

COMPARING AGRICULTURE REAL ESTATE INVESTMENT TRUSTS AND
DIRECT AGRICULTURAL LAND INVESTMENTS

A Thesis

by

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ABSTRACT

Investing in agriculture land has a new avenue with the initial public offerings of Gladstone Land Company and Farmland Partners Incorporated. In this paper, both companies are evaluated by their investment strategies and financial standing. The major analysis is to compare the companies against a direct agriculture land investment, and also against major Real Estate Investment Trust (REIT) indexes in the stock market. Each investment avenue provides varying risk profiles and volatility given market conditions, offering opportunities based on the motives of investors. Inevitably, these characteristics dictate the investment chosen. As realtors stress “location, location, location”, it appears that for the investor there is an added aspect of “timing, timing, timing”. When we evaluated the lifespan of each company compared to a weighted average investment in agriculture land the historical outcome appear different had both Gladstone and Farmland Partners done their initial public offering at a different time. We found that total returns to agriculture REITs are much more variable than those of direct land investments. Additionally, the risk-adjusted returns of REITs are substantially lower than direct land investment. In conclusion, it is the goal of this paper to evaluate the agriculture-based REITs performance and timing as an investment in agriculture land, when compared to a direct land investment.

DEDICATION

First and foremost, I thank my Lord and savior Jesus Christ for the opportunity to work on this thesis. Without his provision and will, I would not be here at Texas A&M or have been capable of the work done in this paper. His glory is all I have to show for what his written here, I pray that the findings of this research and its work will grow his kingdom and have ripples of impact beyond our sight.

With that being said, I would like to dedicate this thesis to my parents, Lane and Wendy Porter. They have sacrificed so much and given me opportunities beyond my understanding to excel and learn. I love you both.

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Words cannot express my gratitude for my committee chair Dr. David Anderson, and my committee members Dr. Henry Bryant, Dr. Andy Herring, and Dr. Erin Kiella. I truly appreciate your leadership, support and sacrifice throughout this process. Also, thanks to Dr. John Penson for his assistance with financial questions.

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Contributors

Leadership of this thesis and committee was headed by David Anderson, Committee Chair of the Department of Agriculture Economics, Henry Bryant of the Department of Agriculture Economics, Andy Herring of the Department of Animal Science, and Erin Kiella of the Real Estate Center.

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NOMENCLATURE

CAPM	Capital Asset Pricing Model
CME	Chicago Mercantile Exchange
E-V	Expected Return-Risk
EPS	Earnings Per Share
Farm	An agricultural entity whose primary focus is cultivation of plants for production
FPI	Farmland Partners Inc. Ticker
F-REIT	Farm Real Estate Investment Trust
IPO	Initial Public Offering
LAND	Gladstone Land Corporation Ticker
MVaR	Mean Value at Risk
NAREIT	National Association of Real Estate Investment Trusts
NAVM	Net Asset Value Model
NYSE	New York Stock Exchange
Ranch	An agricultural entity that raises livestock on native or improved pasture
REIT	Real Estate Investment Trust
USDA	United States Department of Agriculture
VECM	Vector Error Correction Models

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INTRODUCTION

Real Estate Investment Trusts (REIT) are an interesting option for investors. Hard asset investing such as land has been a successful and valuable part of a portfolio (Painter 2013). Real Estate Investment Trusts allow an investor, who previously did not have the capital to invest in real estate directly, the opportunity to diversify into real estate assets. Successful inclusion in a portfolio has been especially true when REITs are correlated with, and act like, a land investment (Ghosh, Miles, and Sirmans 1996; Glascock, Lu and So 2002).

Investing in land offers a higher return for a low risk investment (Morrill 2016), and a positive correlation with inflation (Sherrick, Mallory, and Hopper 2013). Projected growth in food demand and economic growth over time will create noteworthy opportunities for investors according to Kesmodel, and Newman (2015). Investors have two avenues to add land to their portfolio, outright land purchases or in REITs.

Publicly traded REITs dealing solely with agricultural land are so new that comparing REITs equally to purchasing agriculture land is difficult. Agriculture REITs are exciting because of the low barrier required to achieve the benefits of an agricultural land investment. Real Estate Investment Trusts also permit the investment in land without the usual work required in managing a land investment. The features of agriculture REITs provide an alternative opportunity for investors to have land invested in agriculture, yet come at it from a different perspective. Previously, if an investor wanted to invest in agricultural land they were restricted to being directly involved with

an actual farm or ranch, or at least owning the land and leasing it to a tenant or farmer. Adding the prospect of investing in an agriculture REIT can make it difficult for investors to decide where to place money if they have decided to put a portion of their portfolio towards agricultural land. Current agricultural land REITs on the New York Stock Exchange are Gladstone who entered the market in 2013, and Farmland Partners who entered the market in 2014. The infusion of capital from private equity provides farmers an alternative source of funding to efficiently operate their land. Investor involvement can provide outside access to needed capital that allows the business to adopt profit improving technology.

Comparing a direct agricultural land purchase and investment in agricultural REITs may offer insight into potentially profitable returns on a secure investment. As realtors stress “location, location, location”, it appears that for the investor there is an added aspect of “timing, timing, timing”. This paper examines correlation and return performance and timing between REITs and agricultural land as investments.

LITERATURE REVIEW

All people are impacted by land and its value. In a Wall Street Journal Article, Kesmodel, and Newman (2015) acknowledge that a growing population inherently means that the food demand will continue to grow, making farmland an investment to consider when building or diversifying a portfolio. Literature for investing in REITs is extensive, but little domestic research has been produced. Only a couple of articles cover both farm and ranch land investment, one from Canada, Painter (2013) and Anderson, et al., (2005) which examines small cap value stocks. Understanding investors' goals in land investment is an important consideration in land investment decision making (Pope 1985; Schueth 2003; Mallett, and Michelson 2010; Sorice et al. 2012; Duffy 2013; Chen et al. 2015).

Farmland Value

Farmers, prior to the downturn of agriculture in the 1980s, responded to market signals to expand and grow. Many operations took on debt to chase the growth expectations in both the agricultural commodity market and the land market. International influences such as potential global trade with China after President Nixon visited, and the crop failure in the Soviet Union, also pushed growth even further (Barnett 2000). In the 1980s, the farm business sector was negatively affected by low commodity prices and contractionary fiscal and monetary policy aimed at taming inflation. Land values collapsed making it difficult for farmers and related businesses to continue operating (Barnett 2000; Hanson, Parandvash, and Ryan 1991). The strain on

farmers and ranchers limited their ability to repay debt, putting strain on agriculture lenders who, as a result failed at extremely high rates. Government programs helped dampen the impacts of the overextended debt that many had acquired during the expansion of the 1970s and early 1980s. After the 1980s, many changes impacted agriculture land, for example, technology, population shifts, efficiency, environmental concerns, and globalization. Each of these changes impact the value of land especially in specific markets where an investor might specialize.

Land value is determined by its derived demand and the consumptive use properties that it holds. The Appraisal Institute (2013) breaks property into smaller categories of utility, scarcity, desire and effective purchasing power. As the landscape changes, different characteristics or opportunities are available. In rural lands, agricultural returns account for less than one fourth of the average market value of land (Pope 1985). Other major factors that play a role in the value of agriculture land is its proximity to towns, recreational opportunities, potential for development and other characteristics depending on the specifications. Politics may also play a role in the value of land, zoning, environmental concerns and public use or need can change the value of land making it more or less desirable to different parties. Government subsidies or farm assistance programs may also impact land values if land is tied up in a conservation easement or has access to special funding.

Mid 2000s

Prior to 2000 there were many changes in the field of investing in land. In the 1980s, the dynamics of investing in agriculture changed significantly. As farms and

banks failed at higher rates than ever before, ideas about government policy and agriculture land investment were reevaluated (Hanson, Parandvash, and Ryan 1991; Barnett 2000).

Following the wreck of the 1980s, in the early 1990s, the market capital of REITs increased by \$35.6 billion, from \$8.7 billion to \$44.3 billion (Bhasin, Cole, and Kiely 1997). The increase is mostly attributed to the desire for investment diversification. Growth in REIT investment has continued. In 2018, REITs had an equity market capitalization of \$1.163 trillion. Gladstone and Farmland Partners, make up \$809.38 million of the total REIT capitalization according to NAREIT, which comes out to 0.0007%.

Population increase, economic growth, fossil fuel exploration, and land use dynamics influence land values. Growth of cities and the fear that food production will fall behind demand is a concern of some, but should not be (Lee 2000). The agriculture industry adapts quickly to market signals. For example, the response to the ethanol policy introduced by the United States through the Energy Independence and Security Act in 2007 was followed by an almost 24% increase in corn production from the previous year (USDA NASS 2007). Nevertheless, the previously mentioned factors play a role in the value of agriculture land and how investors might approach it as an investment. General economy changes, personal income availability for investing will change the liquidity and motivations for investing in agriculture land (Gosh, Miles, and Sirmans 1996).

Investment and Inflation

When analyzing an investment, whether a stock or land investment, there are two types of returns to consider. First value appreciation and second annual income (Noland et al 2011; Duffy 2013). Both land and agriculture REITs share in this truth, yet their approach to investing and ties to inflation are slightly different. Investors' desire to reduce volatility and maintain or increase total returns was studied by Kaplan (1985) in his analysis of farmland portfolio investments. Kaplan (1985) compared farmland index returns against benchmarks, analyzed farmland gains as an asset class and used Markowitz optimization to enhance portfolios (Markowitz 1959). With these findings we can conclude that there are different aspects that need to be considered when using agriculture REITs to invest in agriculture land. Agriculture REITs may struggle as a prominent diversification tool because of correlations to S&P 500 (Cotter and Stevenson 2006), other assets (Gosh, Miles, and Sirmans 1996) and agriculture land itself (Painter 2013). Land has long been used for a hedge against inflation. Although the sources of inflation are somewhat disputed and may depend on the type of land and its region, investing in land and an inflation hedge is still done with confidence (Barry 1980; Schurle et al 2012).

Glascok, Lu, and So (2002) looked at REIT returns using Vector Error Correction Models (VECM) to study the relationship between REIT returns and inflation. The study confirmed that REITs are used similarly as land as an inflation hedge. Hennings, Sherrick, and Barry (2005) study the inclusion of farmland in risk efficiency portfolios. They find that land is positively correlated with inflation. Work

by Lins, Sherrick, and Venigalla (1992) and Sherrick, Mallory, and Hopper (2013) also support a positive correlation between agriculture land, REITs and inflation. This knowledge supports investors' use of agriculture REITs as a hedge against inflation in their portfolios.

To compare farm land investment with other investments, Noland et al. (2011) considers University of Illinois' endowed farmland portfolio. They find that farmland's E-V frontier outperforms stocks and bonds. The concentration of the land portfolio and time frame of farms considered from across the United States and products produced may change the results of the study. "Economic Feasibility of Farm Real Estate Equity Investments" by Dodson (1994), analyses land investments using different modes of investments, bank debt, owner equity, leasing or REITs. In this analysis, Dodson uses a Collins and Bourn model (1986) along with sensitivity analysis. Dodson's results suggest that due to the disadvantages of bank debt, owner equity, and leasing, REITs offer farmers and ranchers who currently own their land an alternative source of equity for advancement of farmland that operators otherwise may not have access to. Outright land ownership can have high barriers to entry due to the required management, sometimes intensive, and specialized knowledge that may be required to maintain healthy and productive land that yields ongoing and future profits.

Comparing REIT investment against direct farmland investments can be done by expected holding time frames. Since REITs are traded publicly, they offer investors the ability to enter and exit the market much easier and more quickly than a farmland purchase might. The liquidity afforded to REIT investments makes them more favorable

to pension funds or small investors (Bhasin, Cole, and Kiely 1997). Annual costs for investing in agriculture land vs. agriculture REITs are different and must be considered. For agriculture land, property taxes, operational overhead, any human capital that is necessary for decision making, maintenance among other expenses can add up depending on the type of operation and how intensive the management strategies are. On the other hand, REITs expenses are much simpler. Any fees for trading depending on how the relationship is set up with the investors broker and taxes will likely be the extent of their annual costs.

Alternative Investments

Agriculture land has more diverse investing opportunities when compared to REITs. An investor can target farmland or ranchland or a combination of both. In some areas farming or ranching can also be broken down into different entities. For example, the ranch can be made up of a chicken and cattle operation, or wheat and cattle operation. Oil companies, wind power, transfer or transmission, hunting and other alternative uses can make land a more flexible investment for the investor (Sunderman et al. 2000). Recreation is becoming more important to recognize as a viable potential source of income for farmland operators, as people desire to interact with and see nature. The combinations for diversification are immense. A factor to be recognized in alternative uses of land is that the proximity to scenic areas could make some uses feasible and others not (Snderman et al. 2000).

Real Estate Investment Trusts

There are several types of REITs that make up the market for this investment. The major groups are Equity and Mortgage REITs. There are also Public Non-Listed REITs or PNLRs and Private REITs. Equity REITs include hospitals, apartment complexes, office buildings and shopping centers to name a few. Farmland is also considered as an equity REIT. As stated on the NAREIT website (NAREIT 2019), equity REITs must “distribute a minimum of 90 percent of their income to shareholders in the form of dividends”.

In January 1994, the 1993 tax act passed that changed the domestic pension plan view of REITs (Glascock, Lu, and So 2000). The tax change allowed REITs to operate like a small cap stock rather than real estate, which was also mentioned by (Anderson et al 2005). Commercial REITs have been studied extensively by comparing the returns to other asset classes in articles by Clayton and MacKinnon (2001); Glascock (1991); Glascock, Lu, and So, (2000). Comparisons between commercial REITs and agricultural REITs are limited and may be an opportunity for further research in this field.

A significant benefit to REITs is their lower barrier to entry compared to direct investment land. The desirable nature of REITs depends on the ability of someone else to efficiently manage the company and provide returns on the investment. In the article “Are REITs Stocks: Real Estate Finance” by Gosh, Miles, and Sirmans, (1996), the author evaluated the stance and behavior of REITs. In their conclusions they state that “REITs are a bit more like direct investment in real estate, and a bit less like other types

of stocks.” This finding is beneficial to investors with the goal of finding benefits comparable to what land has to offer. They mention that liquidity may be an issue but as the industry continues to grow over time there is less of a concern regarding entry and exit of the market.

