors crowd into the asset class.
- If capital gains tax is lower than income tax, as expected inflation rises so too will the real price (Feldstein, 1980).[8]

Many studies (notably Alston, 1986) have found the impact of inflation on real returns to be insignificant.[9] Acknowledging that farmland should act as a perfect inflation hedge, from this point we will deal with prices and returns in real terms.

[5] Fama and Schwert, 1977
[6] www150.statcan.gc.ca/n1/pub/71-607-x/2018016/cpi-ipc-eng.htm
[7] Baker, Boehlje and Lange, 2014
[8] Feldstein, 1980
[9] Alston, 1986

Capitalization Model

The income capitalization model is a widely accepted method of valuing income-producing assets:

$$P_0 = \sum_{0}^{T} \frac{E(I_t)}{(1+d)^{t+1}} \tag{2}$$

With $E(I_t)$ being the expected net income between t and t+1 and d being the (assumed constant) discount rate.

If $E(I_t)=I_1$ for all t (is constant), this can be simplified to:

$$P_t = \frac{I_t}{d} \tag{3}$$

If $E(I_t)$ is growing at a constant rate g:

$$P_t = \frac{I_t}{d-g} \tag{4}$$

i.e. the Gordon growth model. Which can be rearranged as:

$$d = \frac{I_t}{P_t} + g \tag{5}$$

d – the real discount rate – is the required rate of return to value the asset:

$$d = R_f + R_p \tag{6}$$

With R_f being the risk-free rate and R_p the risk premium of the asset. Which in equilibrium, equals the total return:

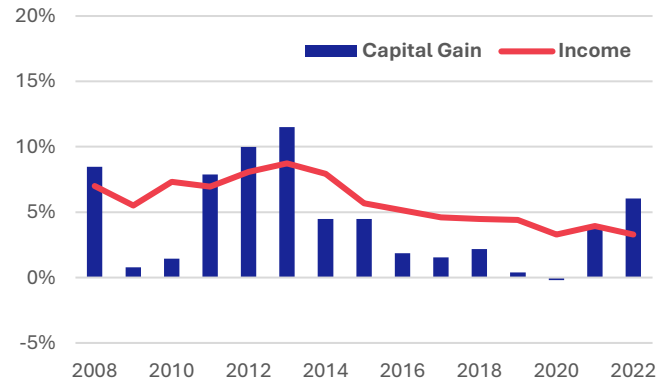
$$d = R_t = \frac{I_t}{P_t} + \frac{P_{t+1} - P_t}{P_t} = (d-g) + g \tag{7}$$

Income

Net farmland income (I) is the rent (less property taxes and expenses) received by the farmland owner from the farm operator. This can take the form of a fixed cash rent, a crop share arrangement, or a share of owner-operated income.

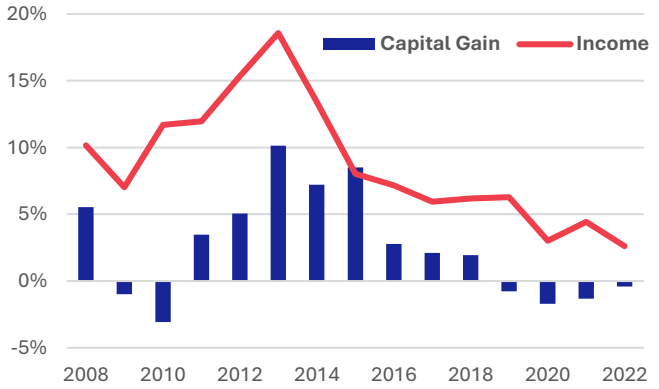
The implications of different lease arrangements and land types can be seen in the differing income characteristics of row crops compared with permanent crops:

FIGURE 8. INCOME & APPRECIATION - ROW
2008-2022 (nominal annual returns)



NCREIF Farmland Index

FIGURE 9. INCOME & APPRECIATION - PERMANENT
2008-2022 (nominal annual returns)



NCREIF Farmland Index

(2008-2022)	Row Crop Income	Permanent Crop Income
Mean	3.86%	8.76%
Standard Deviation	0.004	0.040

Permanent crop income is both higher and more volatile than row crop income. This can be explained by two main factors:

- **Lease Type:** Permanent cropland is often leased on a revenue-share, rather than cash-rent basis. Returns are therefore more volatile as they depend on the variable factors affecting farm production and price. Higher average income reflects this increased risk.
- **Asset Risk:** The permanent-crop landowner will often own not only the land but also the permanent plants. The plants are a riskier asset and require more upkeep and investment, average income may be higher to reflect returns to this other asset too.

