

Investors' Expectations of New Generation Cooperatives' Equity

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Abstract

New Generation Cooperatives (NGCs) or value-added agricultural cooperatives are undergoing several structural changes with the acceptance of outside (non-farmer) investor equity and demutualization or transformation into investor-oriented ownership firms (e.g., Limited Liabilities Cooperatives (LLCs) to ameliorate perceived financial constraints for high technology investments. These changes introduced added complexity to investors' expectations of equity and to the valuation of NGC and LLC stocks, especially for stock traded among members. Current stock valuation methods do not capture NGC-specific characteristics such as social capital, liquidity constraints, and ongoing demutualization to LLCs. Social capital is the premium paid for non-monetary benefits available to NGC members such as crop quality control. Liquidity is important because NGC stocks have low trading volumes. The objective of this study is to use publicly available data of stock traded between NGC and LLC investors to evaluate investors' expectations of changes in growth and social capital and derive implications on the firm.

The data set used comprised of 565 observations for NGCs for the period from 1996 to 2004, 175 observations for LLCs for the period from 2003 to 2004, and 127 observations for NGCs that transformed into LLCs, for the period from 1997 to 2004. A two-step linear regression model using earnings price ratio and the realized rate of return as the dependent variables, and risk, liquidity, social capital, and expectation of change in growth as the independent variables, was used for the analysis. In the first step, we estimate NGC and LLC earnings price ratios, and we derive investors' expectations of changes in earnings growth. In the second step, we analyze the impact of systematic risk, social capital, liquidity, expectations of changes in growth and seasonality on NGC and LLC realized returns.

The results suggest that non-systematic risk factors (size, dividend, leverage, and earnings variability) are important determinants of NGC and LLC equity or earnings price ratio and that systematic risk negatively impacts NGC and LLC realized returns. In addition, social capital positively affects NGC and LLC earnings price ratio, but has no significant effect on NGC and LLC realized returns. Liquidity affects LLC earnings price ratio at the 10% significance level. The findings reveal that investors have negative expectations (higher future stock values) about NGC future earnings growth at the 1% significance level but there is no significant expectation effect on LLC realized returns. NGCs and LLCs managers could maintain low-risk investments and increase social capital services to build loyalty among current investors and attract additional infusion of equity capital from outside investors.

Key Words: Pure NGC, LLC, expectations of equity, social capital

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Introduction

Cooperatives play an important role in the U.S. economy. According to the U.S. Department of Agriculture (USDA, 2001), there are more than 47,000 cooperatives in the United States, and 40% of the U.S. population belongs to some form of cooperative. They generate billions of dollars annually and are represented in every sector of the economy including agriculture, health, finance, utilities, housing, and retail (Reynolds, 2001). Agricultural cooperatives serve as a tool for economic development because their future is tied to that of the rural communities they serve (Zeuli, 2001). In 2001, the USDA reported that 3,229 farmer cooperatives generated a net business volume of \$103.3 billion.

Historically, cooperatives in the United States evolved in waves as a response to market failures (Fulton, 2001). In the early 1900s, cooperatives emerged as a response to oligopolistic markets that farmers faced. In the 1940s and 1950s, they emerged in public utilities because urban service providers did not invest in rural areas. Egerstrom (1994) stated that the need for a rural economic resurgence required a new wave of cooperative development. In the 1990s, the country experienced a new wave of cooperative activity: New Generation Cooperatives (NGCs). Structural changes in agriculture associated with traditional cooperative limitations led to the emergence of NGCs. Traditional cooperatives were unable to obtain more equity to sustain their growth because of the horizon problem, the free-rider syndrome, the diversification motive that their members faced, and asset specificity problems.

The horizon problem refers to the tendency of cooperative members to request current cash flows at the expense of future earnings (Sexton, 1991). The free-rider syndrome suggests that few members will contribute more than what is required for membership. A free rider ignores the personal commitment and expects others to contribute capital to the cooperative because all, regardless of their contribution, will share the benefits of cooperative growth and have equal voting rights. The diversification motive faced by cooperative members suggests that members may prefer to invest their funds in non-agricultural sectors rather than increase their investment in an agricultural cooperative (Lerman and Parliament, 1991). Asset specificity problems exist in situations where a producer is obliged to undertake an important investment in order to make a product tailored to a specific buyer (Umarov, 2002). In most cases, producers are reluctant to undertake this type of investment. This is because tailored products have little market value outside of their specific use and cannot be sold without significant price

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concessions to another customer, therefore, exposing the producer to the opportunistic behavior of the buyer.

Within cooperatives, we distinguish traditional cooperatives from NGCs. Traditional cooperatives are agricultural cooperatives with longer equity revolving periods, usually 55 years, and they return approximately 20% of equity received to members. In contrast, NGCs are closed agricultural cooperatives with shorter revolving periods, usually 5 to 7 years; members are customers who have a contractual right and obligation to deliver a particular quantity and quality of product as specified in a marketing agreement. Owners are required to purchase shares of equity stock, which convey the right to deliver a certain quantity of product consistent with the marketing agreement. Current members may transfer or sell equity stock to new members at an agreed upon price (Coltrain, Barton, and Boland, 1999).

NGC development was an important new dynamic in the economic growth of many regions, such as North Dakota and Minnesota. In 1994, farmers and rural citizens invested approximately \$1 billion in new business investments and 50 NGCs were formed, primarily in Minnesota and North Dakota (Egerstrom, 1994). In 1999, the North Dakota Department of Agriculture reported that value-added cooperatives had built nearly \$800 million in facilities since 1990, and that the state producers had invested \$216 million in equity.

The evolution of ownership structure from traditional cooperative to Pure NGCs and to Limited Liability Cooperatives (LLCs) is presented in Figure 1 (Chaddad and Cook, 2004). Traditional cooperatives are characterized by ownership rights restricted to member-patrons, redeemable equity, benefits to member-patrons, and non-proportional member investment. Pure NGCs are characterized by ownership rights restricted to member-patrons, non-redeemable, and transferable. LLCs (investor-oriented cooperatives) are characterized by ownership rights not restricted to member-patrons and by publicly traded common stock.

According to Lerman and Parliament (1991), cooperatives must grow in order to be more competitive and continue to provide services to their members. Growth requires investment capital that can be obtained through either equity or debt. Agricultural cooperatives are financed mostly with equity capital (Lerman and Parliament, 1991), which is obtained from direct members' investments. Because of traditional cooperatives members' dissatisfaction with low rates of cash patronage payments and long revolving payment periods (Royer and Ingalsbe, 1983), NGCs have developed equity management strategies that consist in receiving getting a high proportion of equity from direct member investments instead of retained earnings.

Pure NGCs return a large percentage of profits to members/investors in the years earned and solicit expansionary investment capital through equity drives to existing or prospective members. Pure NGCs pay high patronage refunds¹ to their members that usually vary between 65% and 85% (Coltrain, Barton and Boland, 1999). This is because investors/members are the primary equity providers to Pure NGCs.

¹ Patronage refunds are similar to dividends in corporate firms.

