Efficient Investment in Saskatchewan Farmland

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EFFICIENT INVESTMENT IN SASKATCHEWAN FARMLAND

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INTRODUCTION

Over the last ten years, as Canadian baby-boomers have reached the 40 to 55 age category, there has been an ever increasing focus on personal financial planning. People have started to think more about retirement and their investment portfolios. The level of interest in and knowledge about investing has grown significantly. Another phenomenon is that investors have overwhelmingly chosen mutual funds as the desired investment vehicle to achieve their financial goals. The financial industry has responded by creating a vast array of mutual funds to choose from, making it very easy for the average Canadian investor to hold a globally diversified investment portfolio. Canadians are no longer investing only in domestic debt and equity markets, but rather, are very interested in taking advantage of investment opportunities around the world, especially in light of the relatively poor financial performance of Canadian equity markets in the last ten years. Could Saskatchewan farmland ownership provide improved financial performance? And, is there an efficient way for Canadians to invest in farmland, given farmland's marketing problems such as illiquidity, poor marketability, and lumpiness of asset size?

BACKGROUND

Markowitz (1959) introduced the concept of efficient portfolio selection from a set of risky assets (E-V analysis), which produced an efficient frontier of portfolios. Tobin (1958) and Treynor (1961) expanded efficient selection with the theory of two-fund separation to include a risk-free security in the choice set of assets, thereby deriving the Capital Market Line (CML). The important conclusion derived from this research is that, for risk-averse investors, diversified portfolios will always out-perform individual risky assets. Therefore, it is assumed that investors will always hold well-diversified portfolios of assets as opposed to owning a single risky asset.

A number of studies have been completed that address the desirability of a farmland investment for non-farmers. Kaplan (1985) measured the correlation of returns for U.S. farmland and U.S. stocks, bonds, and treasury bills. He found that U.S. farm real estate was significantly correlated with treasury bills only. He suggested that farm real estate had two favorable attributes; high total return and low correlation with other assets, making it an excellent diversification vehicle. Moss, Featherstone, and Baker (1987) applied E-V analysis to U.S. farm assets, government and corporate bonds, and treasury bills. Their efficient sets included farm assets ranging from 30% to 68% in various efficient portfolios. They concluded that agricultural assets entered the E-V efficient portfolios at levels greater than were historically observed in the capital markets. The implication is that non-farmer investors would react favorably to a market instrument that allowed them to diversify into agriculture. Lins, Kowalski, and Hoffman (1992) indicated that farmland represented over 5% of the market wealth in the United States but remained a relatively insignificant component of institutional investors' portfolios. They used an E-V model to assess the benefits of diversifying U.S. stock, bond, and business real estate portfolios with investments in international stocks and/or investments in U.S. farmland. They found that farmland entered the optimal portfolio at a fairly high level of risk and remained a choice asset to the low end of the risk spectrum, reaching a portfolio proportion of 50% near the middle. The results implied that the financial performance of U.S. portfolios that included U.S. stocks, bonds, and business real estate, could be improved by adding U.S. farmland. Shiha and Chavas (1995) suggested there are barriers to the flow of non-farm equity into farm real estate markets due to high transaction costs and illiquidity. These barriers create a segmented farm real estate market where compensation for risk on farmland investment is high relative to well-established secondary markets. They conclude that policies to reduce or eliminate the capital flow barriers may increase farm real estate market activities and stimulate a greater influx of non-farm capital into the farm economy. Lence and Miller (1999) investigate whether the farmland “constant-discount-rate present-value-model puzzle” is due to transaction costs. Their testing, using Iowa farmland prices from 1900 to 1994, suggests that it is not

possible for speculators with a short holding horizon to obtain systematic excess returns by trading in land markets, however, the opposite was found using an infinite holding horizon. They conclude that farmland markets are efficient and that farmland prices are consistent with the standard farmland valuation model, allowing for market frictions and transaction costs, if the one-period model is accepted.

MODEL

To assess whether Saskatchewan farmland would benefit a well-diversified international portfolio of financial assets, an E-V analysis is performed using Canadian T-Bills and long term bonds, farmland returns, and average equity market returns for Canada, United States, Japan, United Kingdom, France, Germany, and Italy.

The expected value-variance model (E-V model) has long been the fundamental approach in showing how the efficient set of portfolio investments is derived. The usual method of deriving the efficient set of investments is to minimize risk for various expected return constraints. The mapping of the minimum risk levels provides the efficient set or frontier.