The article, “REIT returns and pricing: the small cap value stock factor” Anderson et al (2005) compared REITs to small capitalization stocks, large capitalization stocks, and private real estate to the model. They find that returns of REITs and small capitalization value stocks have “common drivers,” and add that REITs are a substantial diversification tool.

“Gold, Black Gold and Farmland: should they all be a part of your investment portfolio?” Painter (2013) analyzed effects of diversifying an investment portfolio with not only F-REITs, but assets like gold and oil. The article concluded that F-REITs were more effective in reducing risk fluctuation, price cycle and dividend than oil or gold.

As the past research has shown, REITs are a powerful tool available to investors who might have restrictions on investment abilities preventing them from purchasing an entire farm or piece of land. The following analysis will focus on two agricultural REITs, Farmland Partners Incorporated (FPI) and Gladstone Land Corporation (LAND). These companies are young and have drastically different approaches when investing in farmland. By comparing both companies to a direct purchase of agriculture land, we will identify strengths and weaknesses of each strategy.

Risk

Risk of investing in REITs and agriculture land have been looked at but only from the point of view of their respective fields, not comparatively. Commercial REITs were examined by Liang, Prudential, and Webb (1995) and Glascock (1991).

Agriculture land has been evaluated for risk by Chen et al (2015); Hennings, Sherrick, and Barry (2005); Morrill (2016) and Barry (1980).

Liang's research indicated that equity REITs, which are the most relevant to this paper, are more stable than mortgage REITs. While an older paper, the results should allow for investors to understand how the risk of REITs have changed over time. Liang uses a two-index regression model for studying returns over time. Glascock (1991) using a dummy variable regression to visualize how market conditions impact real estate portfolio betas found that as times change, so does the beta (standard risk measure) for the REITs.

For agriculture land, Barry (1980) found using a Capital Asset Pricing Model (CAPM) that "farm real estate has offered substantial premiums above those for systematic risk." This finding shows that land is capable of outperforming market investments at less of a risk to the investor. Hennings, Sherrick, and Barry (2005) following the same line of thought as Barry (1980), but using an expected return-risk (E-V) model came to similar conclusions. Recently, Morrill (2016) updated the data set and re-ran the work done by Hennings, Sherrick, and Barry (2005) with minor differences. Both studies agree that farmland has higher rewards at lower risk levels when compared to other low risk investments. Taking it one step further, Chen et al. (2015) used a

Mean-Value at Risk (MVaR) model to examine optimum portfolios when considering farmland, agricultural equities and grain, as risk levels change. Chen et al (2015) find that at low risk tolerances, the farmland portfolio outperforms the other investments.

Risk is present in any investment. Previous work has shown investment in land has the ability to bring stable returns to a portfolio that most other investment types will likely struggle to match. When investors are sensitive to risk levels, land is certainly a place to consider investing.

Summary

Real Estate Investment Trusts have been considered for use of agriculture land investment at least as far back as the mid-1990s as it is mentioned in Dodson's (1994) article. Private pensions, investors and funds have invested in agriculture land for years, but only since the Initial Public Offering (IPO) of Gladstone in 2013 and Farmland Partners in 2014 have publicly traded agriculture REITs been available on the NYSE. Farmland value is important for food production and security and offers financial opportunities for investors. Investment in land is not new, and largely focuses on capital gains and yearly returns. Inflation is a major draw for investors as many other investment areas are not positively correlated with inflation like land is. The overall versatility of land for investment is infinite, as all land and properties differ across the globe, which offers diversification on an unprecedented scale. Over time, REITs have become an important vehicle for investors to achieve a well-diversified portfolio for themselves and their clients. Finally, the risk associated with land investments, REITs or farmland, is shown historically to be beneficial to add to portfolios. Moving forward,

this paper looks to compare a direct agricultural land purchase against the agricultural REITs Gladstone Land Corporation and Farmland Partners Incorporated through performance and timing.

COMPANY INFORMATION

The following information was retrieved from each individual companies' website.

Gladstone Land Corporation (LAND)

In 2013, Gladstone made its IPO on the New York Stock Exchange (NYSE). Currently they are invested in 49 different farm operations spanning the United States. Over 75% of their operations are in California, Florida, and Colorado. California dominates their portfolio with 20 operations. Florida is represented by 13 and Colorado by 4 operations. Gladstone has three or fewer properties in seven other states (Figure 1).

Figure 2 contains the amount of land held by Gladstone in each state. The number of tillable acres compared to total acres owned is significant because of potential reductions in income to total acres if a large amount of their portfolio is in non-tillable acres. Table 1 contains descriptive statistics on the tillable and total acres operated.

Gladstone's portfolio of land currently produces a total of 35 different products. The bulk of their products are permanent high value crops, typically used for human consumption. Their two largest products by number of properties producing are strawberries and vegetables, followed by blueberries and alfalfa. Figure 3 offers a count of the number of properties that produce each type of product in their portfolio.

Farmland Partners Incorporated (FPI)

Farmland Partners was publicly listed on the NYSE in 2014. In contrast to Gladstone, Farmland Partners has the bulk of its operations in the Midwest United States. Illinois farmland is their largest holding with over 190 operations. Holdings by state drops off sharply after Illinois across the next 16 states. Figure 4 depicts the number of properties by state.

Farmland Partners reports total acres and tillable acres. Illinois has a greater number of properties; the disparity is not as large when considering the number of acres owned in each state (Figure 5). Table 2 offers the summary data of Farmland Partners total acres and tillable acres.

Figure 6 contains Farmland Partners production by the number of operations producing a commodity. Over 80% of Farmland Partner's properties produce one or more of the following products: corn, sorghum, wheat, and/or soybeans. Farmland Partners product portfolio is strikingly different than Gladstone's. After those major commodities produced, a second cluster of products; oats, alfalfa and grass hay for example, which are produced on about 70% of all properties. The remaining products in the Farmland Partners portfolio are produced by a much smaller number of operations. Partially due to the size of Farmland Partners, there are 80 listed types of products that are potentially produced on Farmland Partners farms. In Figure 6, only the top 25 products are shown, for comparison purposes to Gladstone.

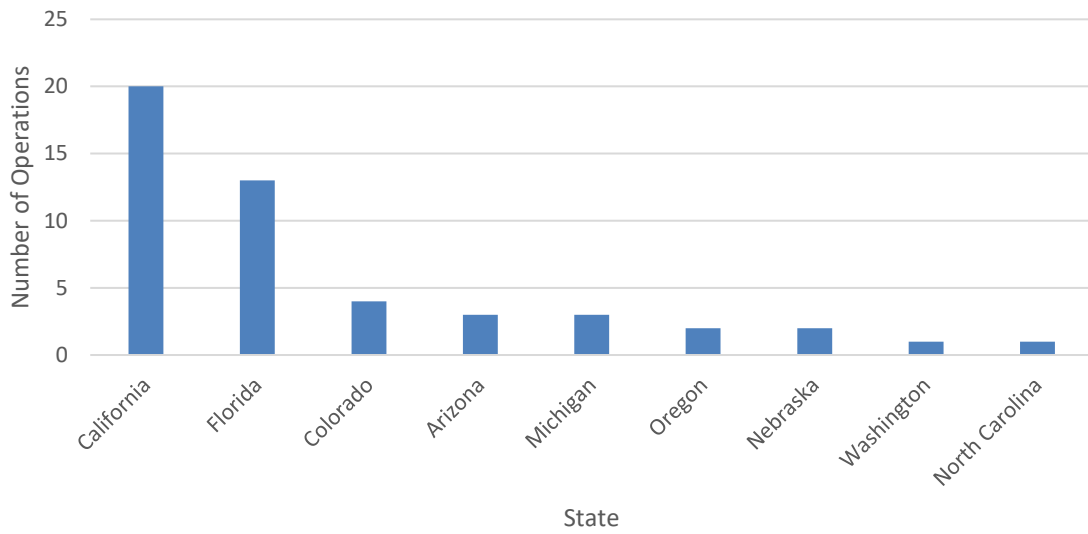


Figure 1. Total Operations by State for Gladstone Land Corporation

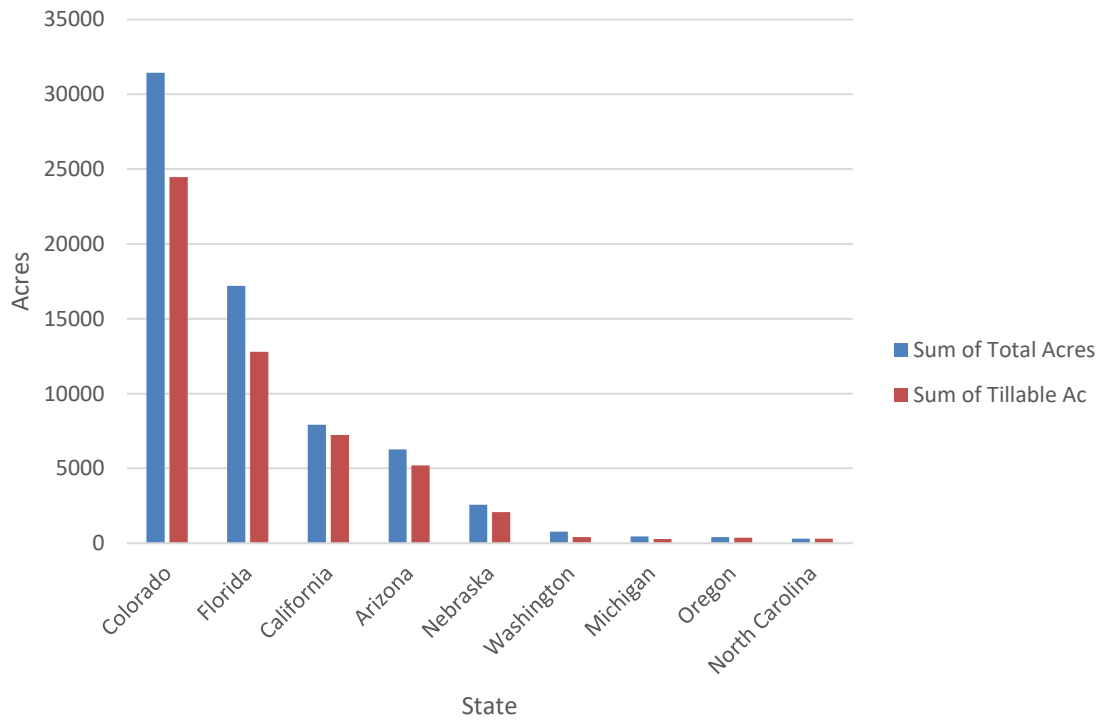


Figure 2. Total and Tillable Acres by State for Gladstone Land Corporation

Table 1. Descriptive Statistics for Property Ownership by Gladstone Land Corporation

Gladstone Property Data	Total Acres	Tillable Acres
Mean	1,374	1,085
Median	400	331
Mode	1,280	195
Max	16,595	11,742
Min	59	50