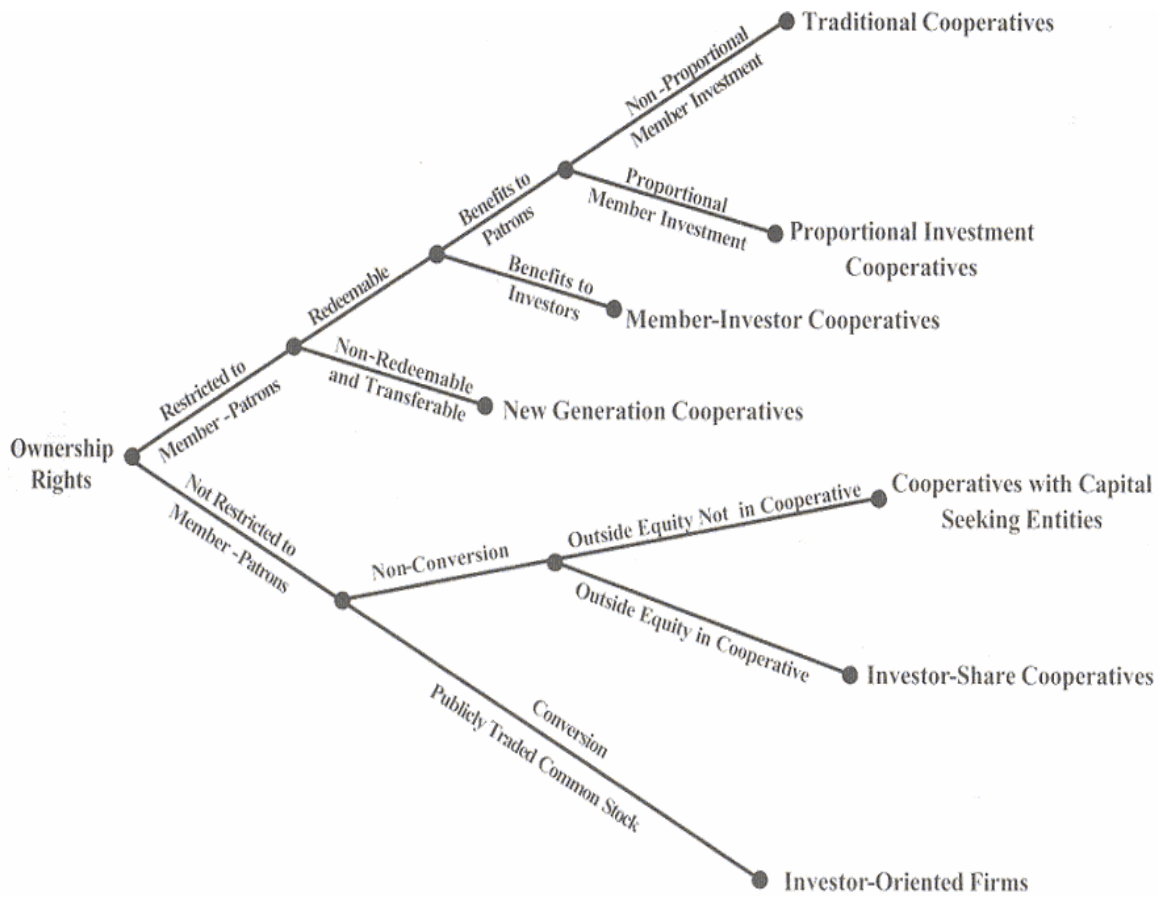


Figure 1. Evolution of Cooperative Ownership Structure
 Source: Chaddad and Cook (2004).

Previous research suggests that cooperative investors/members are primarily influenced by profitability and risk when making investment decisions (Lerman and Parliament, 1993). However, the recent trend in NGCs converting to LLCs adds a layer of complexity on factors that impact investment decisions in an NGC. The NGC environment is characterized by the existence of new laws that favor outside investment, by the process of demutualization undertaken by some Pure NGCs, and by the development of alternative trading systems.

The Wyoming cooperative law and the Minnesota chapter 308 B law allow cooperative membership to be constituted of both patrons and investment members, who may not be growers (Hensley and Swanson, 2003). According to the Wyoming law and the Minnesota chapter 308 B law, patrons receive allocations and distributions based upon patronage. Investment members receive allocations and distributions based upon their investment. At least 15 % of the profit

allocations and distributions must go to patron members (Minnesota Statutes, 2004). These statutes have set the stage for non-patrons to serve on the board of directors, which was not the case before. Previously, non-patron sources of equity capital had no representation on the board.

Furthermore, some Pure NGCs are converting to investor-oriented firm ownership structures (for example, LLCs) for the purpose of acquiring more capital from non-member sources (Chaddad and Cook, 2004). The concept of demutualization occurs when cooperative membership rights are converted to unrestricted common stock ownership rights in a corporate organization (e.g., Dakota Growers). Demutualization is usually followed by public listing, which allows the converting firm to acquire additional risk capital from investors.

The implications of outside equity on cooperative performance are yet to be investigated. An important indicator of firm performance is stock price variability. In the case of NGC, stock values traded between members will serve as an important performance indicator. Until recently, data on such trades were limited. The development of alternative trading systems such as Variable Investment Advisor or Alerus Securities provides opportunities to acquire data for Pure NGCs and LLCs stock trades.

There is a need to analyze NGC equity because of the possibility for outside investors' equity and expansion or growth into high technological investments, social capital benefits, limited liquidity, and risk. This imposes the challenge of providing stocks that match the rates of return on members' investments while simultaneously providing incentives for additional infusion of equity capital. This requires the identification of the variables that drive NGC equity prices.

Most studies conducted in the area of cooperatives' financing and investors' expectations of equity used variations of Gordon's model (1963) or Modigliani and Miller's (1961) model to value equity. These studies focused on the firm's stock valuation models and most of them emphasize profitability and growth as the main factors that affect stock prices and realized returns. Limited consideration has been given to the impact of liquidity and none to the impact of social capital on the NGC stock values and realized returns. Social capital refers to non-monetary benefits that may be allowed to investors/members by cooperatives and it affects investment decisions in NGCs (Puaha and Tilley, 2003). An example of social benefit could be that the NGC may provide jobs, i.e. economic development for the community. Some studies such as Ofer's (1975) research on investors' expectations of earnings growth have focused on investors' expectations of stock value. Liquidity and social capital differentiate NGC equity from that of traditional cooperatives or corporate firms, yet valuation models for NGC continue to omit these variables. This report will expand the current literature on investors' expectations of NGC equity with particular emphasis on stock liquidity and social capital.

The goal of this report is to develop a model of investors' expectations of NGC stock values and derive implications for long-run infusion of additional equity capital. NGCs are separated into LLCs and Pure NGCs following Chaddad and Cook's (2004) classification. A two-step approach is used to develop the model. The specific objectives are:

1. Use secondary data to evaluate the significant determinants of the NGC stock value, and compute investors' expectations of changes in NGC earnings growth.
2. Develop a model to evaluate the impact of market risk, social capital, liquidity, and expectations of changes in earnings growth on the NGC realized rate of return.
3. Compare Pure NGCs performance to that of LLCs and analyze the performance of NGCs that switched to LLCs.
4. Derive implications for long-run infusion of additional equity.