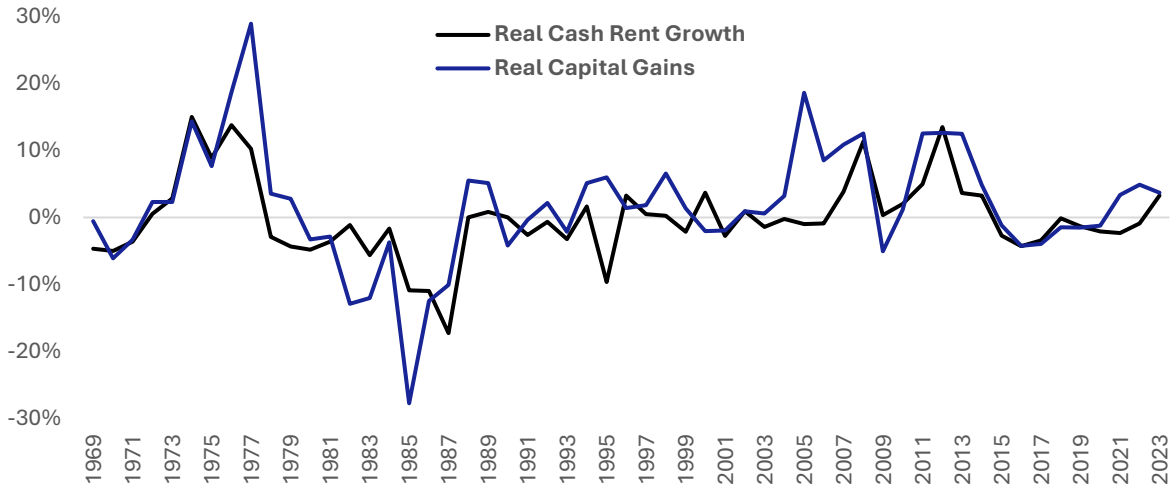
In the long run, net farmland income (assuming g=0) should reflect the returns to farmland as a factor in the production of crops, which depends on the relative productivity and scarcity of the land compared to other factors of production (labor, capital).

However, the way in which these long-run returns are reached reflects the unique nature of land as a fixed factor of production. Land can change uses (in a global food crisis, vegetables may be planted on golf courses), but for the most part, the quantity of land is fixed for a given purpose. The economist Robert Triffin described how “excess returns are either competed away, or imputed away”. When mechanical reapers were scarce Cyrus McCormick made very high returns until other manufacturers entered the market and competed away excess returns. When expected rents on land are high, excess income returns (I/P > d) are ‘imputed’ down to the market rate - the price of land is bid up, benefitting the existing landowner through capital gains.

Capital Gains

The capitalization model can illuminate the drivers of farmland price changes. In equation (2), farmland price is a function of expected future income. Expectations are hard to model, but simply using a 'naïve' estimate (last period's rent) is a suitable approximation.[10] This implies that changes in price (capital gains) should move closely with changes in net income (income growth).

FIGURE 10. CASH RENT GROWTH/CAPITAL GAINS
1969-2023 (nominal annual returns)