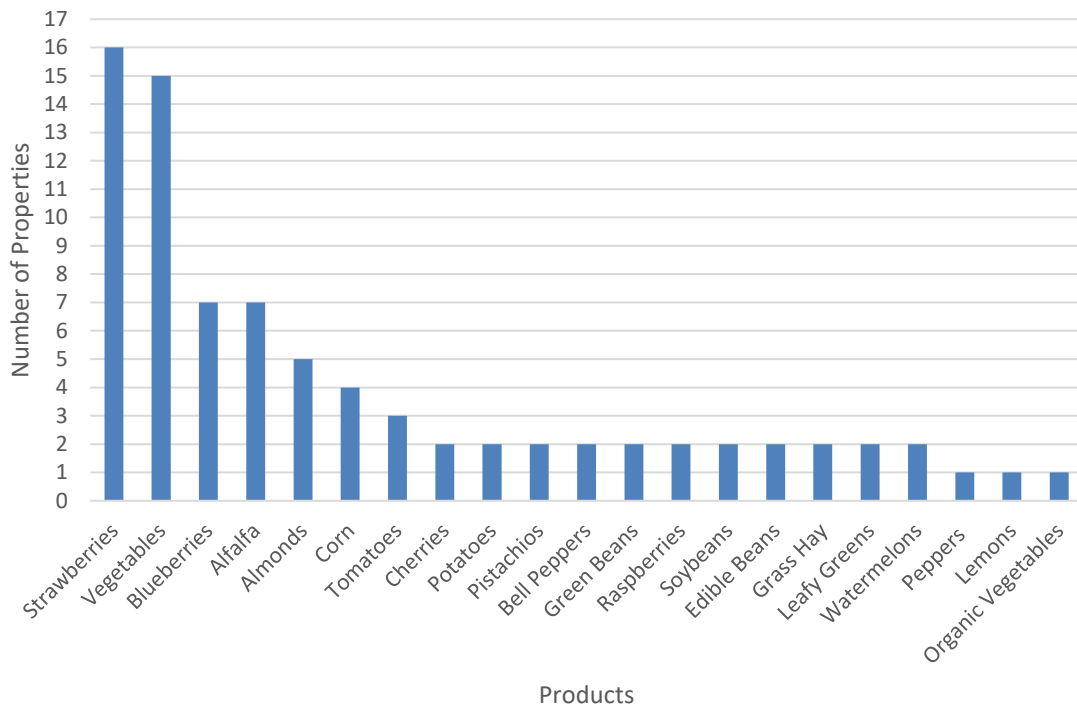


Figure 3. Number of Gladstone Properties by Product Types

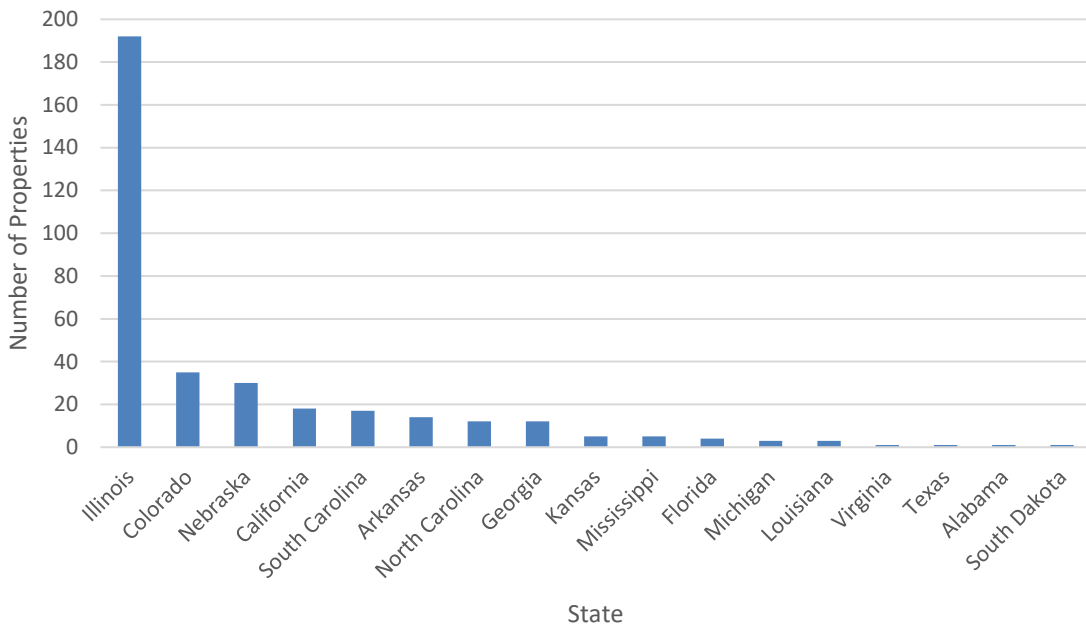


Figure 4. Number of Farmland Partners Inc. Properties by State

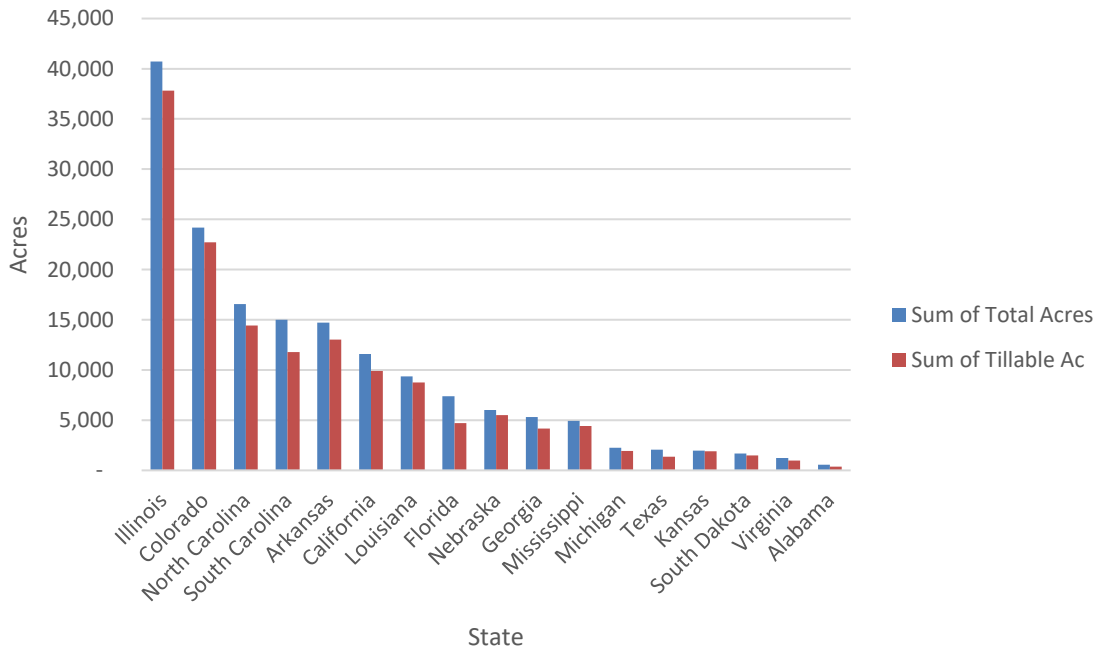


Figure 5. Farmland Partners Inc. Acres by State

Table 2. Descriptive Statistics for Property Ownership by Farmland Partners

Farmland Partners Data	Total Acres	Tillable Acres
Mean	468	411
Median	201	183
Mode	80	78
Max	7,400	6,882
Min	7	0

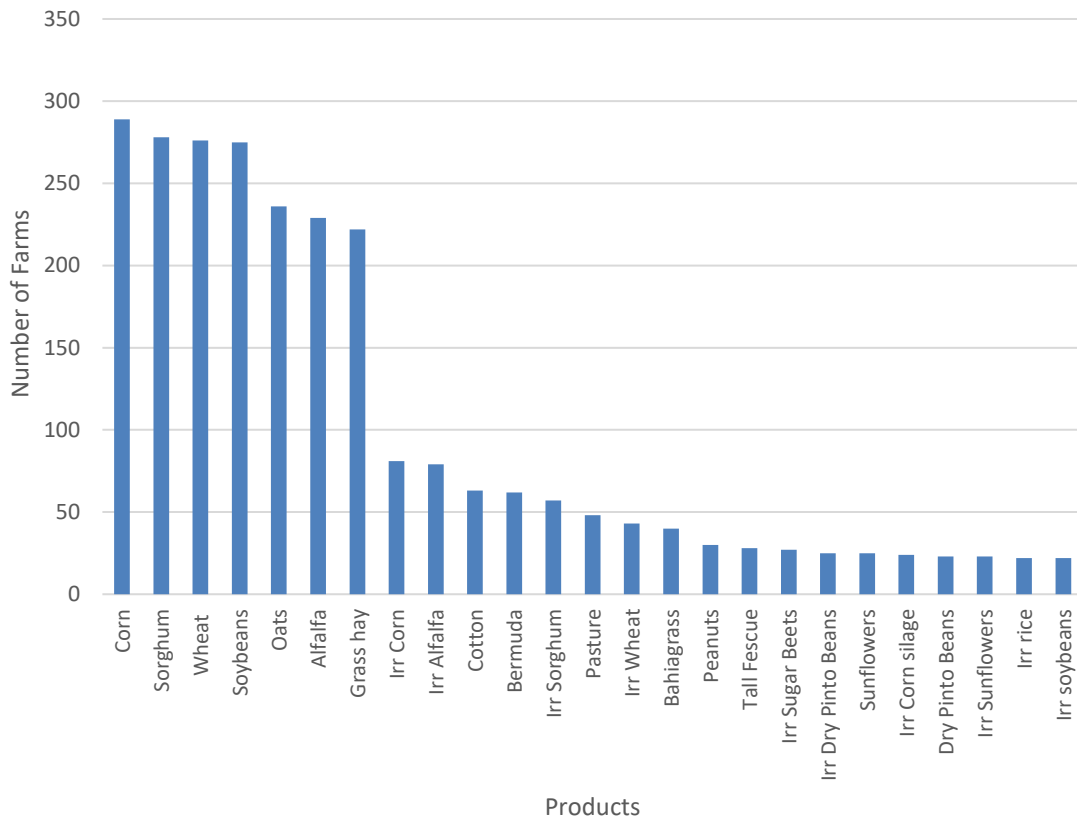


Figure 6. Number of Farmland Partners Inc. Properties by Product Type

DATA

This project examined agricultural land REITs versus the value of assets and income of a direct land investment utilizing data from USDA NASS, USDA AMS and Bloomberg. We use Simetar on Excel to conduct a financial analysis and portfolio comparison evaluating market capitalization and dividend payments. Simetar is used to analyze the performance of Gladstone and Farmland Partners compared to direct land investment and against corn, small cap stocks, micro-cap stocks and REIT Indexes, and the S&P 500. The goal was to draw conclusions from the financial and portfolio analysis that will allow investors to better understand potential risks and rewards of REITs that are made up of only agriculture land.

Gladstone and Farmland Partners Data

Stock prices, dividend payments, and volume of trades for Farmland Partners and Gladstone are collected from Bloomberg for use in the analysis from the time of their respective IPOs, through January 29, 2019 (Bloomberg, 2019). The stock performance of each REIT is compared to that of other investment vehicles to examine correlation of price movements, level of returns, and the value of an initial investment today. Other financial values are assessed as necessary by gathering data from the individual company websites or as reported by Bloomberg.

Land Data

Farmland Partners is primarily invested in Illinois, Colorado and North Carolina, while Gladstone's land holdings are in California, Florida, Colorado, and Arizona.

USDA land value and land rent data for these states, as well as rates of return are used to compare to the REIT data (USDA, 2019). The USDA data are annual in nature as are dividends paid by the REITs. However, the daily stock price trade allows for more frequent data for investment analysis. Following Duffy (2013), an investment in each vehicle at different points of time ending in the value of each one through 2018 is used to evaluate the investment.

ANALYSIS AND RESULTS

With the data previously mentioned, we analyzed both Farmland Partners and Gladstone against themselves, each other, other stocks on the NYSE, land that is relevant to each company, and finally a look at returns over time following the work of Duffy (2013), comparing to other investments.

Stock Analysis

A graphical representation of the price of stock for the Russell 2000, Russell Microcap Indexes and MSCI US REIT Index (RMZ), compared to Farmland Partners and Gladstone is contained in Figure 7. This figure was made to compare small, micro, and adjusted capitalization indexes to each company. By definition, a small capitalization stock equals \$250 million to \$2 billion, and micro capitalization stocks are from \$50 million to \$300 million. This places Farmland Partners in the small capitalization group and Gladstone in the micro capitalization group. Given the substantial correlation between the S&P 500 and the Russell 2000, as well as the designation of large capitalization stocks of the S&P 500, the S&P 500 was dropped from the analysis. To account for non-stationarity the data was differenced once. The differenced data was used to calculate the correlation matrix in Table 3. The Central Illinois corn price was added to test the correlation with Farmland Partners given their substantial investment in land in corn production. The correlation between Farmland Partners and Gladstone is 0.047. The Dow Jones U.S. Select REIT Index (DWRTF) was also excluded from the figure due to its high correlation to the RMZ market price.

Interestingly, the only negative correlation was between Gladstone and the Central Illinois corn price at a correlation value of -0.005.

Figure 8 and Figure 9 are both price and volume data over the lifetime of Gladstone and Farmland Partners respectively. For Gladstone some initial observations include, that its price has declined since its initial public offering, bottoming out at the first of the year in 2016. Its volume of trades has been increasing over time as has its volatility. Farmland Partners displays a similar story of declining price and increased volume as time goes on. In order to interpret these figures some, research was done to identify possible causes of major price or volume peaks and valleys. These observations are outlined in Figure 10 for Gladstone and Figure 11 for Farmland Partners. The majority of the spikes in volume for both companies were easily accounted for in the press releases of the individual companies, and could be attributed to issuance of common stock. There were several instances with less obvious reasons for volume to spike in both companies. A possible cause could be increases in the interest rate by the Federal Reserve. Increases announced by the Fed seem to line up well with several of the spikes in both companies. In Figure 11 though, there is a significant event that is not correlated to the Fed or common stock issues. On July 17, 2018 Farmland Partners was accused that the company “intentionally mislead investors with its financial reporting”, the company responded by denying the accusations and releasing financial statements to support their position. During this time, the price of stock for Farmland Partners fell from \$8.65 down to \$5.28 over 24 hours. This article was extremely destructive to the

company and observation of the price data would suggest that Farmland Partners stock price has not completely recovered from this situation.

Dividends for both Gladstone and Farmland Partners have been recorded and are displayed in Figures 12 and 13, respectively. For Gladstone, their first two dividends were \$0.04 per share, then jumped to \$0.12 from late 2012 to early 2013 before dropping down to \$0.03 and then slowly rising over time to its most recent level of \$0.0444 per share. Over the lifetime of Gladstone there have been a total of 72 dividend payments. Comparatively, Farmland Partners began its dividend payments at \$0.105 and increased to \$0.128 until dropping to \$0.05 after the severe drop in stock price due to the accusations made against Farmland Partners. Much fewer dividend payments have been made by Farmland Partners compared to Gladstone, with Farmland Partners only having a total of 17 payments.

The next part of this analysis looks at combining the changes in stock price and the dividend payments to calculate total expected returns for investors. To accomplish this, we take the natural log of the sum of dividends for each year added to the end of year price minus the natural log of the beginning of year price (Equation 1).

Equation 1.

Total Returns

$$= [\ln(\mathbf{End\ of\ Year\ Price} + \Sigma \mathbf{dividends}) \\ - \ln(\mathbf{Beginning\ of\ Year\ Price})]$$

This value gives us the appreciation value change over time for each company. The appreciation of value change is further illustrated in Figure 14. From year to year for

each company there seems to be a lot of volatility in the expected returns from price and dividends. The year 2018 was particularly hard on Farmland Partners where their returns declined to \$-0.58 after the detrimental loss of value due to the allegations made against them.

As previously mentioned, the market capitalization of Gladstone categorizes it as a micro-cap and Farmland Partners, although a younger company is larger and also classified as a micro-cap stock. Figure 15, contains the market capitalization for both companies. While the market capitalization for both companies has grown, Farmland Partners has grown much more rapidly because of loans and aggressive acquisitions.

The annual reports of each company provide Earnings Per Share (EPS) calculations. These values are provided in Table 4. For both companies the first year, 2014, is negative and then becomes positive. Gladstone had no listed EPS for the year 2017. Using the given EPS values, we were able to divide the EPS values by the end of the year price used later in this study to calculate a Price/Earnings Ratio (P/E) (Table 5). And finally, a dividend yield was calculated using the dividends per share divided by the end of year stock price, which is also shown in Table 5. Gladstone's Dividend Yield starts at 7% and declines to 4%. Interestingly, Farmland Partners dividend yield begins to increase as time advances and their price declines.

Land Analysis

The land analysis for this thesis is addressed in a similar fashion to the stocks. A market price for land in states where each company holds the amortization of their acreage was gathered for the same time frame as the stocks. Then the land rents for the

same states were acquired from USDA NASS (2019) for a comparison to dividends. To compare to the stocks, a similar equation was used to calculate the appreciation of value change in the land. Finally, a weighted average is formed according to the percentage make up of each state in each company according to its investments by acreage. In this evaluation, farm returns from production were not considered due to the fact that legally, REITs cannot be involved in or have claim to the returns to the farm itself.