Challenges Faced by Cooperatives

A cooperative is a user-owned firm where the owners are also the patrons (Lerman and Parliament, 1991). Cooperatives are generally formed for the motives of challenging market power, providing unique products and services, and enhancing members' income (Zeuli, 2001). The challenges faced by cooperatives can be grouped under four major categories: minimizing market risks, enhancing members' income, sourcing equity capital, and providing other member services.

Minimizing Market Risks

Cooperatives are generally formed to minimize market risks and challenge the market power of monopolists (Cook, 1995). Cooperatives can challenge market power through pricing strategies and resource pooling. Because their customers are the owners, cooperatives are able to compete with a monopolist by lowering product prices to the break-even point or by charging the higher monopolist price and distributing profits to its members (Fulton, 1989). By pooling their resources together, members often pay lower prices for supplies and receive higher prices for products sold (Zeuli, 2001). How well the cooperative performs the risk-minimizing service has great implications for its performance and stock values.

Enhancing Members' Incomes

Farmers form cooperatives primarily to increase their income (Ingalsbe, 1990). Through processing and other value-added activities, cooperative members may make more profit than if they patronized an investor-oriented firm (Rhodes, 1983). This can be because of savings in production costs. Farmers can also receive higher prices for their products by pooling their products together rather than selling them individually. The structure of the cooperative can also contribute to more profits for members because they are allowed to share the returns of the cooperative.

Sourcing Equity Capital

Outside equity is becoming increasingly important for NGCs because they currently undertake high technological investments (examples in the ethanol industry). This capital need may not be met by retained earnings. The Pecking Order Theory (Myers, 1984) suggests that firms turn to external sources of funds, specifically loans from banks or credit institutions, as the next source of equity if retained earnings are insufficient to meet investment needs. However,

these institutions require borrowing firms to have 50% of the capital as equity. This requirement may not be met with farmers' contributions, which emphasizes the use of outside equity.

Providing Other Member Services

This is done by providing unique products and services. Cooperatives, because of their particular structure, are able to operate in markets where there are no competitive rates of returns. Non-cooperative organizations will not be willing to operate in such markets because their owners would not receive any monetary reward (Fulton and Ketilson, 1992). Cooperative members, at the opposite of non-cooperative organizations owners, may be attracted by social capital benefits. Examples of such non-monetary benefits include stability of market outlet, crop quality control, farm inputs (fertilizers, machineries, seeds, experts, consultants, etc.), and research and development support that cooperatives provide to their members or growers. Some of these services are paid for indirectly by members with social capital investments. However, the implications of social capital have not been explicitly modeled in NGC equity structure.

Uniqueness of New Generation Cooperatives

The valuation of NGC equity poses an exciting challenge. The challenge comes from including NGC special characteristics in the valuation model. NGCs differ in structure from more traditional elevator and farm supply cooperatives (Olson, Kibbe, Goreham, 1998). Some features that distinguish NGCs from traditional cooperatives are: focus and functioning, delivery rights, closed membership and current membership trends, expansion and drive toward outside equity, and transferability and the opportunity for appreciation or depreciation in the value of delivery rights.

Focus and Functioning

NGCs focus on the processing and marketing of agricultural products, rather than marketing raw commodities or supplying agricultural production inputs. Cooperative members are required to provide raw commodities for processing through marketing contracts. The amount each member is allowed to deliver is tied directly to the number of equity stock shares which are purchased. The total number of equity shares and related contract delivery rights is limited to the amount needed for the cooperative's financial stability and peak processing efficiencies.

Delivery Rights

Equity shares in an NGC not only assign membership to producers, but also allocate delivery rights and obligations. Producers purchase equity shares that obligate them to deliver a certain amount of farm product to the cooperative each year. For instance, one equity share may give the producer the right and obligation to deliver one bushel of a stipulated commodity to the cooperative every year. The delivery rights ensure that members provide up-front equity capital to the NGC that is proportional to their level of use of the cooperative. Any patronage refunds that the cooperative generates is distributed to members according to the level of product that they delivered to the NGC.

Essentially, delivery rights shares act as a two-way contract between the producer-members and the cooperative. The use of delivery rights assures producers a market for their product, and assures the cooperative a steady source of its primary input. The total quantity of delivery rights shares that the cooperative sells to producers depends on the processing capacity of the cooperative's operations. The cooperative only sells enough shares so that it meets its efficient capacity level. Delivery rights shares are different from membership shares. Each individual producer holds only one membership share, but can hold more than one delivery rights shares.

Closed Membership and Current Membership Trends

In contrast to many traditional cooperatives that typically accept new members on a continual basis, membership in NGCs is restricted once the targeted amount of delivery rights shares is sold. Once that occurs, new members will only be allowed if an existing member wishes to sell his delivery rights shares to another producer. Alternative trading systems provided the opportunity to obtain data on NGC secondary stock trades. This new data is essential to the valuation of cooperative performance because it allows capturing the variability of stock trades between members.

Expansion and Drive Towards Outside Equity

NGCs typically raise between 30% and 50% of their total capital requirements from the sale of equity shares (Harris, Stefanson, Fulton, 1995). Also, NGCs receive a higher level of equity financing at the start of operations. At the end of the year, NGCs return a greater portion of patronage refunds in cash to members instead of retaining it as additional equity financing.

Producers must invest for the right to deliver their commodities to the cooperative. In order to participate in the cooperative's value-added processing, producers must provide up-front capital by purchasing delivery rights. The NGC usually sets a minimum required number of delivery rights shares that a producer must purchase in order to be eligible for membership. NGC members tend to be more committed and involved than traditional cooperative members because they invest a significant amount of equity and have delivery obligations.

For these reasons, NGC members might have different expectations from traditional cooperative members about equity issues. The fulfillment of members' expectations is a key factor for NGCs in obtaining additional equity. However, before members' expectations are fulfilled, they have to be known; and that is the goal of this report.

Transferability and the Opportunity for Appreciation or Depreciation in the Value of Delivery Rights

NGC members are allowed to transfer their delivery rights shares to other members or other producers who wish to become members, subject to board approval. The price of the share in this situation is negotiated between the member who is selling and the producer who is buying. The price of the share will, therefore, fluctuate according to the performance and earnings potential of the cooperative. If the cooperative is performing well and the buyer

perceives strong earnings potential from owning the delivery rights, the buyer can offer a price that is higher than that originally paid by the member. The member would, therefore, be able to realize a gain from the appreciation of the share value. Alternatively, if the buyer perceives that the earnings potential is weak, then the share might have decreased in value for that member.

Valuation Methods for Corporations, Cooperatives, and NGC Equity

Previous studies on cooperative equity used survey instruments to elicit cooperatives' or members' responses, and used regression approaches to value equity. The majority of stock valuation studies was conducted on corporations and used simulation or regression approaches to determine stock prices. The adaptation of these models to evaluate NGC equity has been limited because of the uniqueness of NGCs and limited understanding of cooperative theory. Other limitations are the availability of valuation models that incorporate potential determinants of NGC stock value such as social capital, liquidity, and outside investor expectations, a trend that has been introduced in recent years by the Wyoming cooperative law and the Minnesota chapter 308 B cooperative law.