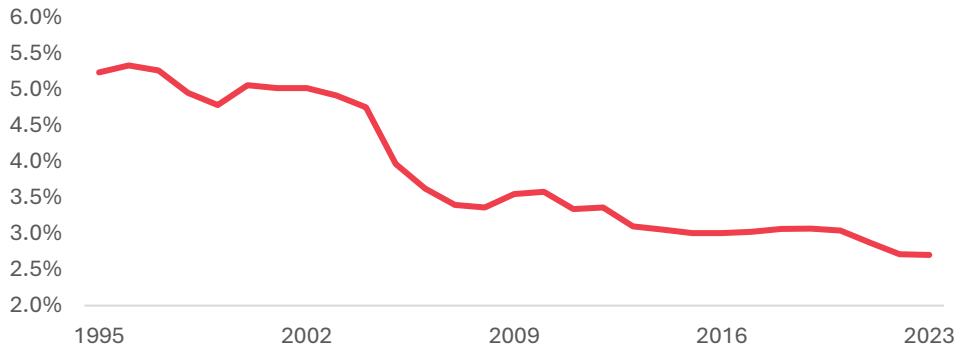


Farmland Cash Rent as a proxy for net income (USDA & FRED CPI)

The relationship between price changes and income growth is supported by farmland data from multiple countries, with Alson (1986) concluding that the growth in real land prices can be explained by the growth in net income.[11] If we assume income growth is constant (4), then the relationship between price and income growth is clear. In equilibrium (7), capital gains is equal to the growth rate 'g'.[12]

Another result following from the capitalization model equilibrium condition (7) is that the income return (I/P) equals the discount rate minus the growth rate (d-g).

FIGURE 11. INCOME RETURN (CASH RENT/PRICE)
1995-2023 (Illinois cropland)



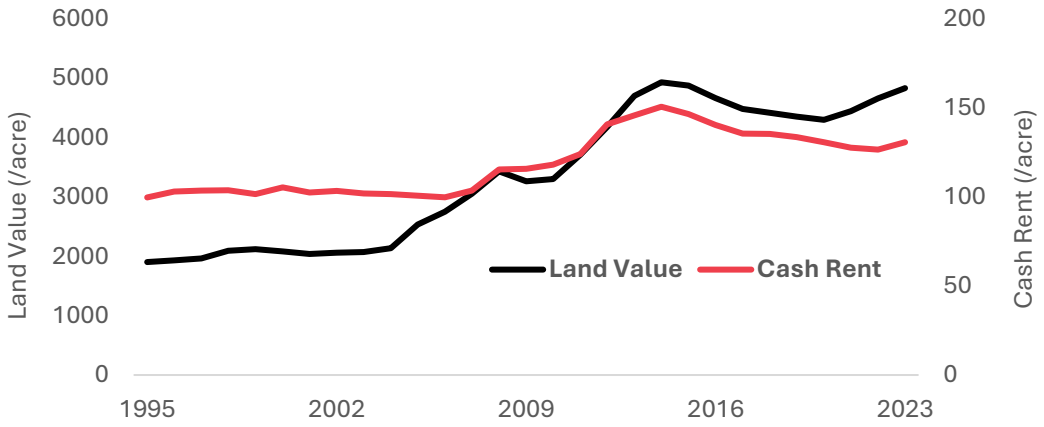
USDA

[10] Just and Miranowski (1993) modelled expectations in several ways and found that lagged values achieve the best fit
[11] One obvious objection would be the high price volatility in figure 4. Falk (1991) found that time varying discount rate to be responsible for the volatility in farmland prices
[12] Melichar, 1979

A common theme in whitepapers and the literature is the falling aggregate farmland income return over the past three decades. This is often attributed to falling nominal interest rates in America and across much of the world, but the income return is a real figure.[13] Based on the simple capitalization model discussed above, the falling income rate can be attributed to either a falling real discount rate (prices rise relative to income) or a rising growth rate (total return is driven more by capital gains than income as expected future income growth is high).

If the latter were true and the expected growth of farmland income has risen, we should see actual income rising to support higher growth expectations.

FIGURE 12. PRICE VS CASH RENT (1995 dollars)
1995-2023 (Illinois cropland)



USDA

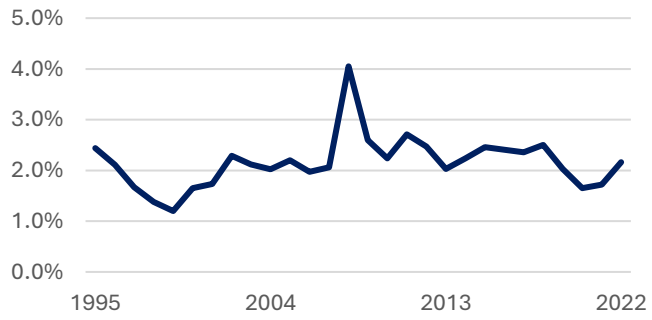
Real cash rents have not increased much over the past three decades while farmland prices (in Illinois and most other North American regions) have grown more rapidly. Therefore, falling income returns (I/P) cannot be attributed to higher income growth expectations, but instead to a falling real discount rate which consist of two components:

- **Risk Free Rate:** In America and globally, real interest rates have trended downwards since the mid 1980s. This is often attributed to slower growth in real output, demographic changes, ageing populations and an increase in savings.
- **Risk Premium:** Risks to farmland returns are likely uncorrelated to broader market risks as food demand is relatively inelastic and therefore rents are not directly impacted by slowing growth as equity returns may be. More pertinent risks include climate volatility, state agricultural policy and global production dynamics. Indeed, in times of broad macroeconomic uncertainty the farmland risk premium may fall as investors turn to stable assets.

FIGURE 13. 10Y REAL INTEREST RATE
1995-2023 (US)

FRED

FIGURE 14. IMPLIED EQUITY RISK PREMIUM (DDM)
1995-2022 (S&P 500)



Damoran, NYU

[13] Analogous to the 'Fed model'

The falling income return can be partly attributed to the falling real discount rate, which has driven farmland price growth since the 1990s. The simple capitalisation model, which assumes a constant discount rate must therefore be taken with a pinch of salt. Nor is the simple capitalisation model best suited to describing the observed price volatility (figure 12). Other factors exogenous to our simple capitalization model drive land price changes in North America:

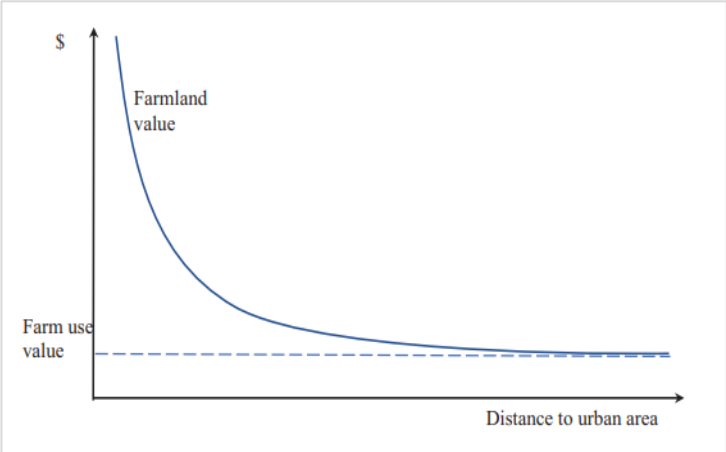
- **Speculation:** The farmland price 'boom-and-bust' in the 1970s-80s presents the largest apparent disconnect between farmland prices and net income. "Capitalization formulas represent an effort to rationalize land values. But in a land boom irrationality rather than rationality tends to dominate. People buy land because it has risen in price, and they become convinced that it will rise more. Not the income from its operations but profits from expected increase in its value tend to dominate the situation." (Norton, 1942; quoted by Deaton and Lawley, 2022). Indeed, Featherstone and Baker (1987) find results that "suggest a market with a propensity for bubbles".
- **Debt Constraints:** While the aggregate debt/equity ratio in the North American farmland sector is approximately 15%, farmland can be highly levered as banks lend readily against a stable asset. Banks may lend more readily when farmland prices are increasing and liquidity may reduce when prices are falling, increasing speculative distortions. Farmland may be more vulnerable to such price deviations as land is in fixed supply and cannot readily be sold short (Carey, 1990). However, Just and Miranowski (1993) find that farm debt did not play a significant role in the boom-and-bust cycle of the 1970s.

Alternative Uses

So far, we have discussed the capitalization model with reference to farmland income only. But land has many uses and prices in the long-run should be determined by returns to the highest and best use. We can consider alternative uses as real options. Land prices are set at the margin, with appraisals being based on recent transactions. In proximity to urban areas, the land market may consist of more non-farm buyers, pricing transactions based on the NPV of non-farming activities such as residential or industrial uses. All farmland prices will benefit from the real option to convert, for some conversion cost, to an alternative cash-flowing use.