The efficient frontier is derived by minimizing investment risk (variance), subject to expected return and wealth constraints.

$$\underset{X}{\text{Minimize}} \quad X' Q X \tag{1}$$

subject to:

$$R_p = C' X$$

$$1.0 = 1' X$$

where:

X = vector of the wealth share invested in each asset, x_i being the proportion of total wealth invested in asset i

Q = variance-covariance matrix of asset returns, $Cov(r_i, r_j)$

R_p = portfolio return on investment

C = Nx1 vector of return on investment for N choice assets

The E-V model is based on a concave investment opportunity surface. However, the introduction of a risk-free asset changes the nature of the efficient set. The two-fund separation theorem suggests that investors can maximize their utility by choosing a portfolio, which is some combination of the market portfolio (tangency portfolio) and the risk-free asset. All optimal portfolios would then fall on the Capital Market Line (CML), which becomes a linear combination of the risk-free asset and the point of tangency with the investment opportunities surface. The greater the slope of the CML, the better the investment performance for all levels of risk greater than zero. By including a borrowing rate, the CML will have two tangency portfolios; lending and borrowing. The shape of the CML between the two tangency portfolios is concave, since it is part of the Markowitz efficient frontier.

This model is used to calculate the CML from the set of choice assets, both with (referred to as CML) and without Saskatchewan farmland included (referred to as CML') in the choice set, to determine whether financial performance is enhanced with the addition of farmland.

DATA

Assets included in the choice set of investments are:

1. Saskatchewan farmland.

2. The risk-free asset (lending rate), which is represented by Government of Canada 90 day treasury bills (T-bills) and the prime rate (borrowing rate).
3. Long term Government of Canada bonds.
4. Equity markets from countries including Canada, United States, Japan, United Kingdom, France, Germany, and Italy.

The Expected Return on Saskatchewan Farmland

The return on investment to farmland ownership is based on a standard crop share lease agreement, which provides one-third of the gross receipts to the lessor (farmland owner) up to 1985, after which the crop share is reduced to one-quarter. The reduction in crop share to the lessor was a market reaction to increasing input costs without corresponding increases in commodity prices. The lessor is then responsible for paying property taxes and depreciation on farm buildings. The crop share lease agreement represents the most common form of rental agreement in Saskatchewan over the past 35 years.

The net annual lessor dollar return in year t (NLR_t), is calculated using average commodity prices and yields in Saskatchewan for the period 1970 to 1998 (note 1). The NLR_t is calculated as:

$$NLR_t = \left\{ \left[\frac{1}{3} \sum_{i=1}^{n} P_{it} W_{it} Y_{it} \right] \phi_t - PT_t - DB_t - M_t \right\} \tau \qquad (2)$$

where:

$$P_{it} = \textbf{Error!} - T_{it} - E_{it} \qquad (3)$$

and,

$$W_{it} = \textbf{Error!} \qquad (4)$$

W_{git} = the proportion of commodity i in grading classification g, in year t. For example, spring wheat grade classifications are #1, #2, #3, and feed.

P_{git} = the price per tonne in year t for commodity i in grade classification g.

T_{it} = the transportation charge per tonne for commodity i in year t. This is based on an average of Thunder Bay and Vancouver transportation costs, which includes the farmer's share only.

E_{it} = the elevator, handling, and dockage removal charge per tonne by the grain handler, for commodity i in year t.

A_{it} = the number of seeded acres for commodity i in year t.

Y_{it} = the average yield in tonnes per acre for commodity i in year t.

ϕ_t = the adjustment factor for the proportion of farmland that is cropped in year t, taking into account the amount of fallow, sloughs, road allowances, unimproved pasture, and any other non-tillable farmland.

PT_t = the average property tax per acre in year t.

DB_t = the average depreciation on buildings per acre in year t (based on the aggregate Saskatchewan farm building depreciation in each year).

M_t = the implied management fee per acre in year t, calculated as 6% of the gross farmland return in each year.

τ = the income tax adjustment factor which applies to lessors in Saskatchewan. The tax adjustment factor is applied to the lessor's net operating return before tax to reflect the difference between the taxation of dividends and ordinary income. τ is estimated to be .83, based on the comparison of Saskatchewan tax rates for dividends and ordinary income.

n = the number of commodities (14), where the commodities included are winter wheat, spring wheat, durum wheat, oats, barley, rye, flax, canola, hay, mustard, sunflower, lentils, peas, and canary seed.

The annual return on investment to farmland ownership (r_{Ft}) is calculated as:

r_{Ft} = **Error!** (5)

where:

NLR_t = the net lessor return per acre in year t.

V_{Ft}, V_{Ft-1} = the average values of farmland per acre in years t and t-1, respectively.

The average annual Saskatchewan farmland nominal operating yield for the period 1970 to 1998 is 3.9%, with a standard deviation of 3.1%. The average capital gain yield for the period is 5.9%, with a standard deviation of 12.9%. Combining the operating and capital gain yields, the average annual compounded rate of return on farmland is 9.6%, with a standard deviation of 15.1%.

Capital Market Return on Investment

The average annual 90-day T-bill rates and long-term government bond rates were taken from the Canadian Economic Observer (Statistics Canada). An average borrowing rate of 10.0% was used, based on an average 9.9% prime lending rate for the period. The total annual index return was used for each equity market, which includes both the capital gain and dividend yields (capital gain yields were netted out using the annual price index for each equity market). Morgan Stanley Capital International provided the equity market returns. No adjustments were made to the equity returns for investment transaction costs such as brokerage fees or mutual fund management fees.