Valuation Models for Corporation Equity

Numerous empirical studies of equity valuation models have appeared in the economic and financial literature during the last two decades. Their main focus was to reveal empirically the characteristics of common stock prices or alternatively to explain differences in expected rates of returns among common stocks at various periods in time. Some relied on firm financial variables while others focused on investors' expectations. The common methodology used in these studies was to fit a linear relationship between the set of explanatory variables (the hypothesized characteristics of common stocks) and stock prices (or rates of returns on common stocks) for various periods of time (Aharony, 1979).

The earlier models evolved with applications of interest rate theory. Tinbergen (1939) developed one of the early models. His research focused on the dynamics of share-price formation. He used a linear regression model to test the dynamic static law, which describes the share price as being dependent on dividends, interest rates, and the share price growth rate. He found that share prices follow the dynamic law for most of the countries and periods involved in the study. However, he did not account for liquidity in explaining share price variability.

Following Tinbergen's model, other equity valuation models were developed. Most of these models defined the share price as a function of the expected growth rate in dividends, the dividend payout ratio, and a measure of the security risk (Morck, Shleifer and Vishny, 1993). Gordon (1962) suggested that firm dividend, expected growth rate of dividends, earnings instability, firm's leverage, asset liquidity, and firm size are the possible constituents to an equity valuation process. Sharpe (1964), Lintner (1965), and Fama (1968) developed the capital asset pricing model (CAPM), which asserts that the equilibrium expected return on any risky asset is a function of the riskless rate of interest, the product risk, and the market return. Bower and Bower (1970) tested a stock valuation model using a regression modeling approach and showed that stock values depend on expected profitability and growth, risk and liquidity. Ofer (1975) evaluated investors' expectations of changes in earnings growth and analyzed their impact on

realized returns. He found that systematic risk and investors' expectations of changes in growth rates affect stock realized returns.

Aharony (1979) developed an empirical valuation model to explain the observed instability of the earlier stock valuation models' estimated parameters. He found that parameters' estimates in a given period depend on investors' sentiment. Sias (1997) investigated whether institutional and individual investors respond differently to changes in market conditions. He discovered that variations in market conditions influence individual as well as institutional investors. Van Eaton (1999) examined how stock prices adjust to the information in dividend changes and found that investors' valuation of companies' equity might depend upon the firm's profitability and expected growth. Damadoran (2001) reviewed four equity valuation models, specifically the capital asset pricing model (CAPM), the arbitrage-pricing model (APM), the multi-factor model (MFM), and linear regression models. He found that all the models define risk in terms of variance of returns and suggested that investment be viewed from the investor's perspective (Umarov, 2002).

Valuation Models for Cooperatives and NGC Equity

Lerman and Parliament (1993) analyzed the factors that affect the proportion of equity in the capital structure of agricultural cooperatives. They found that equity capital was positively affected by profitability and risk of the commodity produced and negatively affected by cooperative risk. The size of the cooperative and the function it carried were found to be insignificant in determining the amount of equity held by the cooperative.

Sporleder and Bailey (2001) used real option to evaluate producer investment in a start-up NGC. They used a simulation model to calculate returns made by producers from purchasing equity shares in the NGC. The model first estimated the capital requirements for constructing the NGC plant and the profits made from operations, and then integrated each member's investment decision in the NGC. It was found that producers are able to understand and analyze investment and risk in further processing facilities when the investment involves the common circumstances of uncertainty and investment in technology.

Diaz-Hermelo, Gray, and Smith (2001) analyzed alternative capitalization strategies that enhance the farmer-owned agricultural cooperative's control of capital structure, growth, and return on investment while maintaining the user-owner balance in a way that provides an acceptable level of financial risk. They found that members favor cash patronage and any policy that reduces its current level results in negative response from members. Moreover, members appreciate the use of debt as an equity redemption method because it results in a higher amount of cash flows at lower variability.

Umarov (2002) developed a model that would be used to appraise NGC equity and found that stock values are positively correlated with profit margins. Carlberg, Holcomb, and Ward (2003) analyzed the important factors that contribute to the success of NGCs. The results revealed that the number of employees and the amount of the member's equity were positively related to the success of the cooperative, but the member's age had no effect.

Puaha and Tilley (2003) investigated investment decisions in NGCs and found that producers who were familiar with Value Added Products Cooperatives were more willing to invest in that cooperative while producers with farmland far away from the cooperative location did not invest in that cooperative. Moreover, strong preferences for low risk investment lowered producers' willingness to invest in Value Added Products Cooperative. Finally, full-time farmers showed a greater intention to invest rather than part-time farmers.

Methodology

An expected, utility approach is used in this report to analyze investment decisions in Pure NGCs, LLCs, and Pure NGCs that transformed into LLCs. Utility can be approximated by stocks with highest growth expectations, less risk, and other benefits (social capital benefits). The Von Neumann-Morgenstern theorem analyzes the economic behavior of individuals under conditions of uncertainty. The theory of expected utility maximization states that rational individuals make choices in uncertain situations based on expected utility (Nicholson, 2002). Investors are assumed in this report to be rational individuals who obey the Von Neumann-Morgenstern expected utility maximization theory of behavior under uncertainty (Nicholson, 2002).

The investor's objective is to maximize his/her utility, which depends on the level of benefits he/she gets from his/her investment. These benefits can be monetary or non-monetary (social capital benefits). The amount of benefits that the investor gets depends on the number of shares he/she owns. However, the number of shares the investor owns is limited by budget and tolerance levels for risk, social capital, and liquidity. The mathematical representation is shown in equation (1).

$$(1) \quad \text{Maximize } U[\pi(\sigma, \kappa, \eta)]$$

$$\text{Subject to a) } \varpi = \alpha * \ell_1 + \beta * \ell_2,$$

$$\text{b) } \theta * \ell_1 \leq \sigma,$$

$$\text{c) } \zeta * \ell_1 \leq \kappa,$$

$$\text{d) } \gamma * \ell_1 \leq \eta$$

where $U(\bullet)$ is the Von Neumann-Morgenstern utility function, (π) represents investor's benefits, (σ) is the investor's tolerance level for risk, (κ) is the investor's tolerance level for social capital, and (η) is the investor's tolerance level for liquidity. The symbol ϖ represents the investor's budget. The symbols ℓ_1 and ℓ_2 denote NGC investment and all other investments, respectively. $\alpha, \beta, \theta, \zeta,$ and γ are scalars. α and β denote the prices per share for NGC and other investment, respectively. θ measures the amount of risk from NGC investment, ζ measures the amount of social capital benefits from NGC investment, and γ measures NGC stock liquidity.

The investor's budget is a linear combination of the NGC investment and other investment opportunities. The investor's satisfaction is constrained by the level of risk associated with the NGC investment. This has to be lower than the investor's risk tolerance level

(σ). Because there is a trade off between monetary and non-monetary profits, the level of social capital in the NGC investment should be lower or equal to the investor tolerance level (κ). NGC stock liquidity should be lower than the investor's tolerance level (η).