USDA NASS offers land values for farm real estate average value, cropland value, non-irrigated crop land value, and pasture value per acre. In this study we will use the cropland values for all states as both companies are heavily invested in cropland. Figure 16 contains the top nine states where both companies have their top five acreage investment. Both companies have land in Colorado that places it in their top five by acreage. Figures 17 and 18 contains the same information broken down into the top five states for each company. These land values are very stable compared to the daily price data of the two stocks. Although it should be kept in mind that there are 1208 fewer data points over the 5 years that we are able to consider for Farmland Partners, and 1511 fewer data points over 6 years for Gladstone for land values.

Historical land rents across the nine states for the time frame of 2012 to 2018 is fortunately complete, but the data readily available by USDA NASS had spaces in the data for cropland rent in several states going back to 1994 (Figure 19). Although there are some states that waver a little in their land rents, like Florida, all states have been increasing over time. Arizona, Illinois, and Nebraska have had the largest increases in cropland rents since the beginning of the data set. For individual analysis, Figures 20

and 21 display the top states by acres rent for Gladstone and Farmland Partners respectively in the time frame of the last 7 years. Interestingly, the states that Gladstone is invested in are spread out across a range of \$74 to \$340, whereas Farmland Partners shows a group of between \$48 and \$111 and then Illinois at \$223.

From here we combined the land values and land rents of each state in a similar fashion as we did with the stock prices and dividends which is outlined in Equation 2.

Equation 2.

Total Returns

$$= [\ln(\mathbf{Value\ per\ Acre}_t + \mathbf{Rent}_t) - \ln(\mathbf{Value\ per\ Acre}_{t-1})]$$

This calculation gives us land value and rent returns for each state (Figure 22). These returns begin spread out in 2013 having a range of 0.29 but become surprisingly tight as time goes on to 2018 offering a range of 0.06. When we sort out the states to again the top five by acres for each company, we see a similar story (Figure 23 and Figure 24).

For Gladstone in Figure 23, there is only one state that shows negative returns for two years which is Nebraska. Farmland Partners had a little rougher time, having two states with negative returns, South Carolina for one year and North Carolina for two years.

Combining Stock Returns and Land Returns

With all of this information we will now evaluate the findings when combined. In Figure 25 we combine the returns from stock and returns from land ownership for Gladstone on the same graph. In this figure, it can be easily discerned that returns from the land are stable and generally positive, whereas the company's stock returns fluctuate from -0.37 to as high as 0.31. Also, for complementary values, a mean, standard

deviation and risk-adjusted return are calculated for each state and the stock of Gladstone (Figure 26). The standard deviation for Gladstone's stock returns is significantly higher than any one state. Also, the risk adjusted return for Gladstone is basically nonexistent, but Arizona is above 2, Florida above 3 and California is above 5. Figure 27 and Figure 28 displays the same information as Figures 25 and 26, but for Farmland Partners. The graphs volatility and potential for profit from the investment in stocks or land when looking at Figure 27 are telling. Of the five years that Farmland Partners has been traded, only two have shown positive returns. The states relevant to the Farmland Partners portfolio are generally positive. In Figure 28, North Carolina, Colorado and Illinois have similar means, standard deviations, and risk-adjusted returns. Arkansas has the highest risk-adjusted return, just short of 3. Dissimilar to the states, Farmland Partners has a negative mean of -0.18 and risk-adjusted return at -0.67, and the highest standard deviation of 0.27.

Next, we created a comparative portfolio of land investments using the amount of land each company owns in each state for the weights. The portfolios then compared to the returns of the stocks for each company. This gave us information as to how the underlying investment as a whole will compare to an investment in the stock. We will begin by looking at Gladstone. The top five states account for 97% of the total land that Gladstone owns. The specific percentages per state are recorded in Table 6. The weighted average of the land smooths out the returns expected from land from the five individual lines to the single line making for less noise and a clearer view of what is potentially going on in the company's assets (Figure 29). The weighted average begins

in 2013 at 0.14 very close to the 0.15 returns of the stock, and slowly declines and hovers at around 0.04. The mean, standard deviation, and risk-adjusted return were recalculated offering a mean slightly higher than the stock for the weighted average of the land and a much smaller standard deviation (Figure 30). The risk-adjusted return that is much higher at 1.33 for the land investment and sits at 0.03 for Gladstone. Due to the size and diversity between states, only 67% of Farmland Partners land is accounted for in their top five states (Table 7). It should be noted that there are significant differences in the diversity of states between the two companies, the products produced, and the number of operations. When combined, the weighted average of the land returns expected from the states that Farmland Partners is invested in starts at about the same point as Gladstone since the graph begins in 2014 instead of 2013 (Figure 31). The returns bottom out at 0.01 in 2016 and end in 2018 at 0.03. The mean and standard deviation for the land returns are both low where Farmland Partners stock is negative and larger respectively. The risk-adjusted return is where there is a large difference again with the land at 1.07 and Farmland Partners stock at -0.60.

Investment Comparison

Duffy (2013), in an update of a study done on Iowa land investment compared to the S&P 500, highlighted the importance of timing in investments. Here, the same method is used to evaluate how an investment in land would compare to an investment in Gladstone or Farmland Partners in the stock market.

The same values derived from the weighted average portion of this study are applied here to achieve an overall view of the land and where the companies are invested

to compare to a stock investment. An arbitrary investment value of \$100,000 is used as it should not swing the value of the stock significantly one way, yet will still be enough investment to buy several acres of land. Time begins on the day of the IPO of Farmland Partners, so that the comparisons will be equivalent. As value is realized annually to each respective investment, it is reinvested in the same asset. It should also be noted that no transaction, annual costs, taxes or maintenance have been included in this analysis, and could result in different findings based on location and type of land investment. Investment decisions should not be made based on this research alone.

For Gladstone and Farmland Partners, we start with the investment amount of \$100,000 and divide by the respective cost per share at the beginning of time to find how many shares are initially purchased. Next the dividends per share for the year are summed and the sum is multiplied by the number of shares initially purchased to calculate the income from dividends. The end of year price is given by Bloomberg, and the income for the year is divided by the end of year price to compute the number of shares purchased by reinvesting into each respective company. This additional stock purchased is added to the initial stock held and gives us a year ending amount of stock held by the investor. The end of year price will then be multiplied by the year ending amount of stock held to find an end of year value of the investment. This is repeated for each year of the study and is expressed in Figure 33 for Gladstone and Figure 34 for Farmland Partners. At the end of 2018 we find the ending value to be the projected value of the investment not including taxes or transaction fees. For Gladstone the ending value of the investment came out to be \$109,173 and for Farmland Partners \$41,276.

These values create a total return on investment of 9% for Gladstone and -59% for Farmland Partners (Table 8).

Moving to the land investment, we have the same set up as the stock investment with the exchange of cost per acre for the beginning stock price, and cropland rents in place of dividends. Due to the lack of specific time data for land values at the beginning and ending of each year, the same land value is used at the beginning and ending of each year. The initial \$100,000 is used to see how much land for investment in the weighted calculation of states' land value that are relevant to Gladstone and Farmland Partners, respectively. These beginning acres are then multiplied by the weighted rent per acre of the investment to find an income from rents. This income will now be reinvested in purchasing more land. The additional land purchased is now added to the beginning of the year land holdings to have an end of the year land amount holding. Each year is then multiplied by the annual land value price to find a value of the investment. Similarly, to the stock investment each year is treated the same through 2018 which is also displayed in Figures 33 and 34 for the land relevant to both companies. The ending value of the investment for land that is relevant to Gladstone was \$121,182 and for Farmland Partners land \$114,501 (Table 8). These values increase overall by 21% and 15% for land relevant to Gladstone and Farmland Partners, respectively.

This analysis shows similar results to Duffy (2013) that timing can significantly impact the performance of an investment. Gladstone and Farmland Partners are both growing throughout this time period so there are more factors than just the land investment impacting their value. When taking general observations of land values

leading up through the earlier 2000's to the time of each company's initial public offering; if they had been formed years earlier, these results might be significantly different. Especially for Farmland Partners which could have had the price of corn and soybeans supporting returns when they peaked during 2012 and 2013. The large increase in corn belt land values stems, in large part, from the ethanol boom that began in late 2006. Land values in the Gladstone portfolio are likely benefiting from the underlying boom in demand for various fruit and nut crops.

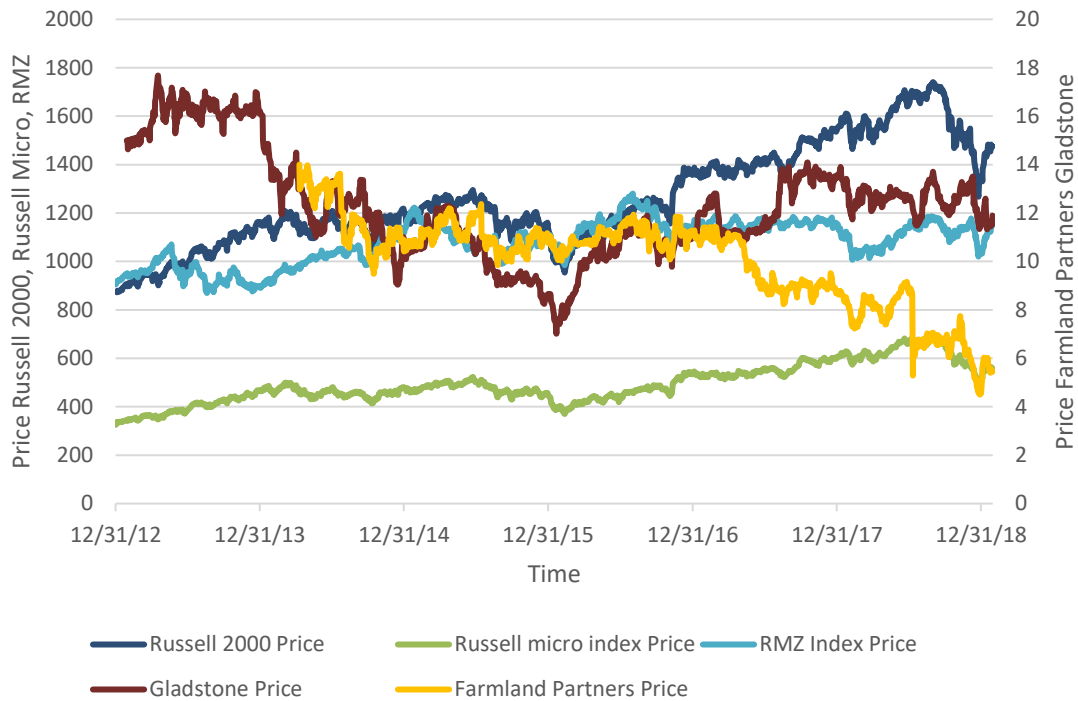


Figure 7. Major Stock Index Price Comparison to Gladstone and Farmland Partners Stock Prices

Table 3. First Difference Linear Correlation of Stock Indexes, Gladstone, and Farmland Partners Prices

	S&P 500	Russell 2000	Gladstone	Farmland Partners	Average Corn Price	Russell Micro Index	DWRTF Index	RMZ Index
S&P 500	1	0.099	0.084	0.024	0.004	0.788	0.546	0.552
Russell 2000		1	0.019	0.029	0.002	0.119	0.072	0.075
Gladstone			1	0.047	-0.005	0.107	0.114	0.118
Farmland Partners				1	0.005	0.022	0.056	0.057
Average Corn Price					1	0.004	-0.035	-0.032
Russell Micro Index						1	0.430	0.443
DWRTF Index							1	0.997
RMZ Index								1

*Information for Farmland Partners is replaced by fewer data points than other stocks, indexes and companies