RESULTS

Table 1 and Figure 1 illustrate the average returns and risk levels for the choice assets over the period 1970 to 1998.

Table 1: Average Returns and Standard Deviations for the period 1970-98

Asset	Return on Investment	Standard Deviation of Returns
90 Day T-Bills	6.9%	0.0%
Long Bonds	7.9%	1.9%
Farmland	9.6%	15.1%
Canada	8.8%	16.7%
France	12.1%	29.1%
Germany	12.0%	29.5%
Italy	7.4%	39.4%
Japan	12.7%	35.6%
UK	12.8%	29.3%
USA	11.8%	16.3%

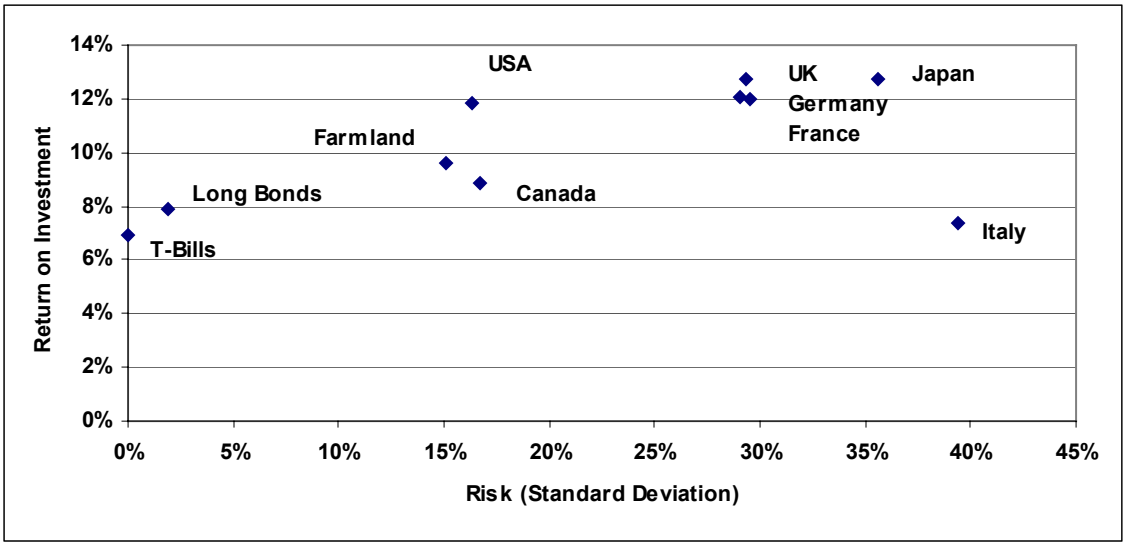
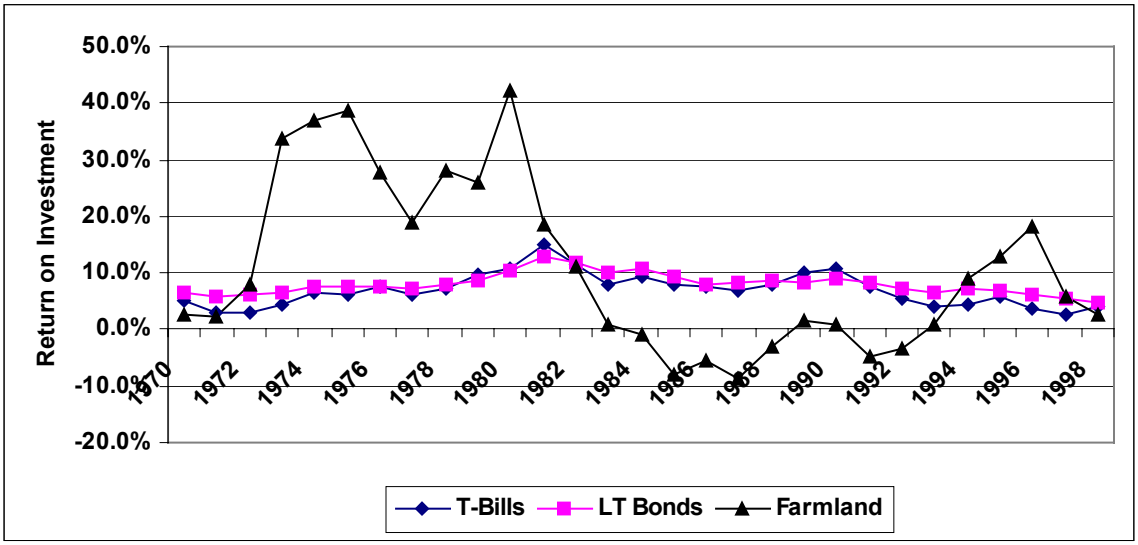