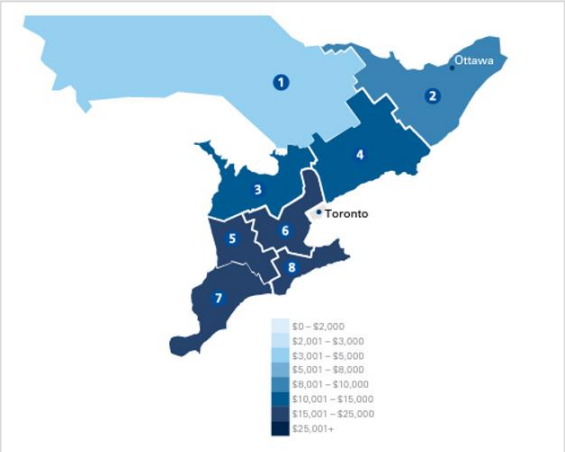
Urbanization has been the primary driver of land values in the British Columbia Lower Mainland. But higher-priced urban land is still used for farming for multiple reasons. Zoning regulations may make exercising the real option unfeasible. Land in urban areas may be more productive (BC has exceptional water resources and fertile soil). And finally, farmland income may benefit from urban proximity: lower transportation costs, higher product demand, and greater access to labor and human capital.

FIGURE 15. FARMLAND VALUE AND DISTANCE TO URBAN AREA



Vyn and Shang (2021) printed in Deaton and Lawley, 2022

FIGURE 16. ONTARIO FARMLAND PRICE
2022

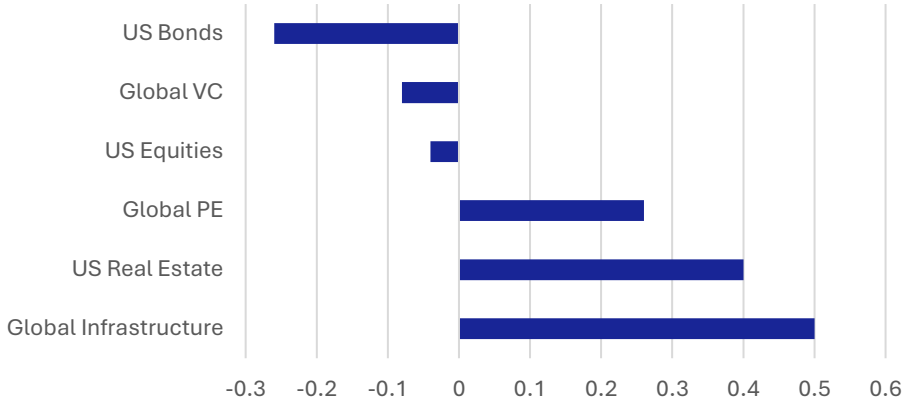


Ontario - Farm Credit Canada Values Report 2021

Diversification

The ability of farmland to act as a portfolio diversifier is well documented. While estimates of farmland returns' correlation with other asset classes and its market beta vary, there is strong evidence that the asset class exhibits a low correlation to large cap equities. Low correlations have contributed to farmland's status as 'gold with yield'. Limitations of the farmland return data (average annual returns, stale appraisals, limited samples) weaken empirical evidence of farmland's aggregate risk-adjusted returns. But it is clear to reason based on the nature of the farmland market how total return can remain uncorrelated with broader macro trends.

FIGURE 17. FARMLAND RETURN CORRELATIONS
1991-2019 (NCREIF Farmland Index)