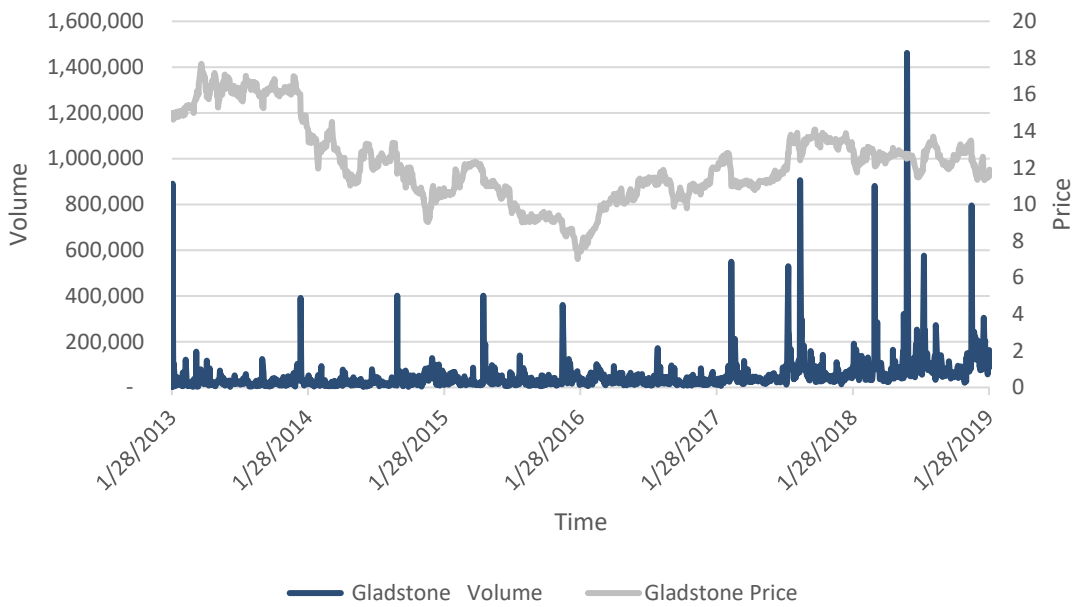


Figure 8. Price and Volume for Gladstone

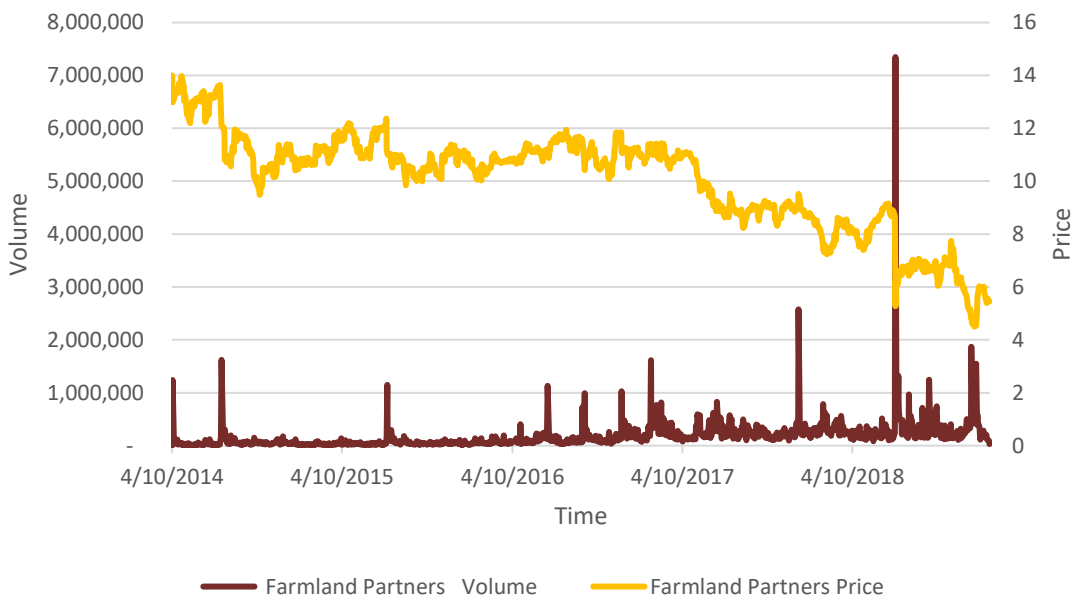


Figure 9. Price and Volume for Farmland Partners

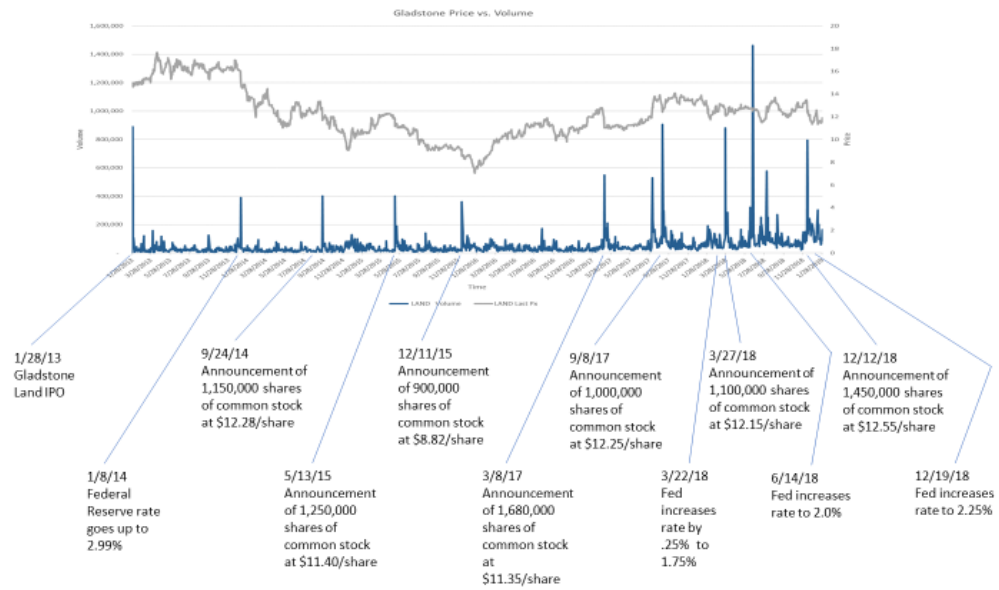


Figure 10. Timeline for Gladstone

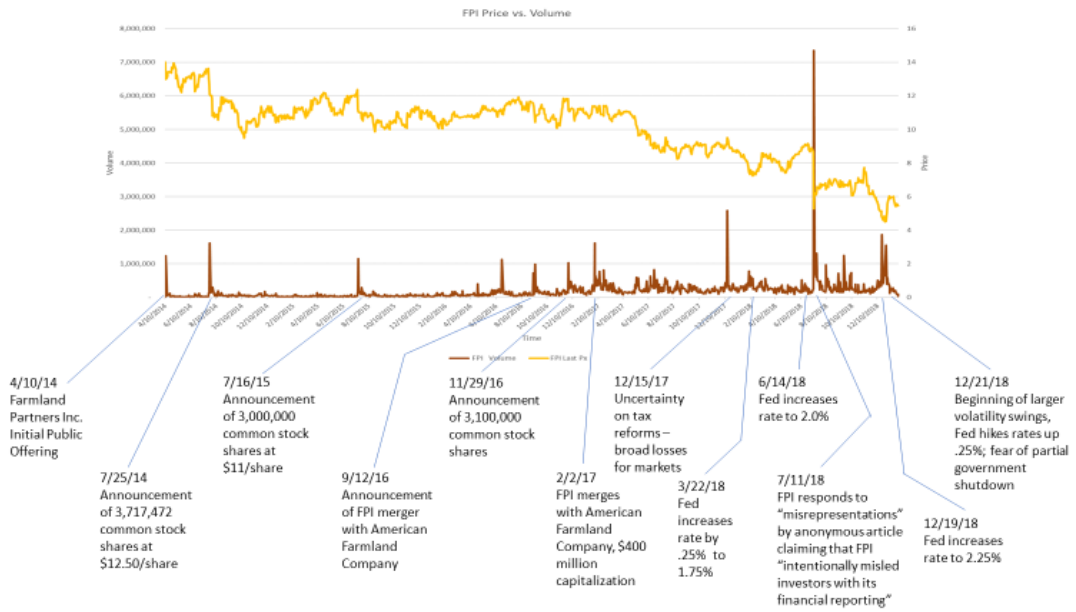


Figure 11. Timeline for Farmland Partners

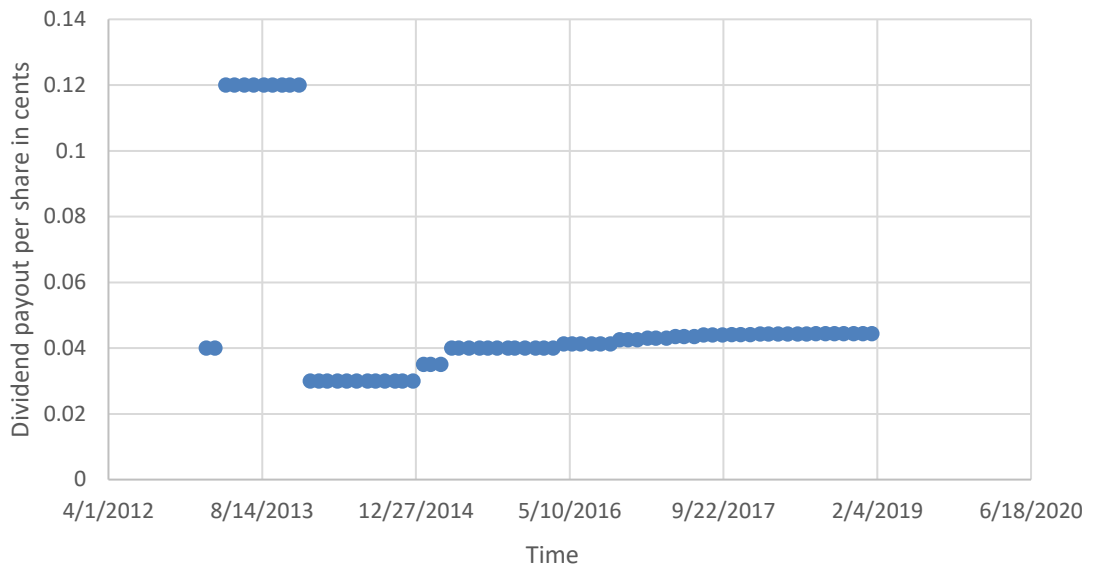


Figure 12. Dividends for Gladstone

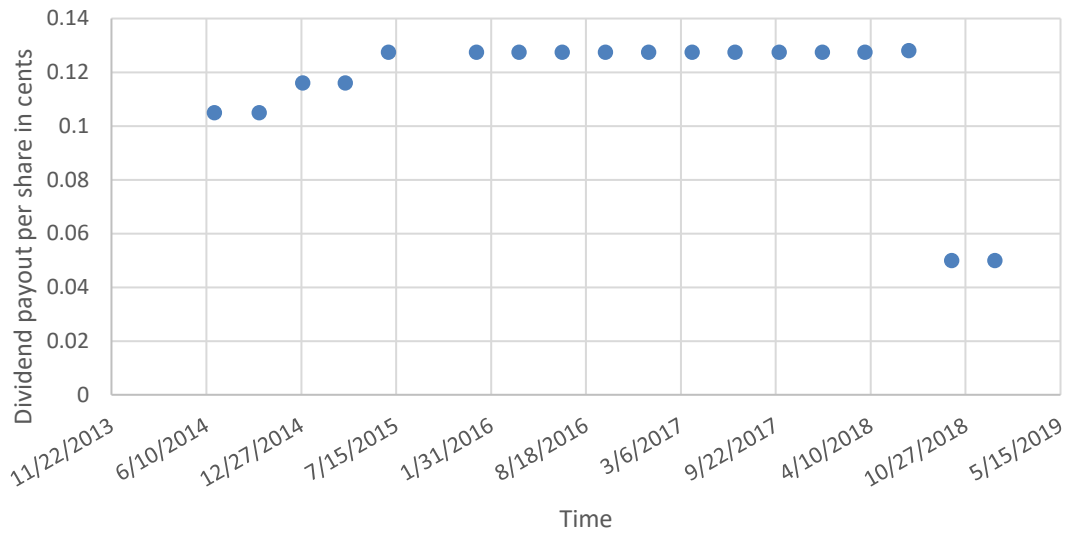


Figure 13. Dividends for Farmland Partners

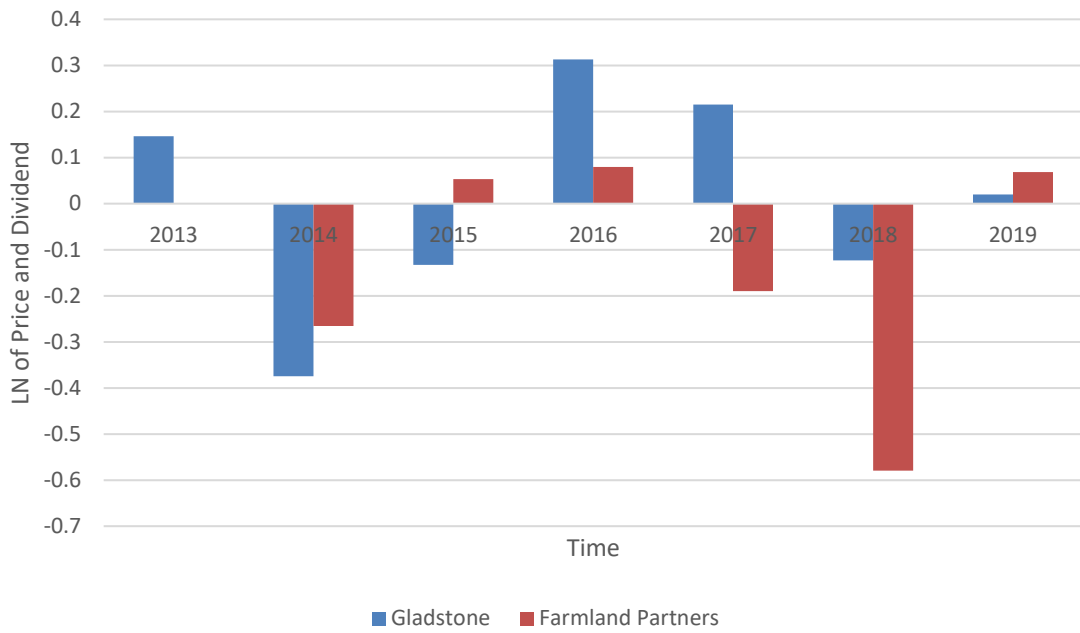


Figure 14. Gladstone and Farmland Appreciation Value Change

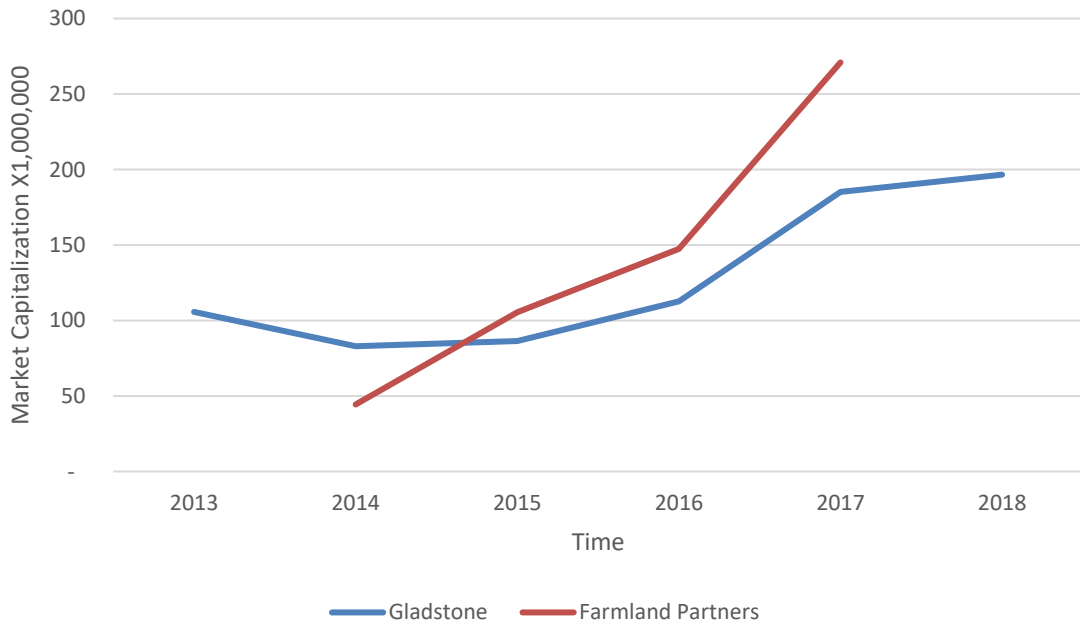


Figure 15. Market Capitalization

Table 4. Earnings per Share

EPS	2014	2015	2016	2017
Gladstone	\$ -0.02	\$ 0.07	\$ 0.04	\$ -
FPI	\$ -0.15	\$ 0.08	\$ 0.09	\$ 0.03