Figure 1: Average Return and Risk for the period 1970 to 1998

Saskatchewan farmland out-performed the Canadian equity market in that farmland earned a higher rate of return while exhibiting less volatility in annual returns (less risk). Other than Canada and Italy, farmland did not earn a higher return than equities, although

it did have the lowest level of risk when compared to all of the equity markets in the choice set. Figures 2, 3, and 4 further illustrate the relative risk level for farmland. In Figure 2, the agricultural price cycle is visible over the 27-year period. Returns were high in the 1970's when commodity prices were high and land prices were on the rise. During the 1980's, commodity prices fell due to international trade wars, large grain stocks, and depressed demand in many developing countries. This caused land prices to decline, leaving farmland returns very small or negative in most years. The mid-1990's showed some recovery in returns but current commodity prices are still low. Figure 2 clearly indicates that there is significantly more risk in farmland ownership than in owning debt securities such as T-Bills or long government bonds.

Figure 2: Annual Return on Investment for T-Bills, Long Bonds, and Farmland (1970-98)



Figures 3 and 4 compare farmland returns to average returns on Canadian and US equities. The comparison indicates that farmland returns are less volatile on a year-to-year basis than equities. Farmland appears to have a longer cycle where it takes a longer period of time to move farmland prices.

Figure 3: Annual Return on Investment for Farmland and Canadian Equities (1970-98)

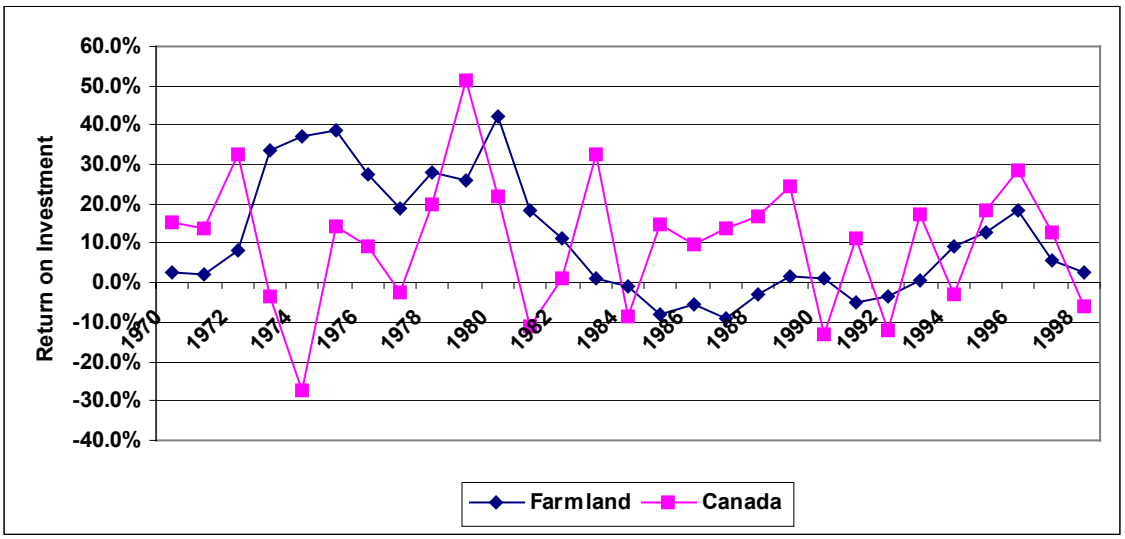


Figure 4: Annual Return on Investment for Farmland and US Equities (1970-98)