The utility function was approximated in this report by a linear regression model using the stock value as the dependent variable and assuming that the error term follows a normal distribution (Goodnight, 1978). Two other approaches might have been used to approximate utility using a linear model. The first approach is the Capital Asset Pricing Model (CAPM), which approximates utility using mean and variance (Reilly and Brown, 2000). Its limitation is that it assumes a single risk factor, while this report considers multiple factors. The second approach is the Arbitrage Pricing Theory (APT), which assumes no arbitrage opportunity and multiple risk factors. However, this report incorporates non-risk factors such as social capital.

The model developed to evaluate investors' expectations of NGC equity is an extension of Ofer's (1975) model with emphasis on NGC risk, social capital, stock liquidity, and past growth. The GLM procedure in SAS was used to estimate the model parameters. Several assumptions were made in this report. First, it is assumed that the relationship between the stock price² and its dependent variables is linear. Second, it is assumed that the error term may serve as a proxy for measuring investors' expectations of changes in earnings growth (Ofer, 1975). Third, it is assumed that NGC investors want to hold a diversified market portfolio and, therefore, mostly care about NGC systematic risk in computing their required rates of returns.

Estimation of the Realized Rate of Return

A linear regression is estimated with systematic risk, social capital, liquidity, and expectations of changes in earnings growth as the independent variables and the rate of return as the dependent variable. The variable season was entered as a random effect to capture sales seasonality. The regression is presented in equation (2).

$$(2) \quad Re_{it} = \alpha_0 + \alpha_1 Beta_{it} + \alpha_2 SC_{it} + \alpha_3 Liq_{it} + \alpha_4 Ech_{it} + \alpha_{j5} Season_n + \varepsilon_{it}.$$

Where $Beta_{it}$ is the beta coefficient of NGC i at time t , SC_{it} is NGC i social capital at time t , Liq_{it} is the liquidity of NGC i stock at time t , Ech_{it} is the expected change of earnings growth for NGC stock i at time t , $Season_n$ represents seasonality, the subscript n represents the number of trimesters, and ε_{it} is the error term. The detailed description of these variables and their computation is presented in the next section.

² The earnings price ratio and the rate of return are used as proxies for the stock price in this report.

Description and Computation of Variables

Beta Coefficient

The beta coefficient measures the systematic or undiversifiable component of the total risk of a security. The beta coefficient has its origin in portfolio theories and market equilibrium models developed by Sharpe (1964) and Lintner (1965). The capital asset pricing model (CAPM) from which the concept of the beta coefficient is derived has been proven to satisfy most of the linear regression assumptions. An implication of the CAPM is that the beta of a portfolio is the average of the individual betas in the portfolio. The beta coefficient is computed in this report using the following equation:

$$(3) \quad \text{Beta}_{it} = \frac{\text{Co var}(R_{it}, R_{mt})}{\text{Var}(R_{it})},$$

where $\text{Co var}(R_{it}, R_{mt})$ is the covariance between NGC i returns and the market return at time t , and $\text{Var}(R_{it})$ is the variance of NGC i return at time t , R_{it} is NGC i return at time t , and R_{mt} is the market return at time t .

Social Capital

Social capital affects investment decisions (Hanson and Robinson, 2001). Many definitions of social capital are provided in the finance literature. Fukuyama (1999) defined social capital as an instantiated informal norm that promotes cooperation between two or more individuals. Robison, Siles, and Schmid (2002) defined social capital as a person's or group's sympathy toward another person or group that may produce a potential benefit, advantage, and preferential treatment for another person or group of persons beyond what is expected in an exchange relationship. Therefore, persons or groups provide social capital when they have sympathetic feelings toward another person or group (Hanson and Robison, 2001). This might be the case with NGC investment. Most NGCs specialize in the development of certain crops with the majority of their members being either growers of the crop or interested in the production of that particular crop. Also, NGC specific services such as crop quality control constitute unexpected benefits beyond that expected in a relationship. Durlauf and Fafchamps (2004) found three themes that characterize most of the definitions of social capital:

- 1) Positive externalities (accrue to group members),
- 2) Spillover benefit (lies in a group member's ability to set expectations and behavior due to trust shared norms among group members),
- 3) Trust and norms (formed through social interaction such as informal social networks or associations).

Pure NGCs and LLCs provide many services to their members. For example, Dakota Growers provides research and development support to its members. NGCs also have many features that lead toward social capital investment. The NGC stock dividend payment is one of them. According to the Wyoming cooperative law and the Minnesota chapter 308 B laws, NGC

dividend rate is capped at 8% per year. On the other hand, corporate firms have no limited dividend payments. The question is why would an outside investor invest in a company that has restricted dividend payments? The answer to this question might be in the realm of social capital motives.

The measurement of social capital poses several challenges due in a large part to the lack of consensus between researchers. For instance, Collier (1998) considers social capital to be an externality created from social interaction. Grootaert (1999), Narayan and Pritchett (1999), and Malucio, Haddad, and May (2000) view social capital as “externally given” when examining the impact of household membership in groups on household expenditures. On the other hand, Wilson (2000), Mogues and Carter (2004), and Shideler (2004) view social capital as an asset. Mogues and Carter (2004) find that social capital differences among groups deepen economic inequality. Shideler (2004) finds that social capital can be created by agents apart from group interaction.

Social capital has been measured directly based on the definition of Flora and Robison (2003). According to Flora and Robison (2003), the change in price is an indirect measure of social capital’s influence if the influence of social capital and social-emotional goods alters the price of a physical good involved in an exchange. In a similar line of reasoning, if social capital influences the rate of return of NGC investments, it might be reflected in the difference between the NGC return on assets and the market return. Consequently, the premium incurred by investors in acquiring NGC stocks could be used as a proxy for social capital. If investors are attracted by social capital benefits, they may be willing to forego monetary benefits and get lower returns from the NGC. We expect a negative relationship between social capital and stock value. Social capital is presented in equation 4:

$$(4) \quad SC_{it} = (ROA_{it} - Re_{mt}),$$

where ROA_{it} is return on asset of NGC i at time t .

Liquidity

Liquidity is theoretically defined as the ability of an asset to be converted into cash quickly and without any price discount. Liquidity refers to how easily investors can convert their securities into cash or get into and out of investments. Stock liquidity is an important determinant of investment decisions because it affects the cost at which investors can trade stocks (Pritsker, 2004). With the existence of alternative trading systems for NGC stock, investors might be able to differentiate between liquid and less liquid stocks causing liquidity to become an important variable in the NGC investment decision process. Trading volume has been used as a proxy for stock liquidity (Lihua, 2003) and was used in this report to measure stock liquidity. The reasons are that alternative trading systems for NGC stocks are thin markets and data is not available to compute other common measures of liquidity such as the spread or the market depth.

Based on investment theory, investors require higher premiums in compensation to high risk (Reilly and Brown, 2000). Because of the liquidity risk that may be caused by thinly traded

NGC stocks, we expect liquidity to have a positive relationship with the NGC stock price. We adopted a trading volume model (Wyss, 2004) to measure stock liquidity. The model was modified for scaling purposes and the algebraic representation is presented in equation (5):

$$(5) \quad Liq_{it} = Ln[Qty_{it}],$$

where Liq_{it} is the liquidity of NGC i stock at time t , Qty_{it} is the quantity of NGC i shares sold at time t , and Ln is the natural logarithm.