Table 5. Price per Earnings and Dividend Yield

Year	2013	2014	2015	2016	2017
P/E					
Gladstone		-535.0	123.6	281.0	-
FPI		-69.4	137.1	124.0	289.3
Dividend Yield					
Gladstone	7%	3%	5%	4%	4%
FPI	-	3%	3%	5%	6%

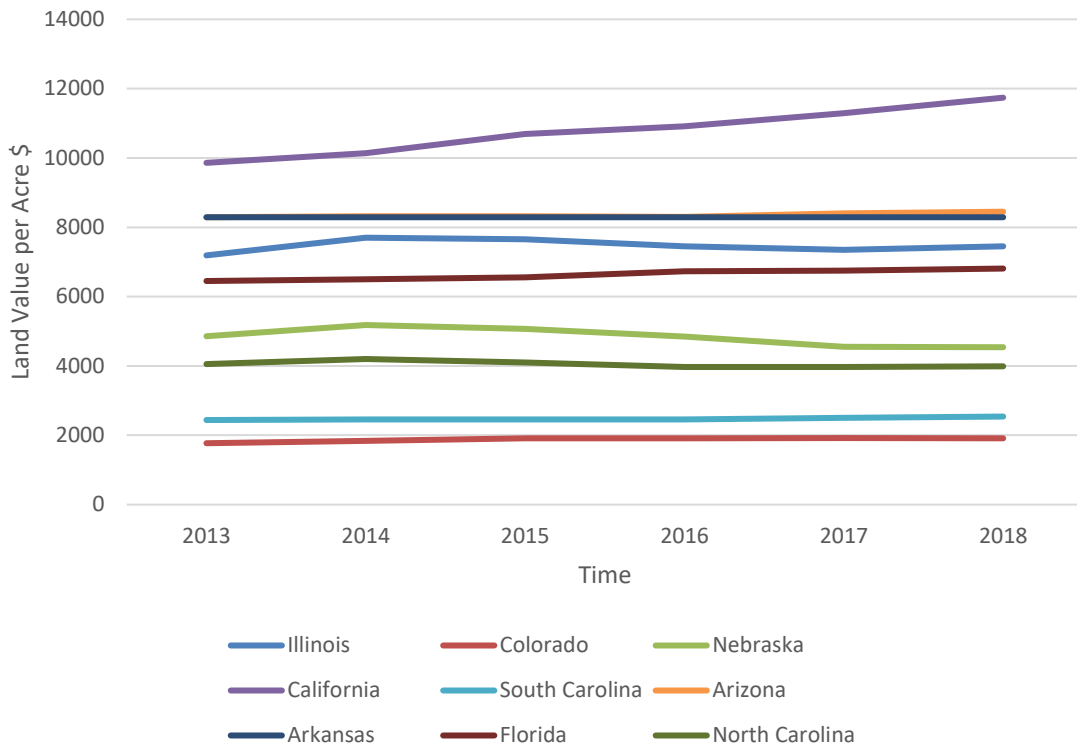


Figure 16. Top Nine States Land Cropland Value

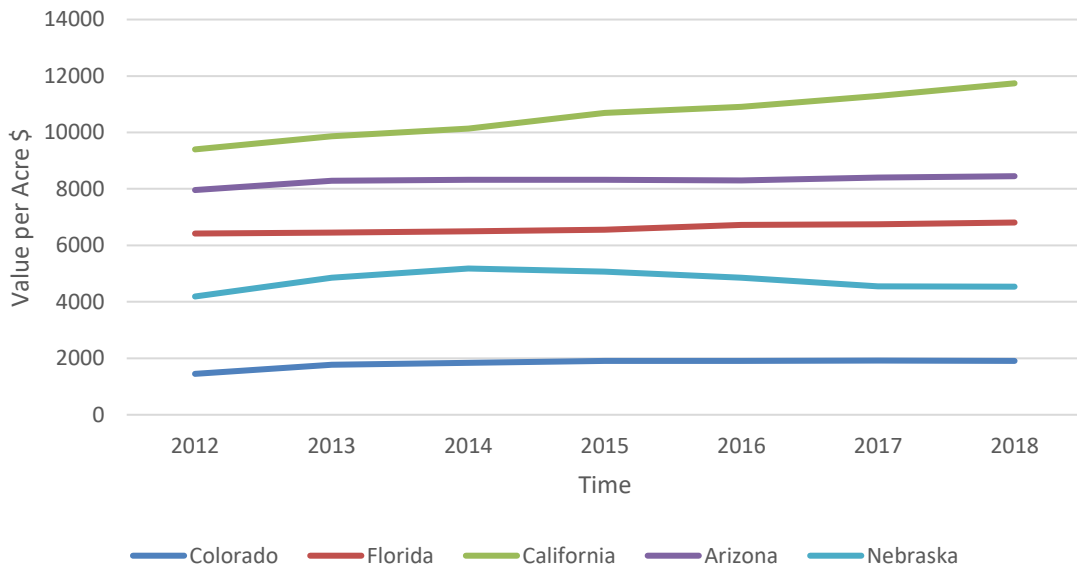


Figure 17. Top Five States Cropland Value for Gladstone

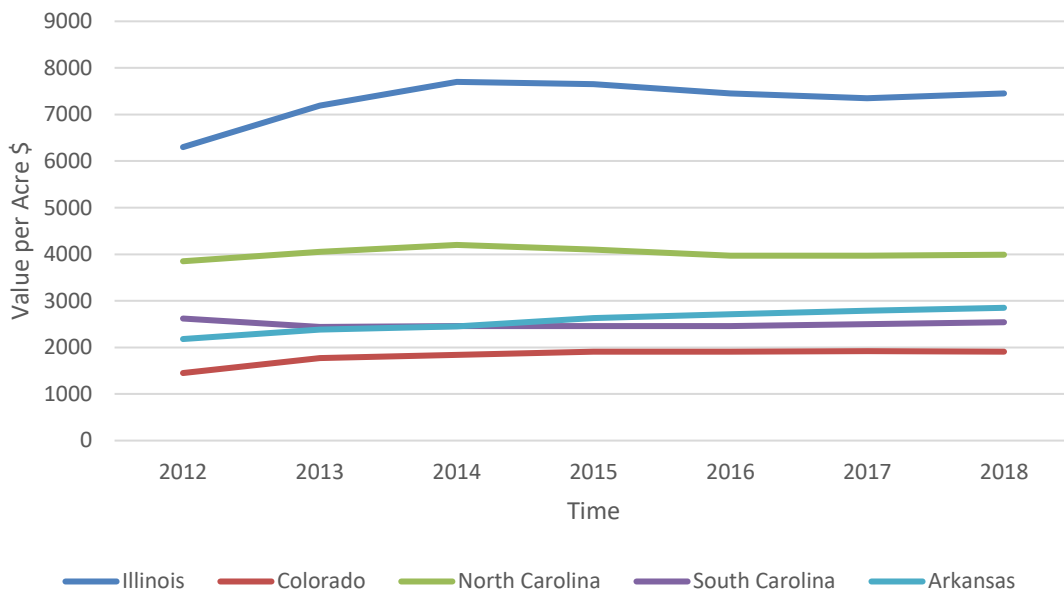


Figure 18. Top Five States Cropland Value for Farmland Partners

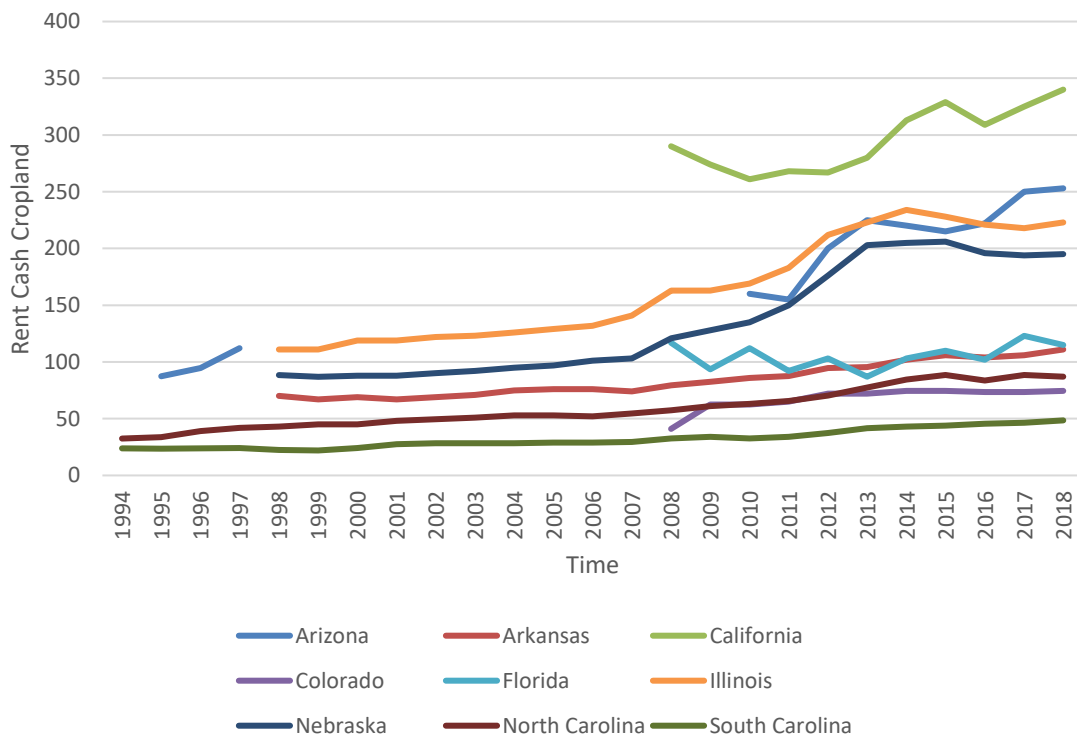


Figure 19. Historical Land Rents for Nine States

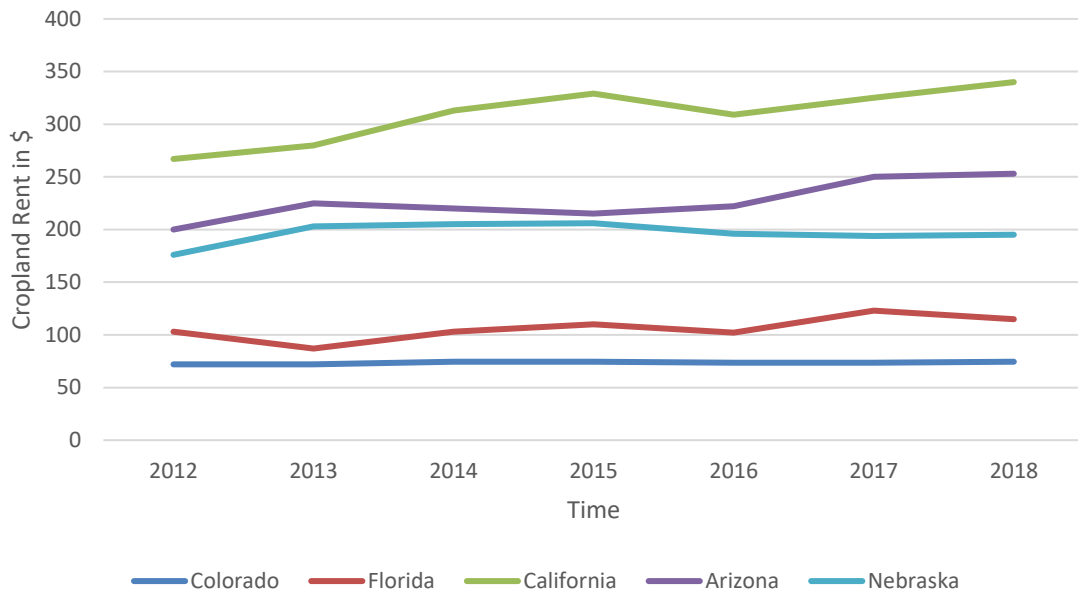


Figure 20. Historical Land Rents for Top Five States for Gladstone

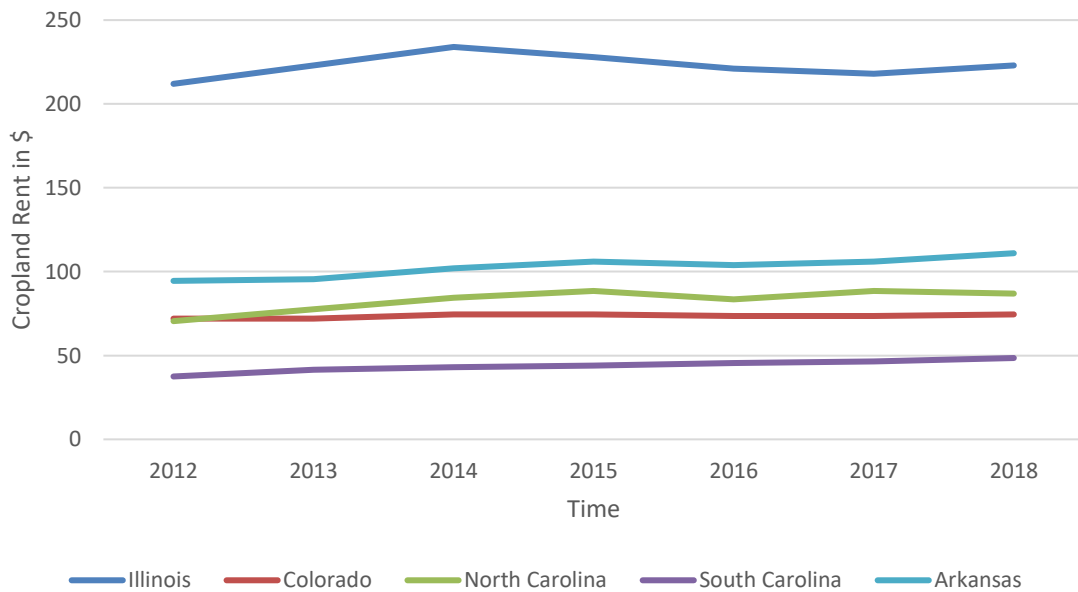


Figure 21. Historical Land Rents for Top Five States for Farmland Partners

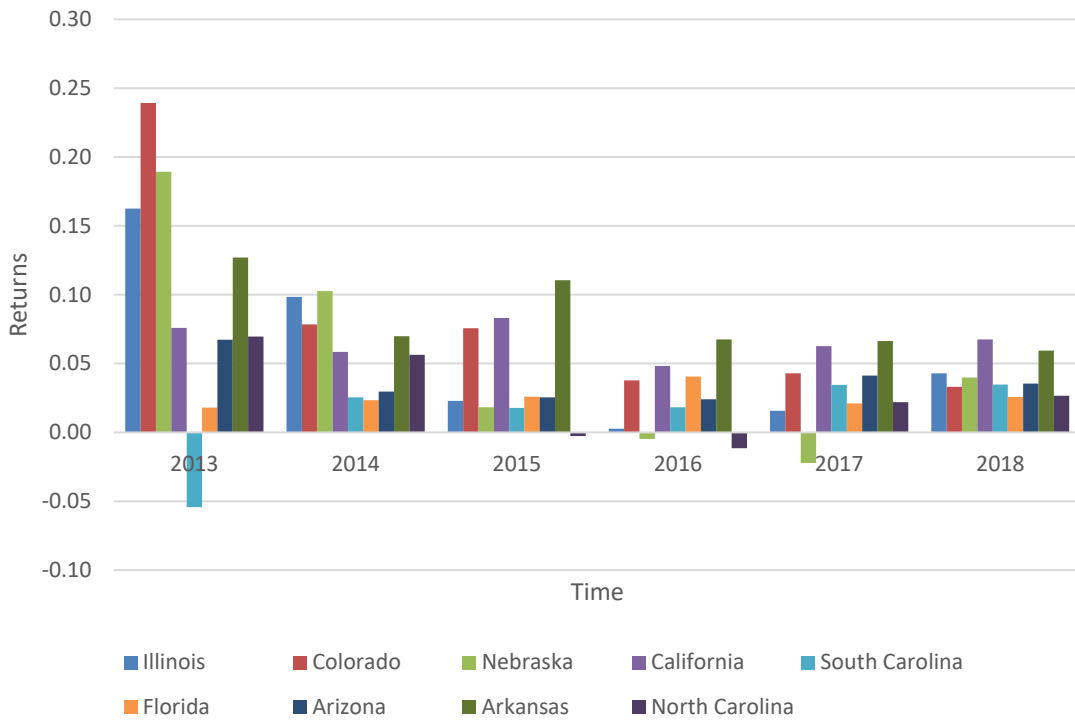