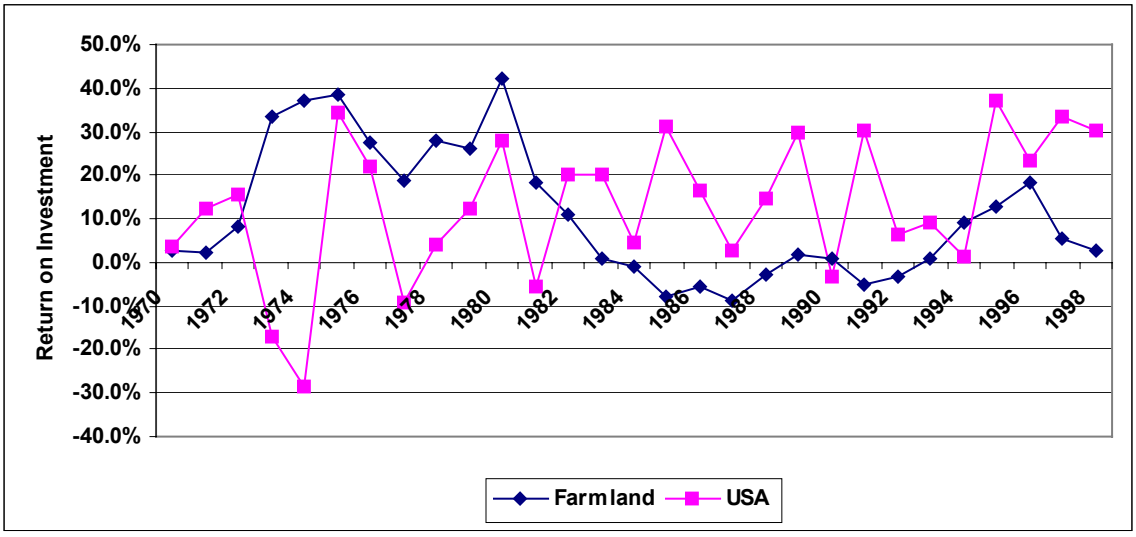


Table 2 presents the correlation of returns for the choice set of assets. Among the various equity markets, there is some room for diversification benefits due to return correlations being less than 1.0. Adding zero risk debt securities can also lower portfolio risk, however, this will also lower the return on investment. There are potentially large

financial performance gains from adding farmland to an international equity portfolio because Saskatchewan farmland is negatively correlated with every equity market in the choice set, while still offering a rate of return that is close to the average equity level. This is in line with the overall goal of portfolio management of reducing risk while maintaining the level of expected return on investment.

Table 2: Correlation of Asset Returns (1970-98)

	T-Bills	Bonds	Farmland	Canada	France	Germany	Italy	Japan	UK	USA
T-Bills	1.00	0.93	0.08	-0.16	-0.12	-0.11	0.04	-0.13	-0.09	-0.04
Bonds		1.00	0.00	-0.18	-0.12	-0.08	0.06	-0.03	-0.06	-0.01
Farmland			1.00	-0.03	-0.21	-0.21	-0.13	-0.19	-0.05	-0.19
Canada				1.00	0.49	0.19	0.34	0.32	0.40	0.61
France					1.00	0.70	0.74	0.45	0.46	0.45
Germany						1.00	0.63	0.30	0.39	0.38
Italy							1.00	0.43	0.29	0.38
Japan								1.00	0.23	0.17
UK									1.00	0.57
USA										1.00

Applying the E-V analysis, the CML and CML' were determined, as presented in Tables 3 and 4, and also in Figure 5.

Table 3: The Set of Efficient Portfolios (farmland included in choice set)

		Portfolio Weights for the Choice Set of Assets										
Return	**Risk**	**T-Bills**	**Bonds**	**Farmland**	**Canada**	**France**	**Germany**	**Italy**	**Japan**	**UK**	**USA**	**Borr**
14.0%	30.3%	0.0%	0.0%	4.9%	0.0%	0.0%	6.6%	0.0%	34.8%	23.2%	124%	-93.9%
13.0%	22.7%	0.0%	0.0%	3.6%	0.0%	0.0%	4.9%	0.0%	26.1%	17.4%	93.4%	-45.5%
12.5%	18.9%	0.0%	0.0%	3.0%	0.0%	0.0%	4.1%	0.0%	21.8%	14.5%	77.8%	-21.2%
12.1%	**15.5%**	0.0%	0.0%	2.9%	0.0%	0.0%	3.4%	0.0%	17.9%	11.8%	64.0%	0.0%
12.0%	15.2%	0.0%	0.0%	4.8%	0.0%	0.0%	3.6%	0.0%	17.5%	11.1%	63.1%	0.0%
11.5%	11.8%	0.0%	0.0%	22.8%	0.0%	0.0%	4.7%	0.0%	13.5%	4.4%	54.6%	0.0%
11.0%	9.6%	0.0%	0.0%	37.9%	0.0%	0.0%	5.4%	0.0%	9.7%	0.0%	44.8%	0.0%
10.5%	8.0%	0.0%	18.0%	31.8%	0.0%	0.0%	4.6%	0.0%	8.1%	0.0%	37.5%	0.0%
10.0%	6.5%	0.0%	33.7%	25.8%	0.0%	0.0%	3.8%	0.0%	6.6%	0.0%	30.1%	0.0%
9.5%	5.0%	0.0%	49.4%	19.8%	0.0%	0.0%	3.0%	0.0%	5.0%	0.0%	22.8%	0.0%
9.0%	3.5%	0.0%	65.1%	13.8%	0.0%	0.0%	2.2%	0.0%	3.4%	0.0%	15.5%	0.0%
8.5%	2.3%	0.0%	80.8%	7.8%	0.0%	0.3%	1.3%	0.0%	1.8%	0.0%	8.0%	0.0%
8.3%	**1.9%**	0.0%	87.1%	5.4%	0.0%	0.6%	0.8%	0.0%	1.1%	0.0%	5.0%	0.0%
8.0%	1.5%	20.2%	70.0%	4.1%	0.0%	0.5%	0.6%	0.0%	0.8%	0.0%	3.8%	0.0%
7.5%	0.8%	56.5%	38.2%	2.2%	0.0%	0.3%	0.3%	0.0%	0.4%	0.0%	2.1%	0.0%
7.0%	0.1%	92.8%	6.4%	0.4%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.4%	0.0%
6.9%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 3 indicates that the tangency-lending portfolio provides a return of 8.3% and a standard deviation of 1.9%. The lending portfolios (returns of 6.9% to 8.3%) are very low risk and consist mainly of T-Bills and long-term bonds, with very little invested in farmland or equities. The tangency-borrowing portfolio provides a return of 12.1% and a standard deviation of 15.5%. From the point of the tangency-lending portfolio to the tangency-borrowing portfolio, risk and return are steadily increased, as less debt securities are used and more equities and farmland are included. Farmland becomes a significant investment in the medium-risk category.