Expectations of Changes in Earnings Growth

Expectations of changes in earnings growth are not observed. However, Ofer (1975) proposed to estimate them using the residual from the earnings price ratio estimation as presented in equation (6). If investors have positive expectations of changes in earnings growth, the predicted stock price will be lower than the actual price. In that case, investors' expectations of changes in earnings growth will have a negative relationship with the stock value (Ofer, 1975).

$$(6) \quad Ech_{it} = Pred(EP_{it}) - EP_{it},$$

where $Pred(EP_{it})$ is the predicted earnings price ratio for NGC i at time t , and EP_{it} is the earnings price ratio for NGC i at time t .

Estimation of the Earnings Price Ratio

The earnings price ratio was chosen as a proxy for the stock value because it is suitable for growth analysis (Marcus, Bodie, and Kane, 2002). The earnings price ratio depends on the firm's expected growth and risk (Morck, Shleifer, Vishny, 1993), and linear regression has been used most of the time to model that relationship (Ofer, 1975). A similar approach is used in this report with the earnings price ratio assumed to be linearly dependent on risk, social capital, liquidity, and expected growth. Social capital and liquidity are added as independent variables because of NGC specific characteristics. Since social capital and liquidity were already presented, the next section will focus on the presentation of risk and expected growth variables.

Risk Variables

Several variables were chosen to capture the risk inherent in the NGC. Some of these variables measure the unsystematic component of the NGC. They are the asset size, earnings variability, dividend payout ratio, and leverage. On the other hand, the beta coefficient measures the undiversifiable component of risk. The detailed description of the systematic risk variables is presented in the following section.

Asset Size

The size of the firm impacts stock returns (Daves et al., 1999). In theory, most investors require higher rates of return on risky investments (Reilly and Brown, 2000). Investors may require higher premiums for smaller NGCs than for larger NGCs because large firms are supposed to be less risky than smaller firms (Ofer, 1975). We expect a negative relationship between asset size and the stock value. The NGC asset size was measured in this report by the natural logarithm of total assets and represented as follows:

$$(7) \quad AST_{it} = Ln[TA_{it}],$$

where AST_{it} is NGC i asset size at time t , TA_{it} is the total asset of NGC i at time t , and Ln is the natural logarithm operator.

Dividend Payout Ratio

The dividend payout ratio is the percentage of earnings paid to shareholders in dividends. It provides an idea of how well earnings affect the dividend payments and the stock price. According to Saxena (1999), a firm uses dividends as a mechanism for financial signaling to investors regarding the stability and growth prospects of the firm. Consequently, the dividend payout ratio could be used as a proxy for management's evaluation of the uncertainty of future earnings.

In theory, investors require higher premiums for risky investments (Reilly and Brown, 2000). Firms with a higher dividend payout ratio might have low volatility in their earnings and be considered less risky than firms with a low dividend payout ratio. We expect a negative relationship between dividend payout ratio and stock value. Investors may be willing to pay more for an NGC that distributes a greater portion of its earnings. In effect, investors may desire faster payout of earnings because longevity of NGCs has been a risk factor. The dividend payout ratio was computed from NGC financial statements using retained earnings at a point in time t .

$$(8) \quad Div_{it} = 1 - RE_{it},$$

where Div_{it} is NGC i dividend payout ratio at time t , RE_{it} is NGC i retained earnings at time t .

Leverage

Leverage is defined as the degree to which an investor or a business utilizes borrowed money. According to the corporate literature, companies that are highly leveraged may be at risk of bankruptcy if they are unable to make payments on their debt; they may also be unable to find new lenders in the future. Based on investment theory (Reilly and Brown, 2000), investors may require higher premiums for NGCs that have large degrees of leverage. We expect a positive relationship between leverage and stock value.

Financial leverage is not always bad. However, it can increase the shareholders' return on their investment and there are often tax advantages associated with borrowing. Leverage is measured in this report by the debt-to-asset ratio.

$$(9) \quad Lev_{it} = \frac{D_{it}}{A_{it}},$$

where Lev_{it} is NGC i leverage at time t , D_{it} is NGC i total debt, A_{it} NGC i total assets.

Earnings Variability

Earnings variability measures historical fluctuations of NGC earnings. The higher the fluctuations in earnings, the riskier the NGC and the higher the premium required by investors (Reilly and Brown, 2000). We expect a positive relationship between earnings variability and stock value. A moving standard deviation is used to calculate earnings variability. The moving standard deviation is calculated as the standard deviation of the earnings price ratio over a seven-period average return. The measure is presented in equation (10).

$$(10) \quad Var_{it} = Stdev(EP_{it}, EP_{i(t-1)}),$$

where, Var_{it} is NGC i earnings variability at time t , EP_{it} is NGC i earnings price ratio at time t , $EP_{i(t-1)}$ NGC i earnings price ratio at time $t-1$, and $Stdev$ is standard deviation operator.

Growth Expectation Variable

Sias (1997) found that individual investors' earnings growth expectations are sensitive to changes in market conditions. Ofer (1975) found that investor's assessment of future growth in earnings must be decomposed in two variables: past growth rate (which is observed) and expectations of changes in earnings growth (which are not observed). He proved that investors re-assess growth rates based on past and new information. The growth expectation measure is adapted from Ofer (1975) and is presented in equation (11).

Investors' expected growth rate of earnings is a function of past growth rates and investors' expectations about changes in NGC earnings growth, which are assumed to have a linear relationship. The past growth rate of earnings is measured in this report by the growth rate of earnings per share. Firms that have a good growth history may be perceived as less risky than those with a bad growth history, and we expect a negative relationship between past growth and stock value (Ofer, 1975).

$$(11) \quad EG_{it} = \beta_1 PG_{it} + \beta_2 Ech_{it}.$$

Where EG_{it} is the expected growth variable for NGC i stock at time t , PG_{it} is NGC stock i past growth rate at time t , and Ech_{it} is the expected change of earnings growth for NGC stock i at time t .

The general regression used to estimate the earnings price ratio is presented in equation (12), which is a linear regression between the earnings price ratio and asset size, dividend payout ratio, leverage, earnings variability, beta, social capital, liquidity, and growth expectations of earnings:

$$(12) \quad EP_{it} = \lambda_{it} + \alpha_1 AST_{it} + \alpha_2 Div_{it} + \alpha_3 Lev_{it} + \alpha_4 Var_{it} + \alpha_5 Beta_{it} + \alpha_6 SC_{it} + \alpha_7 Liq_{it} + \alpha_8 EG_{it} + v_{it},$$

where λ_{it} is the intercept term and v_{it} is the error term.