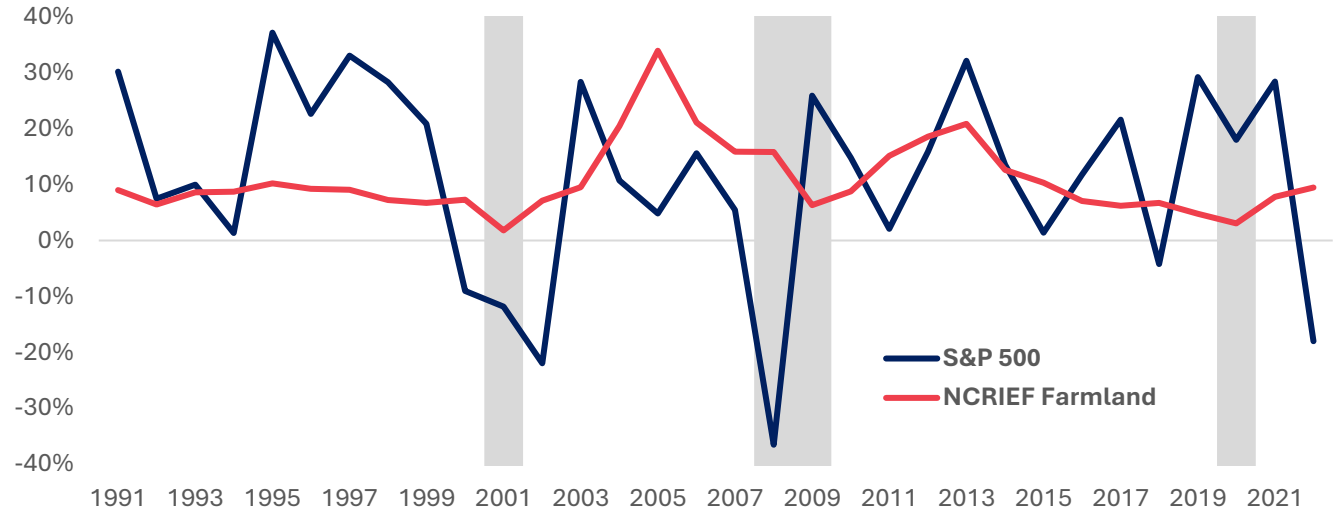
NCREIF US Farmland Index. Bloomberg Results quoted in Stepstone, 2019

Low observed correlation with major asset classes can be attributed to multiple factors:

- **Uncorrelated Return Drivers:** Farmland returns are driven by factors uncorrelated with the broader economy. Notably, the weather – a stochastic variable – affects production quantity and global prices. Demand is relatively inelastic, falling little during economic crises.
- **Illiquidity:** Farmland trades infrequently, and when it does pricing can often be based on appraisals from the previous five years. As such, annual returns may not reflect up-to-date pricing and return expectations (this may be reflected in the higher correlation with other 'illiquid' assets such as PE, RE and Infra).
- **Unexpected Inflation Hedge:** As discussed earlier, farmland income adjusts to unexpected inflation, making farmland a good inflation hedge. If Bonds and Equities are poor unexpected inflation hedges, then low correlation may reflect differential returns in periods of volatile inflation (Irwin, Forster, Sherrick 1988 find the inclusion of unexpected inflation in a two factor CAPM model, reduces the market beta).

FIGURE 18. US FARMLAND VS S&P 500 (US RECESSION HIGHLIGHTED)

1991-2022 (annual returns)



Farmland is often described as a good investment for 'Capital Preservation'. Low systematic risk limits farmland return volatility during broader market downturns.

The use of the CAPM to estimate risk premia has been well evaluated in the literature.

	Period	Farmland Index	Market Proxy	Intercept	Beta
Barry, 1980	1950-1977	USDA National	US Stocks, Bonds and Farmland RE	4.79	**0.19**
Irwin, Forster, Sherrick, 1988	1947-1984	USDA National	US Stocks, Bonds, RE and Farmland RE	4.15	**0.32**
Baker, 2014	1911-2012	USDA Iowa	S&P 500	9.82	**0.11**

Low systematic risk suggests that farmland could be a good addition to a well-diversified portfolio.

"Farmland equates to approximately 5% of the market capital of assets in the United States but is a de minimis allocation in institutional portfolios." (Lins et al., 1992)

"For a medium risk portfolio represented by equity/bond holdings of 60/40 weighting, farmland enhanced financial performance and a material allocation is supportable." (Veripath, 2020)

"This analysis of the [University of Illinois] farmland portfolio holds the advantage of having data from a live portfolio of farms. The results substantiate what previous studies have concluded; Illinois farmland can lower the volatility of an already diversified investment portfolio while providing a return premium above what is required to compensate for its systematic risk." (Noland et al., 2011)[14]

[14] The Role of Farmland in an Investment Portfolio: Analysis of Illinois Endowment Farms

Conclusions | Opportunities for Alpha

Strong past performance, inflation protection and diversification benefits suggest farmland could be a suitable addition to an investment portfolio. Aggregate farmland returns data confirms the value of using the capitalization model to describe price movements and income characteristics. Capital gains can largely be attributed to net income growth, with recent price growth also driven by falling real interest rates and urbanisation.