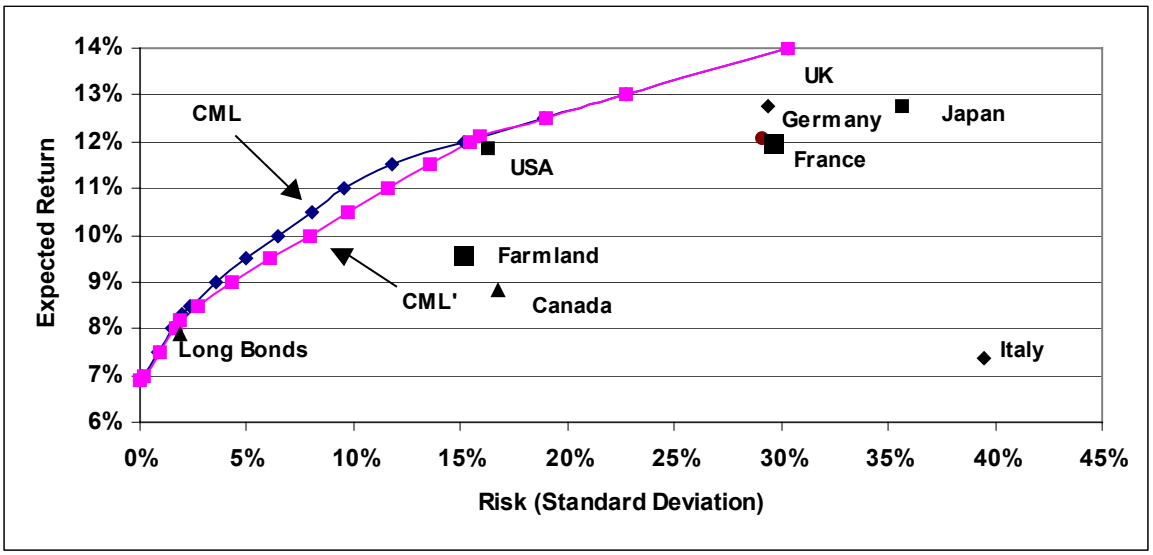
Table 4 illustrates the efficient portfolios when farmland is not included in the choice set of assets. The main difference is that the efficient portfolios include more equities in the USA, UK, German and Japanese markets and more long-term bonds to compensate for not having farmland included.

Figure 5 shows the financial performance gains from including farmland. CML is the efficient set of portfolios when farmland is included (Table 4 results) while CML' is the efficient set when farmland is excluded (Table 5 results) from the choice set. In the low-risk and high-risk categories, the gains are either zero or very small. However, the addition of farmland provides significant gains in the medium risk category. It appears that farmland's risk characteristics (negative correlation of returns) allow it to enhance portfolio performance when combined with the major equity markets around the world, especially USA, UK, Germany and Japan.

Table 4: The Set of Efficient Portfolios (farmland excluded from choice set)

		Portfolio Weights for the Choice Set of Assets										
Return	**Risk**	**T-Bills**	**Bonds**	**Farmland**	**Canada**	**France**	**Germany**	**Italy**	**Japan**	**UK**	**USA**	**Borr**
14.0%	30.3%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%	0.0%	34.5%	23.6%	124%	-88.0%
13.0%	22.7%	0.0%	0.0%	0.0%	0.0%	0.0%	4.7%	0.0%	25.9%	17.7%	92.8%	-41.0%
12.5%	19.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%	21.6%	14.8%	77.3%	-17.5%
12.1%	**15.9%**	0.0%	0.0%	0.0%	0.0%	0.0%	3.7%	0.0%	17.5%	10.3%	67.4%	0.0%
12.0%	15.4%	0.0%	0.2%	0.0%	0.0%	0.0%	5.2%	0.0%	14.6%	2.7%	77.4%	0.0%
11.5%	13.5%	0.0%	12.3%	0.0%	0.0%	0.0%	4.5%	0.0%	12.8%	2.4%	67.8%	0.0%
11.0%	11.6%	0.0%	24.5%	0.0%	0.0%	0.0%	4.0%	0.0%	11.0%	2.1%	58.3%	0.0%
10.5%	9.8%	0.0%	36.7%	0.0%	0.0%	0.0%	3.4%	0.0%	9.2%	1.8%	48.8%	0.0%
10.0%	7.9%	0.0%	48.9%	0.0%	0.0%	0.0%	2.9%	0.0%	7.5%	1.5%	39.3%	0.0%
9.5%	6.1%	0.0%	61.1%	0.0%	0.0%	0.0%	2.3%	0.0%	5.7%	1.2%	29.8%	0.0%
9.0%	4.3%	0.0%	73.3%	0.0%	0.0%	0.0%	1.7%	0.0%	3.9%	0.9%	20.3%	0.0%
8.5%	2.7%	0.0%	85.4%	0.0%	0.0%	0.0%	1.1%	0.0%	2.1%	0.6%	10.8%	0.0%
8.2%	**1.9%**	0.0%	93.5%	0.0%	0.0%	0.5%	0.5%	0.0%	0.8%	0.3%	4.4%	0.0%
8.0%	1.7%	11.9%	82.8%	0.0%	0.0%	0.5%	0.4%	0.0%	0.6%	0.3%	3.5%	0.0%
7.5%	0.9%	52.4%	44.6%	0.0%	0.0%	0.3%	0.2%	0.0%	0.4%	0.2%	2.0%	0.0%
7.0%	0.2%	90.9%	8.8%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%
6.9%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure 5: The Capital Market Line with (CML) and without Farmland (CML')