Substituting equation (11) into equation (12), we obtain equation (13):

$$(13) \quad EP_{pred\ it} = \lambda_{it} + \alpha_1 AST_{it} + \alpha_2 Div_{it} + \alpha_3 Lev_{it} + \alpha_4 Var_{it} + \alpha_5 Beta_{it} + \alpha_6 SC_{it} + \alpha_7 Liq_{it} + \alpha_8 PG_{it} + \alpha_9 Ech_{it} + v_{it}.$$

Since we cannot observe expectations of changes in earnings growth (Ech_{it}), we use equation (14) to estimate the earnings price ratio and then compute the predicted earnings price ratio. The difference is used to compute expectations of changes in earnings growth (as presented in equation 6).

$$(14) \quad EP_{it} = \lambda_{it} + \alpha_1 AST_{it} + \alpha_2 Div_{it} + \alpha_3 Lev_{it} + \alpha_4 Var_{it} + \alpha_5 Beta_{it} + \alpha_6 SC_{it} + \alpha_7 Liq_{it} + \alpha_8 PG_{it} + v_{it}.$$
³

Performance of Pure NGCs, LLCs, and Pure NGCs that Transformed into LLCs

To analyze the performance of Pure NGCs, LLCs, and Pure NGCs that transformed into LLCs, the report estimates equations (2) and (14) for Pure NGCs, LLCs, and Pure NGCs that switched to LLCs and uses these results to make the aforementioned comparisons.

Data

The data used in this report consist of publicly available NGC information from financial statements and stock prices traded between NGC investors. NGC financial reports were obtained from security filings while NGC stock prices were obtained from alternative trading systems; specifically, Variable Investment Advisors and Alerus Securities. The NGCs included in this report are classified into two groups: Pure NGCs and LLCs. This classification is related to NGC ownership structure,⁴ which has implications on NGC investment in terms of risk, social capital, liquidity, and profit.

³ For combined Pure NGC and LLC, year is entered in equation (14).

⁴ In a Pure NGC, ownership is restricted to member/patrons, non-redeemable and transferable. LLC ownership is not restricted to member/patrons and stocks are publicly traded (Chaddad and Cook, 2004).

Five hundred and sixty-five data observations were obtained for Pure NGCs. They cover the period from 1996 to 2004. No data were available for 2002. One hundred and seventy-five data observations were obtained for LLCs. They cover the period from 2003 to 2004, a time period when NGC and LLC stock trading companies initiated a significant volume of stock trade for these firms. Finally, 127 data observations were obtained for NGCs that transformed into LLCs. They cover the period from 1997 to 2004. No data were available for 2002, a time period when some NGCs transformed into LLCs.

Table 1 presents the definitions of variables and the data sources used to estimate the earnings price ratio and to derive investors' expectations of changes in earnings growth. The earnings price ratio is the ratio of the earnings price per unit and the price per share. Earnings per unit data were obtained from NGC financial statements and share price data from alternative trading systems (Variable Investment Advisors and Alerus Securities). The beta coefficient was computed using S&P 500 data obtained from Yahoo Finance.

Table 1. Description and Sources of Variables used to Estimate the Earnings Price Ratio

Variables	Description	Data Sources
Ep	Earnings price ratio	Financial Statements/VIA/A.S.*
Beta _{sp}	Beta coefficient (S&P 500)	Yahoo Finance
AST	Asset size	Financial Statements
Var	Variability of earnings (\$/share)	Financial Statements
Div	Dividend payout ratio	Financial Statements
Lev	NGC leverage	Financial Statements
PG	Past growth rate of earnings (%)	Financial Statements
Liq	Logarithm of quantity of shares sold	Financial Statements
SC _{sp}	Social Capital using S&P 500 (%)	Yahoo Finance

*VIA represents Variable Investment Advisors and A.S. represents Alerus Securities.

Asset size, dividend payout ratio, leverage, earnings variability, liquidity, and past growth are computed with data from NGC financial reports. Leverage is estimated with data from NGC financial statements. Social capital is calculated using S&P 500 index data obtained from Yahoo Finance, and data for share prices are obtained from Variable Investment Advisors and Alerus Securities⁵.

Table 2 presents the definitions and the sources of variables used to estimate the realized rate of return. The realized rate of return is computed using data from NGC financial statements, Variable Investment Advisors, and Alerus Securities. The beta coefficient was computed using S&P 500 data obtained from Yahoo Finance. Social capital was computed using S&P 500 data obtained from Yahoo Finance. Liquidity was computed using data from alternative trading systems. Expectations of change in earnings growth are computed from equation (13).

Season is the variable added to the model to capture sales seasonality (Table 3). Season is represented by dummy variables from one to three, with one representing the first trimester, two the second trimester, and three the third trimester. Year is the variable used to capture the

⁵ Time series plot of stock data and descriptive statistics of data are presented in the Appendix.

year effect and is captured using dummy variables from one to seven. One denotes the year 1996, two denotes the year 1997, three denotes the year 1998, four denotes the year 1999, five denotes the year 2000, six denotes the year 2001, and seven denotes the year 2003/2004, respectively.

Table 2. Description of Variables used to Estimate the Realized Rate of Return

Variables	Description	Data Sources
Re	Realized rate of return (%)	Financial Statements/VIA/A.S.*
Beta _{sp}	Beta coefficient (S&P 500)	Yahoo Finance
SC _{sp}	Social capital using S&P 500 (%)	Yahoo Finance
Liq	Logarithm of quantity of shares	VIA/A.S.*
Ech	Expectations of change in growth	Generated from equation (12).

*VIA represents Variable Investment Advisors and A.S. represents Alerus Securities.

These variables were added to the model because NGC stocks are sold per trimester. Given that different trimesters have different sales (there can be more sales in the first trimester and fewer sales in the third trimester), the variability of sales with respect to season can affect the valuation of the NGC stock and needs to be captured. Similarly, NGCs face different operating conditions over various years and this might affect the stock value. For instance, one NGC can invest in technology during one year or undergo structural changes. Hence, year variability should be captured.

Table 3. Description of Other Variables

Random Variables	Value	Description
Season	1	First trimester
	2	Second trimester
	3	Third trimester
Year	1	1996
	2	1997
	3	1998
	4	1999
	5	2000
	6	2001
	7	2003/2004

Estimation Procedure

F-tests for Data Aggregation

Four F-tests were conducted to determine how stock data should be aggregated. The ANOVA procedure in SAS was used to conduct the tests. Table 4 presents the F-values and the P-values from the F-tests. The first F-test was used to test the hypothesis that stock data should be aggregated by NGC type. The F-value (6.94) obtained from the test was statistically significant at the 1% confidence level implying that data be split up by NGC type. The second

F-test was conducted to test the hypothesis that LLC stock data should be aggregated by year. The F-value (5.46) obtained from this test was statistically significant at the 5% confidence level and implied that LLC stock data be split up by year. The third F-test was carried to test the hypothesis that Pure NGC stock data for 2003 and 2004 be aggregated by year. The F-value (0.44) obtained from the test was not significant and implied that Pure NGC data for 2003 and 2004 be combined. From this result, data for 2003 and 2004 are grouped and are referred to as 2003/2004 data. The fourth F-test was carried to test the hypothesis that Pure NGC stock data from 1996 to 2001 should be aggregated by year. The F-value (13.72) obtained from the test was highly statistically significant and suggested that Pure NGC data be split up by year. These F-test results provide guidance on how many econometric models to estimate.