While useful for testing models and illustrating the nature of the farmland market, aggregate farmland returns data has little use for the direct analysis of potential farmland investment strategies. Beyond methodological issues relating to the data itself, the heterogenous and localised nature of farmland transactions present numerous specific investment considerations. However, it is precisely the heterogenous, localised, thinly traded nature of the market characterised by information asymmetry and in some cases inefficiency, that presents potential opportunities for strategies to generate excess returns.

'Underbought' Asset Class

Based on the CAPM results printed above, it could be argued that average farmland returns exceeding 10% reflect mispriced risk. While the farmland credit markets are very mature, farmland investment management remains a small industry, with many institutions only adding small farmland allocations to their portfolio over the last decade. A belief that the farmland market will become increasingly 'financialised' (perhaps aided by technology enabling remote farm management) may suggest falling future risk premia.

Information Asymmetry

Farming returns to human capital are high. Particularly in permanent crops, where top farmers can produce yields in excess of four times that of the median operator. Differing income expectations provide scope to benefit from strategic land acquisition. The nature of farmland sales exposes other sources of potential returns – the use of backdated appraisals, differing land use valuation methods and liquidity constrained sellers.

Localized Differentiated Markets

At the start of this report, we provided some context on the many different types of crop, land, leases, and market structure. Some crop markets (e.g. corn) are more commodified than others (e.g. organic blueberries). Consolidation and vertical integration based on expectations and information regarding a farmland niche could be a source of excess returns while benefiting from the investment characteristic of the underlying farmland.

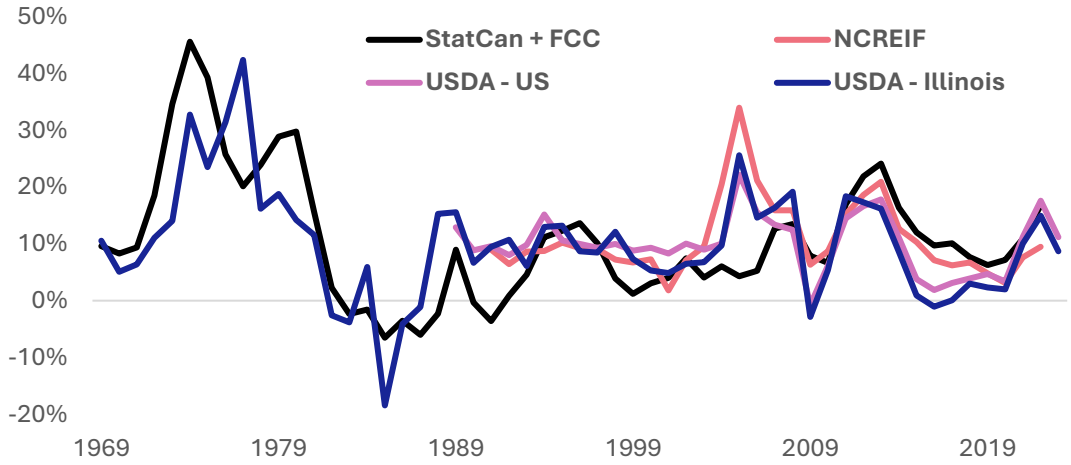
Appendix | Note on Aggregate Farmland Returns Data

$$Total\ Return = Income\ (\%) + Capital\ Gains = R_t = \frac{I_t}{P_t} + \frac{P_{t+1} - P_t}{P_t}$$

With R_t being the one period total return, I_t being the asset's net income between t and t+1, P_t being the price at time t and P_{t+1} the price the following period. We can already see issues that might arise in gathering this data in practise: separating net income to land from total owner-operated income, choosing a consistent valuation method (the land is not traded yearly and has no homogenous market price).