The model was also used to determine the extent to which farmland would be included in the efficient set of portfolios if the expected farmland return was less than the past return for the period 1970-98. For example, the average farmland return in the past has been 9.6%, compounded annually. What if average farmland returns are lower in the future due to continuing low commodity prices, higher transportation costs, and relatively higher input prices? The results, assuming that farmland maintains the same risk characteristics as return is reduced, are provided in Table 5.

Table 5: Farmland's Weight in the Efficient Portfolios

	Tangency Portfolios Weights		Maximum Weight
Farmland Return	**Lending**	**Borrowing**	**Achieved on CML**
9.6%	5.4%	3.0%	37.9%
9.0%	5.1%	1.0%	33.3%
8.0%	4.5%	0.00%	20.7%
7.0%	1.9%	0.00%	1.8%
6.0%	0.00%	0.00%	0.00%

This indicates that farmland's risk characteristics (negatively correlated returns) are very important in determining its weight in the efficient portfolios. Even if future farmland returns are somewhat lower than in the past, there is still room for farmland in the efficient set of portfolios.

DISCUSSION OF RESULTS

There are some problems associated with investing in farmland. Saskatchewan farmland does not trade in an active and efficient marketplace. Liquidity and marketability with a farmland investment is poor, relative to a financial asset that does trade regularly in a secondary market. Therefore, farmland should be considered a long-term investment and, unlike stock market equities, which are perfectly liquid, the eventual divestment of farmland assets may take more time and include larger transaction costs.

Another problem with farmland investment is the large cost per trading unit. Farmland usually trades in units of 160 acres, which in Saskatchewan would currently command an approximate average price of between $50,000 and $75,000, depending on location and quality of the land. For many investment portfolios, this is simply too much to invest in a single asset. At present, there is no solution to this problem available in Saskatchewan.

A potential solution to the problems of illiquidity, marketability, and asset lumpiness is to allow the organization of a Saskatchewan (or Canadian) farmland mutual fund. The mutual fund would be diversified across different geographical areas by investing in farmland from all areas of Saskatchewan. This would give the farmland mutual fund the return and risk characteristics as presented in this paper. The farmland mutual fund managers would be responsible for buying and selling land, arranging and managing lease contracts, and fund accounting. The estimation of farmland returns for 1970-98 included a management fee calculated as 6% of gross returns, however, the management fees for a farmland mutual fund would likely be based on net asset value. Most financial

asset mutual funds charge an annual management fee of between 1% and 3% of net asset value. With a farmland mutual fund, investors could purchase smaller units, similar to other mutual funds.

Given that a farmland mutual fund could solve the problems associated with liquidity, marketability, and asset lumpiness, there are a number of reasons why investors should consider farmland as part of their portfolio:

- Farmland is a good hedge against inflation.
- Changes in the agriculture industry, such as biotechnology and increasing demand for organic food indicate that there may be new opportunities and better farmland financial returns in the future.
- The average farmland operating yield for the period 1970-98 (similar to a dividend yield for a stock) has been 3.91%, with a standard deviation of 3.1% (this is after the tax adjustment to farmland operating yields). This compares favourably with the Canadian equity markets, which over the same period had an average dividend yield of 3.0%, with a standard deviation of 0.9%.
- The average farmland capital gain yield for the period 1970-98 has been 5.9%, with a standard deviation of 12.9%, while the Canadian equity markets capital gain yield for the same period has been 6.4%, with a standard deviation of 16.4%. The full comparison with other equity markets is provided in Table 6.