Figure 22. Rent and Value Return for Nine States

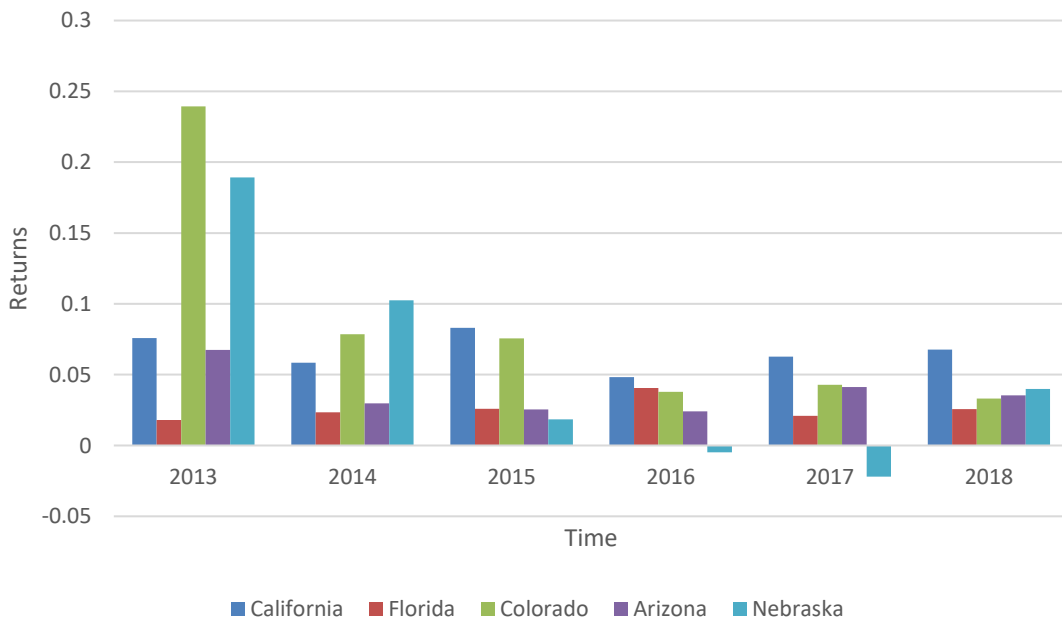


Figure 23. Land Return for States Invested in by Gladstone

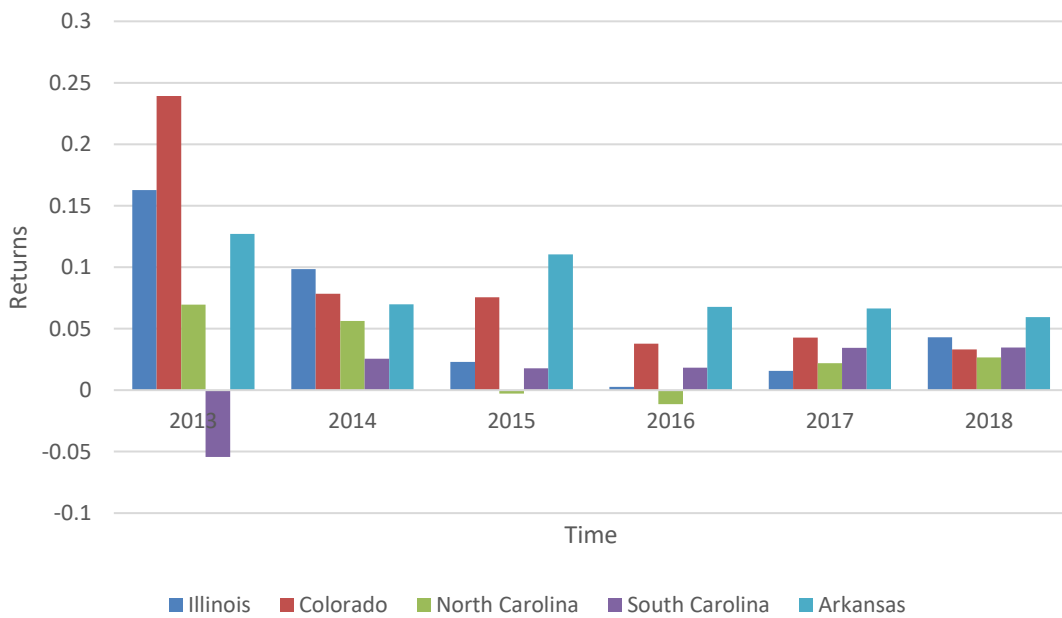


Figure 24. Land Return for States Invested in by Farmland Partners

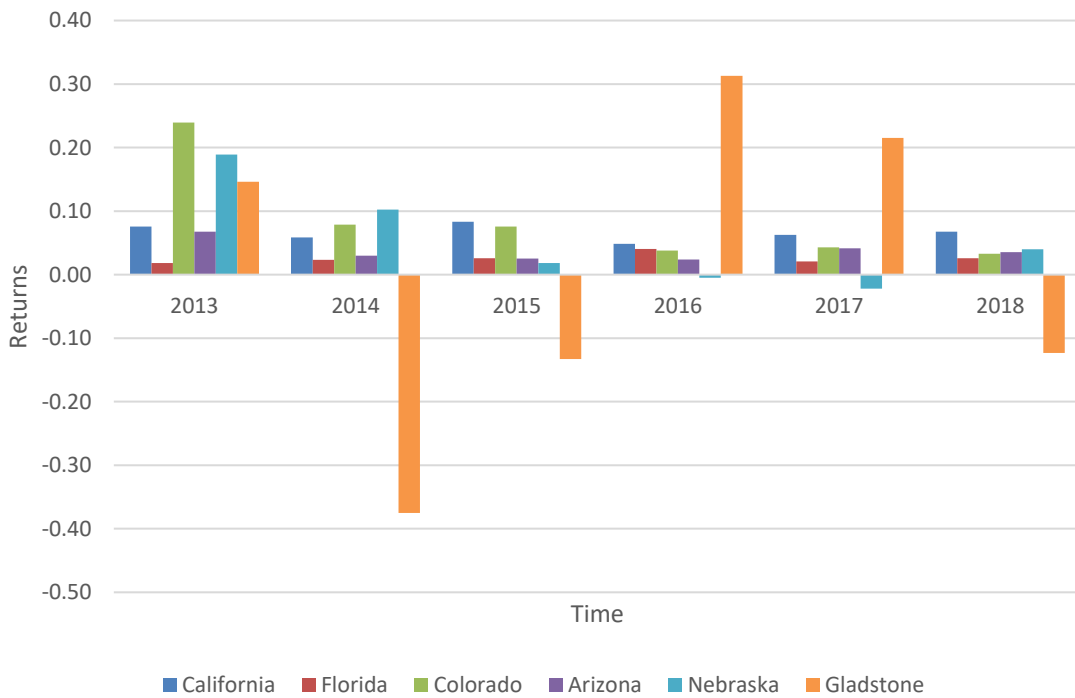


Figure 25. Gladstone Stock and Land Returns



Figure 26. Gladstone Mean, Standard Deviation and Risk-Adjusted Return

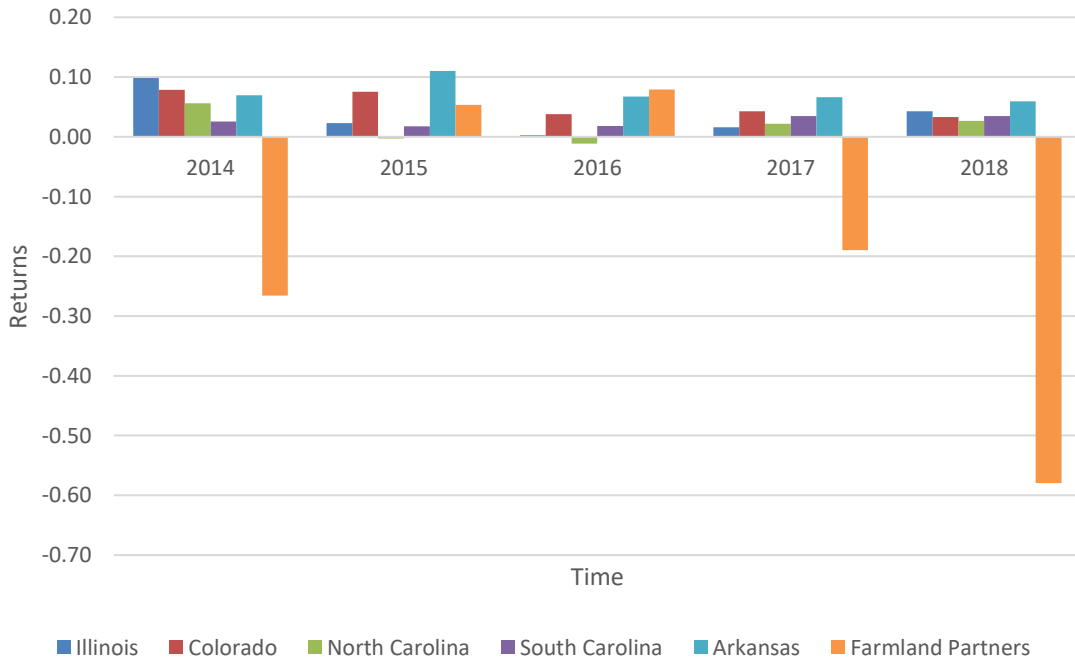


Figure 27. Farmland Stock and Land Returns



Figure 28. Farmland Partners Mean, Standard Deviation and Risk-Adjusted Return

Table 6. Gladstone Land Top Five Percent of Whole Investment by Acres

Gladstone	Sum of Total Acres	Percent of Total
Colorado	31449	47%
Florida	17204	26%
California	7908	12%
Arizona	6280	9%
Nebraska	2560	4%
Washington	764	1%
Michigan	446	1%
Oregon	409	1%
North Carolina	310	0%
Grand Total	67330	100%