Given the heterogenous nature of farmland properties and transactions, different methodologies for calculating 'total returns' are used. The three data sets most widely used in North America are produced by the U.S. Department of Agriculture, NCREIF and Statistics Canada.

FIGURE 19. TOTAL NOMINAL RETURNS (INCOME + CAPITAL APPRECIATION)
1969-2023 (North American Farmland)



	Mean	Mean	SD	SD
	1960-2023	*1991-2022*	*1960-2023*	*1991-2022*
StatCan + FCC	10.87%	9.03%	0.11	0.061
NCREIF	10.82%	10.82%	0.066	0.066
USDA - US	9.98%	9.98%	0.049	0.051
USDA - Illinois	11.39%	10.44%	0.11	0.069

Correlation	NCREIF	USDA - US	USDA - Illinois
StatCan + FCC	0.30	0.35	0.66
NCREIF		0.73	0.76
USDA - US			0.93

Perhaps the most surprising observation is the similarity of parameters, despite differences in each dataset's scope and methodology. From 1991-2022 there is a small range of means around 10% and of standard deviations around 0.6. The period from 1969-1991 is clearly more volatile than the following period.

USDA

- Land value and cash rent survey data from a population of all farms in 48 American States with >$1,000 in agricultural sales.
- Data collected as part of the June Area Survey. Land Value Survey: ~15,000 respondents. Cash Rent Survey: ~150,000 respondents. Separation by irrigation, cropland, pastureland and farmland real estate.
- In 1995 the survey changed from the Agricultural Land Survey to the June Area Survey. This results in a large discrepancy between 1994 and 1995 cash rent data.
- The stated use of the survey is for farmers for farm planning.

USDA - Illinois

- Illinois-specific data is used during this report and is commonly used throughout the literature for the following reasons.
- Mature agricultural markets. Illinois is the 5th largest state exporter of agricultural products.
- Limited crop mix, mostly soybeans and corn.
- Limited impact of urbanisation.
- Long data series, starting in 1921.

NCREIF

- Debuted in 1995, including data from 1991 contributed by a group of eight institutions including Westchester, Hancock, Prudential, Gladstone Land, US Agriculture.
- Income returns and capital gains data based on a sample of 998 Row crop properties ($9.9B) and 333 Permanent crop properties ($6.3B) in 50 American states. The property universe varies from year to year and membership changes as sales/purchases are made.
- Property's market value based on Real Estate Appraisal.
- Higher mean returns than other data series may be due to the sample scope (professionally managed institutional properties), self-reporting, and selection bias as underperforming properties are sold and thus not included.
- Valuation, purchase, and operational methodology based on the contributing institutions' financial decision-making (IRR, NPV etc.) and thus the data may conform most to financial theories.

Statistics Canada + FCC

- Statistics Canada, a government body, collects aggregate agriculture sector income statement and balance sheet data as part of the agricultural census. Farm Credit Canada, Canada's largest agricultural lender, collects annual land value data from across Canada.
- Income is calculated as the Net Realized Income/Value of Land and Buildings – which we would expect to be higher than income from land rental alone.

The purpose, in this report, of analyzing data of farmland returns is twofold; to serve as empirical evidence for assessing theories of what drives farmland returns, and to assess the investment benefits of the asset class. The most representative data may vary in each case. For example, in assessing what drives farmland returns we may not select data from an area heavily impacted by urban development (British Columbia) in order to isolate drivers endogenous to farming activities. In assessing the benefits of the asset class a dataset including only investable farms (NCREIF) may be more appropriate. Narrowing the dataset (row crop in a single state) we can perhaps draw more specific, but less widely applicable conclusions. USDA Illinois data is widely used to test asset pricing theories as it has a large, consistent dataset, single crop type and limited impact of urbanisation.

Further Reading

Food Transition

EAT-Lancet Commission Report, 2019

Farmland Valuation Literature Reviews

A survey of literature examining farmland prices: A Canadian focus. Deaton and Lawley, 2022
Farmland Valuation and Asset Performance. Moss and Katchova, 2005

Institutional Farmland Investment

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