Table 6: Average Dividend and Capital Gain Yield for the Period 1970-98

Asset	Dividend Yield	Standard Deviation	Capital Gain Yield	Standard Deviation
Farmland	3.9%	3.1%	5.9%	12.9%
Canada	3.0%	0.9%	6.4%	16.4%
France	3.0%	1.6%	8.1%	28.7%
Germany	2.4%	0.8%	9.0%	29.6%
Italy	2.0%	0.7%	4.1%	38.9%
Japan	1.6%	1.2%	11.5%	35.6%
UK	3.9%	1.2%	8.8%	28.9%
USA	3.0%	0.9%	8.3%	16.1%

When looking at the overall relative risk and return characteristics of Saskatchewan farmland, it is somewhat lower in risk, pays a higher dividend and lower capital gain, and is negatively correlated with all of the other equities.

- For non-pension investment, the tax advantages would be similar to other equity mutual funds in that operating income would be taxable each year as received (as dividends are taxed each year from an equity mutual fund), while capital gains taxes would be deferred, depending on how much land was sold each year by the fund managers. Realized capital gains would be distributed as a capital gains dividend, similar to other equity mutual funds. However, the operating income would not be treated as a dividend but would be fully taxable as ordinary income (note that in the calculation of farmland returns, this tax differential has been accounted for by discounting the farmland operating returns – the actual returns are larger before the tax discount).
- Of course, to make the farmland mutual fund feasible, it would have to be RRSP (registered retirement savings plan) and pension eligible.

What are the implications of a farmland mutual fund for Saskatchewan farmers? This should be good for farmers who are expanding their operations in order to achieve

economies of size and increase competitiveness. Leasing land, as opposed to buying, allows expanding farmers to direct their capital to equipment, new technologies, and inputs. For farmers who are retiring, this should be good because it provides another potential buyer for them. A retiring farmer could sell to the mutual fund, use his/her $500,000 capital gains exemption, and then gift back to his/her children shares in the farmland mutual fund, if desired. For existing farmers who are intent on owning their farmland, this may be a detriment as is it possible that the farmland mutual fund will bid up farmland prices.

What are the implications for the Saskatchewan government? Certainly, the farmland mutual fund would need the full support of the Saskatchewan government. Currently, the Saskatchewan Farm Security Act places restrictions on non-residents who want to own Saskatchewan farmland. The Saskatchewan government would have to consider changing the act to allow non-residents to become farmland mutual fund unit holders.

CONCLUSIONS

Farmland has been a good investment over the past 30 years, as part of an internationally diversified medium-risk portfolio. The results show that, for average or medium levels of risk, farmland can enhance the financial performance of an investment portfolio. Investors who choose to maintain a low-risk portfolio will not include farmland and similarly, the gains at the high-risk level are also very minimal. The financial gains from farmland are a result of its negatively correlated returns with other equity markets. When added to an equity portfolio, the risk level is reduced while maintaining the same rate of return on investment. This is especially true of the medium risk portfolios.

In conclusion, farmland ownership need not be for farmers alone. There are significant gains to non-farmers for investing in farmland assets. Financial performance can be enhanced with the addition of farmland to an internationally diversified portfolio, mainly because of the unique risk characteristics of Saskatchewan farmland. A farmland mutual

fund would potentially solve the problems associated with liquidity, marketability, and asset lumpiness. Farmers will gain by having more capital to invest in machinery and other technologies, instead of having to use a large part of their capital for the purchase of farmland.

NOTES

1. The data used to calculate farmland returns is available from a number of sources including Statistics Canada, Agriculture and Agri-Food Canada, Canada Grains Council, Canadian Wheat Board, Canadian Grain Commission, Canadian Transportation Agency, Farm Credit Corporation, Saskatchewan Crop Insurance Corporation, and Saskatchewan Agriculture and Food.

REFERENCES

Kaplan, Howard M (1985). "Farmland as a Portfolio Investment." The *Journal of Portfolio Management.* Volume 11: 73-79.

Lence, Sergio H. and Douglas J. Miller (1999). "Transaction Costs and the Present Value Model of Farmland: Iowa, 1900-1994." *American Journal of Agricultural Economics* 81, May, 257-272.

Lins, D., A. Kowalski, and C. Hoffman (1992). "Institutional Investment Diversification: Foreign Stocks vs U.S. Farmland." In Proceedings of Regional Research Committee NC-161, Department of Agricultural Economics, Kansas State University, Manhatten, Kansas. February.

Markowitz, H. M.(1959). *Portfolio Selection: Efficient Diversification of Investment* . New York: John Wiley and Sons.

Moss, Charles B., Allen M. Featherstone, and Timothy G. Baker (1987). "Agricultural Assets in an Efficient Multi-Period Investment Portfolio." *Agricultural Finance Review*. 47: 82-94

Statistics Canada (1999). "Canadian Economic Observer". Government of Canada.

Shiha, Amr N. and Jean-Paul Chavas (1995). "Capital Market Segmentation and U.S. Farm Real Estate Pricing," *American Journal of Agricultural Economics* 77, May, 397-407.

Tobin, James (1958). "Liquidity Preference as Behavior Toward Risk," *Review of Economic Studies*, XXVI, February, 65-86.

Treynor, J. (1961). "Towards a Theory of the Market Value of Risky Assets," unpublished manuscript.