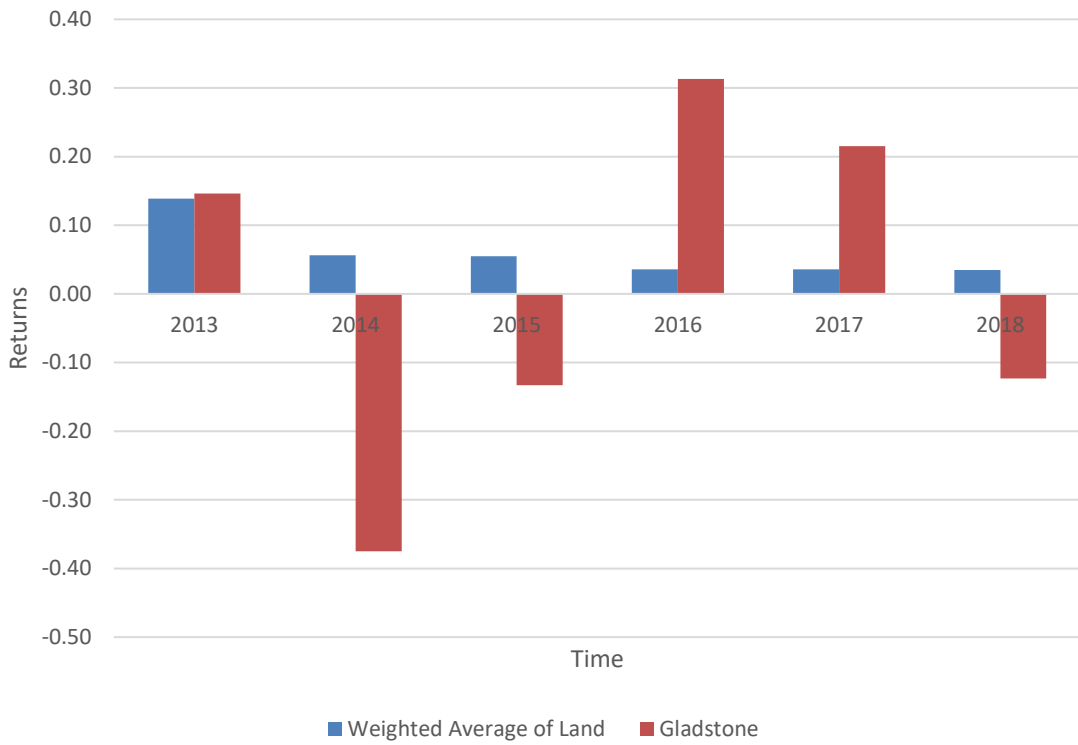


Figure 29. Weighted Average Returns for Gladstone

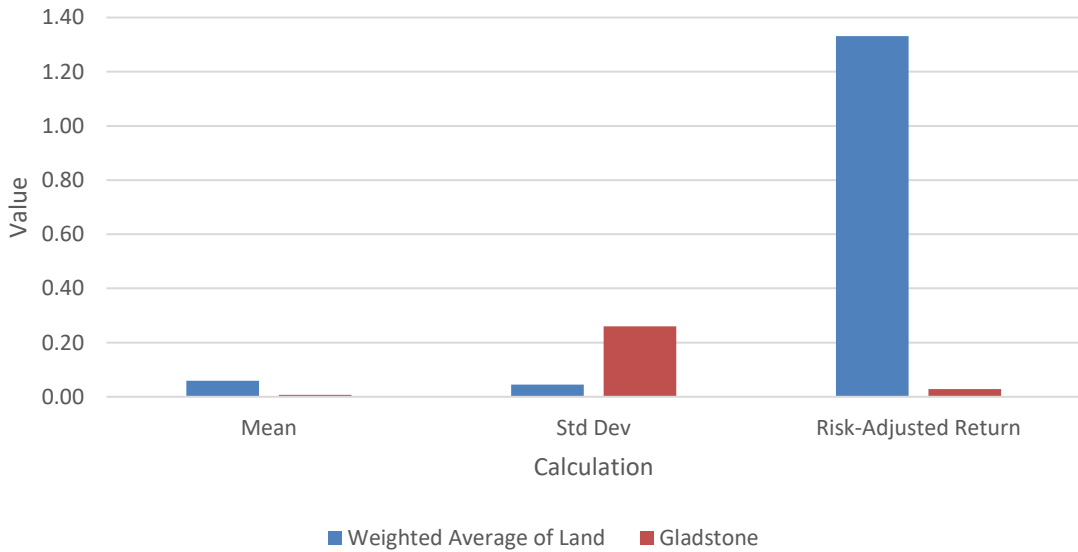


Figure 30. Weighted Average Mean, Standard Deviation and Risk-Adjusted Return for Gladstone

Table 7. Farmland Partners Land Top Five Percent of Whole Investment by Acres

Farmland Partners	Sum of Total Acres	Percent of Total
Illinois	40727	25%
Colorado	24164	15%
North Carolina	16571	10%
South Carolina	14987	9%
Arkansas	14712	9%
California	11586	7%
Louisiana	9373	6%
Florida	7382	4%
Nebraska	6019	4%
Georgia	5319	3%
Grand Total	165531	91%

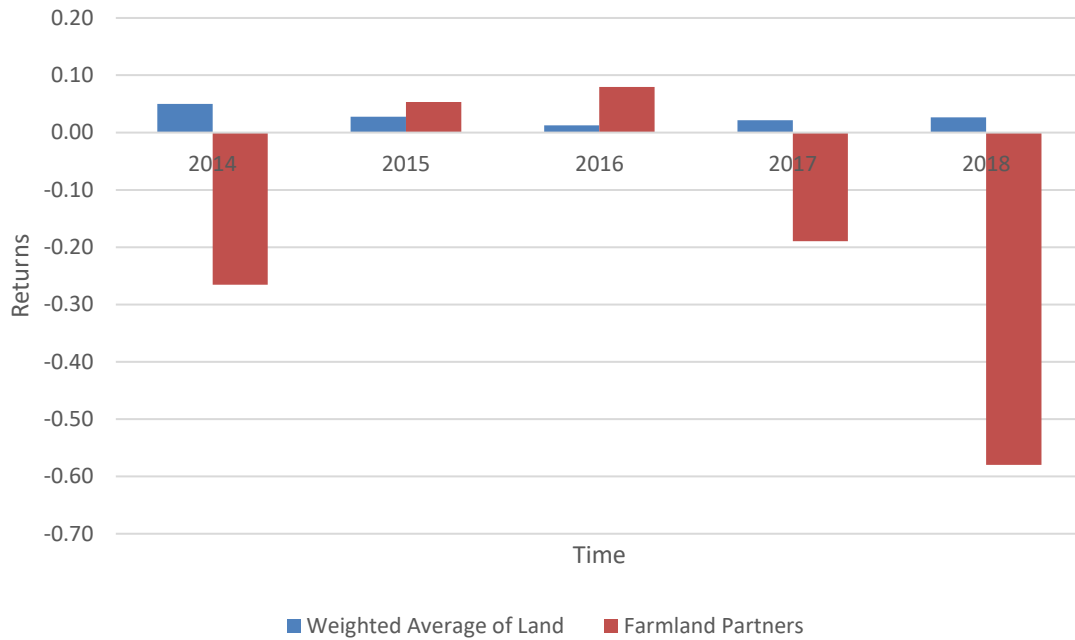


Figure 31. Weighted Average Returns for Farmland Partners

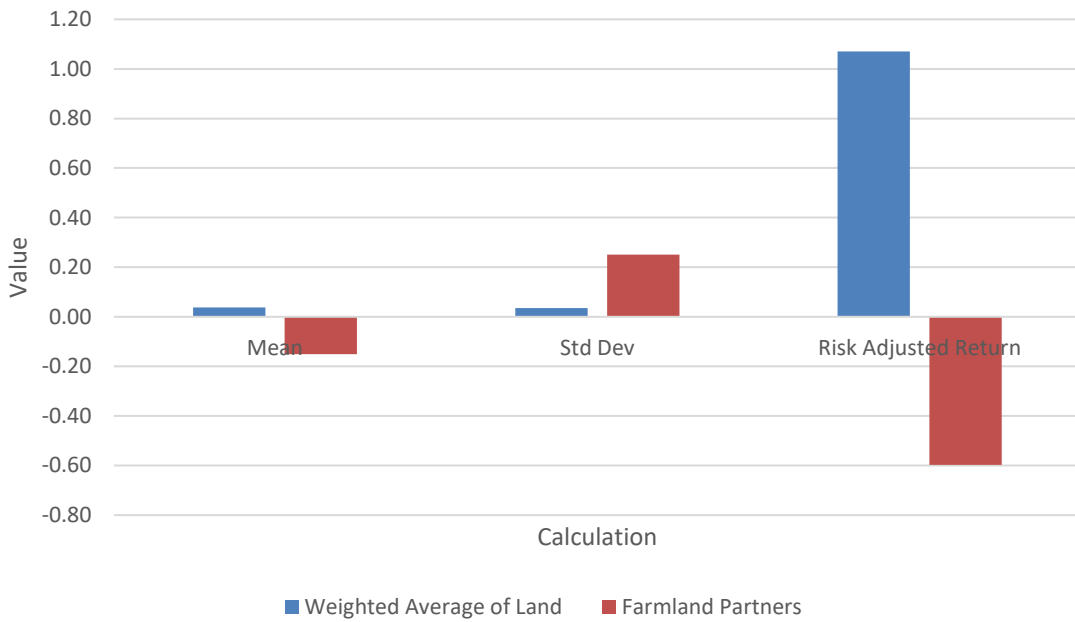


Figure 32. Weighted Average Mean, Standard Deviation and Risk-Adjusted Return for Farmland Partners

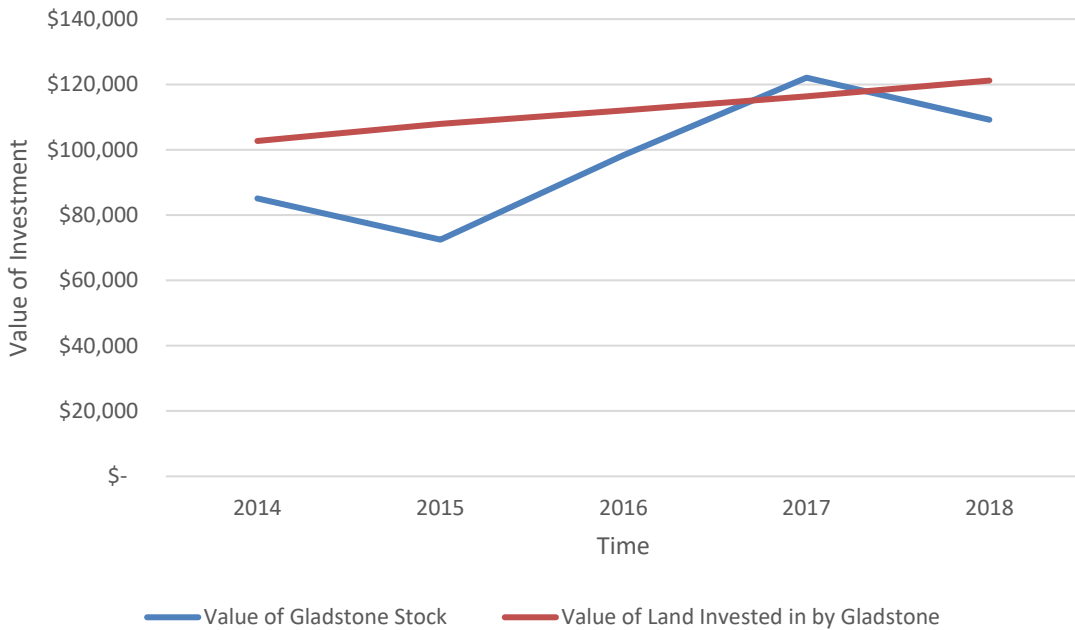


Figure 33. Duffy Growth for Gladstone and Land Invested in by Gladstone

Table 8. Duffy Results for Gladstone and Farmland Partners, Land and Stock

Gladstone	2014	2015	2016	2017	2018
Value of Gladstone Stock	\$85,077	\$72,474	\$98,322	\$122,061	\$109,173
Value of Land Invested in by Gladstone	\$102,694	\$107,909	\$112,049	\$116,367	\$121,182
Farmland Partners	2014	2015	2016	2017	2018
Value of Farmland Partners Stock	\$76,686	\$83,544	\$88,875	\$73,186	\$41,277
Value of Land Invested in by Farmland Partners	\$102,972	\$106,143	\$107,255	\$109,941	\$114,502

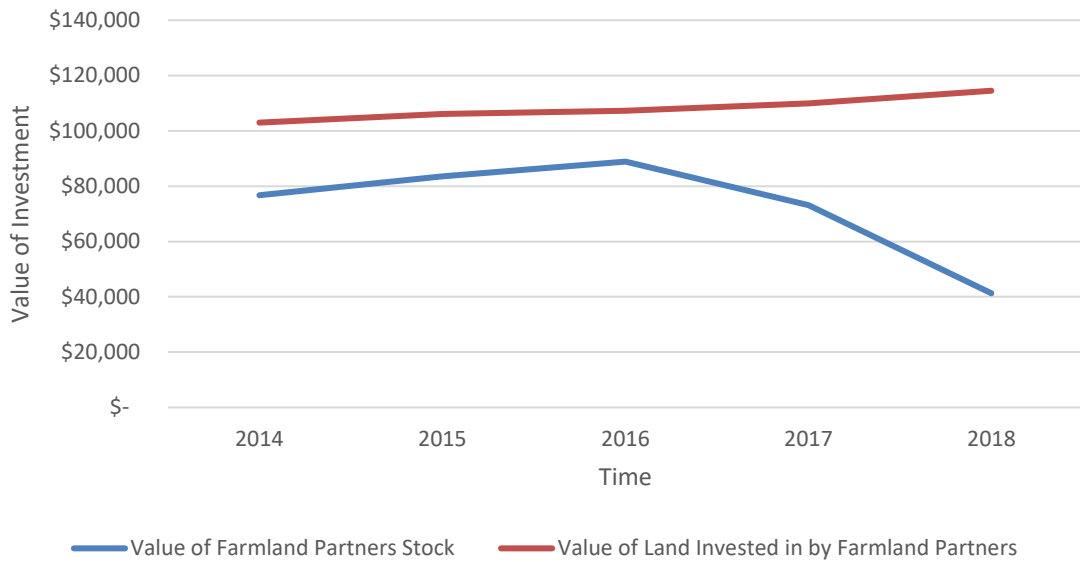


Figure 34. Duffy Growth for Farmland Partners and Land Invested in by Farmland Partners

CONCLUSION

The goal of this study was to identify agriculture-based REITs as a potential substitute for a direct investment in agriculture land and evaluate their performance side by side. The correlation of Gladstone and Farmland Partners to other conventional REITs and direct land investments is found to be extremely different from one another, based on their short lifespan, different investment strategies and sensitivity to external influences.

As expected, there is much more volatility in the price and value of both REITs that lend to opportunities for speculators and investors to realize value change much quicker than a direct investment in land. While these companies continue to grow and the price trends of land continue to make their expected trend peaks and valleys, it will be interesting to see how they react and evolve. Their ability to obtain a diverse portfolio of land that stretches across so many states is incredibly unique and likely unobtainable to the bulk of investors that choose a direct land investment over the stock market. Also, as anticipated, the returns look drastically different for each investment type. The direct land investments in different states followed each other well when concerned with returns but the returns for Gladstone and Farmland Partners was volatile like their historical prices.

When applied to an analysis similar to Duffy (2015) over the lifespan of the companies through 2018, investing in Gladstone or Farmland Partners versus the

weighted average of the majority of their holdings, favors the direct land investment.

But different timing may yield very different results.

Risk is one of the most significant differences in these two types of investments. From the perspective of the REITs, we have external influences, high volume of trades and less certain returns. When looking at direct land investments investors will be more susceptible to weather, local influences and production capabilities. In regards to returns, we find that total returns to agriculture REITs are much more variable than those of direct land investments. Additionally, the risk-adjusted returns of REITs are substantially lower than direct land investment.

A similar or more in-depth study of these companies in several years' time will be interesting to compare and contrast as food demand rises and more is required of land to sustain the world.

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