Following from the test results, the earnings price ratio and the realized rate of return were estimated each year to analyze Pure NGCs and LLCs yearly performance. The earnings price ratio and the realized rate of return were then estimated over all years to analyze Pure NGC and LLC performance over time. A variable named year was entered as a random effect to capture year variability.

Table 4. F-test for NGC Type Split and Year Aggregation

Source	F-value	P-value
Split NGC by type	6.94	0.0086
Split LLC by year	5.46	0.0205
Split 2003 and 2004 Pure NGC data	0.44	0.5142
Split Pure NGC by year	13.72	0.0001

Model Selection

Multicollinearity problems were faced in estimating the earnings price ratio. To solve for strong multicollinearity, restricted versions of equation (14) were estimated. The restrictions consisted in removing one, two, or three non-systematic risk variables (asset size, dividend payout ratio, leverage, earnings variability) when faced with perfect multicollinearity. For Pure NGCs, dividend payout ratio and earnings variability were removed from equation (14) in 1996, 1998, 1999, and 2000. In 1997, leverage and earnings variability were removed from equation (14). In 2001, asset size, dividend payout ratio, and leverage were removed from equation (14). No variable was removed for LLCs. For Pure NGCs that switched to LLCs, asset size and dividend payout ratio were removed from equation (14) after the LLC move. No variable was removed for combined LLCs and Pure NGCs.

Results

Pure NGCs Earnings Price Ratio and Realized Return Results

Table 5 presents Pure NGC parameter estimates, t-statistics, and r-square values for equation (14) used to estimate the earnings price ratio from 1996 to 2003/2004. Table 6 reports Pure NGC parameter estimates, t-statistics, and r-square values for equation (2) used to estimate realized returns from 1996 to 2003/2004.

Table 5. Pure NGC Earnings Price Ratio Results for Each Year

Year	Intercept	Asset Size	Dividend	Leverage	Earnings Variability	Beta	Social Capital	Liquidity	Past Growth	R ²
1996	-2656.5*** (-8.59)	131.2*** (8.93)			0. (1.06)	3.7*** (4.14)	27.9 (1.10)	1.8 (2.75)	-0.0 (-0.04)	86%
1997	-238.8*** (-12.33)	12.5*** (11.91)	0.4 (0.34)			0.0** (2.61)	-7.6** (-2.29)	-0.1 (-0.77)	0.0 (0.11)	99%
1998	-78.4*** (-21.47)	4.4*** (24.55)			1.0*** (708.51)	-0.0 (-0.19)	-3.1*** (-4.89)	0.1 (1.01)	-0.0 (-1.01)	99%
1999	359.5*** (45.70)	-17*** (-38.41)			-0.0 (-0.44)	0.0 (0.49)	1.9 (0.62)	0.0 (0.73)	0.0** (2.04)	99%
2000	173.1*** (4.20)	-7.5*** (-3.41)			-1.1*** (-2.82)	0.3 (0.73)	-18.8*** (-2.78)	-0.1 (-0.17)	0.0 (0.14)	71%
2001	-0.7 (-1.43)				0.5 (0.70)	-0.0 (-0.05)	-0.0 (-0.22)	1.5*** (14.34)	-0.0 (-1.10)	81%
2003	-21190.7***	1126.9***	602.8	-3588.8***	7.1***	-0.7	17.9	-6.7	-14.0	97%
/2004	(-3.93)	(4.03)	(1.19)	(-4.68)	(4.82)	(-0.48)	(0.14)	(-1.69)	(-0.50)	

Numbers in parentheses are t-statistics.

** Indicates statistical significance at the 5% confidence level

*** Indicates statistical significance at the 1% confidence level.

Earnings Price Ratio Results

Risk Results

In 1996, Table 5 reports a positive size effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level. Its parameter estimate is 131.17 (t-statistic of 8.93). This result is counter-intuitive and suggests that Pure NGC earnings price increases as its size increases. Daves et al. (1999) found a similar relationship between the stock price and the firm size. A possible explanation might be that Pure NGC managers undertook risky investments and investors require compensation. Beta has a positive effect on the earnings price ratio and is statistically significant at the 1% confidence level. Its parameter estimate is 3.68 (t-statistic of 4.14). This result suggests that Pure NGC earnings price rises when systematic risk increases. One reason why investors invest in Pure NGCs is to minimize the volatility of market prices for the commodity they produce. They might require higher premiums as compensation for high systematic risk.

In 1997, Table 5 also reports a positive size effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of 12.46 (t-statistic of 11.91). This implies that the Pure NGC earnings price increases as its size increases. Again, this result might be explained by the fact that investors require compensation for risky investments undertaken by Pure NGC managers. As in 1996, beta has a positive effect on the earnings price ratio in 1997. However, beta is statistically significant at the 5% confidence level. Its parameter estimate is 0.04 (t-statistic of 2.61). This result implies that Pure NGC earnings price rises as systematic risk increases. Investors might require higher premiums to compensate for positive systematic risk.

In 1998, Table 5 reports a positive size effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of 4.41 (t-statistic of 7.02). This finding implies that Pure NGC earnings price rises as size increases. A possible explanation might be that investors require higher premiums to compensate for risky projects undertaken by managers. Earnings variability has a positive relationship with the

earnings price ratio and is statistically significant at the 1% confidence level. Its parameter estimate is 1.00 (t-statistic of 74.83). This result suggests that the Pure NGC earnings price increases as it becomes more risky and is consistent with investment theory of high returns in compensation to high risk.

In 1999, Table 5 reports a negative size effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of -16.67 (t-statistic of -105.49). This result suggests that Pure NGC earnings price decreases as its size increases, probably because investors perceive large NGCs to be less risky than small NGCs. The opposite relationship was observed in 1996, 1997, and 1998.

In 2000, Table 5 reports a negative size effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of -7.50 (t-statistic of -3.41). This suggests that as the Pure NGC size increases, its earnings price declines. As in 1999, this might be explained by the fact that investors perceive large Pure NGCs to be less risky than small Pure NGCs. Earnings variability has a negative effect on the earnings price ratio and is statistically significant at the 1% confidence level. Its parameter estimate is -1.09 (t-statistic of -2.82). This finding is counter-intuitive and implies that as the Pure NGC earnings become more volatile, its earnings price declines. A possible explanation might be that investors are willing to accept some variability in Pure NGC earnings because Pure NGC managers undertook risky investments.

In 2001, Table 5 reports no significant risk variable. In 2003/2004, Table 5 reports a positive size effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of 1126.85 (t-statistic of 4.03). This suggests that as the Pure NGC size increases, its earnings price rises. Investors might require higher premiums in compensation to risky projects (plant building). Leverage has a negative effect on the earnings price ratio and is statistically significant at the 1% confidence level. Its parameter estimate is -3588.80 (t-statistic of -4.68). This finding implies that as the Pure NGC degree of leverage increases, its earnings price declines. A possible explanation is that high leverage might be a sign of good performance. Earnings variability has a positive effect on the earnings price ratio and is statistically significant at the 1% confidence level. Its parameter estimate is 7.08 (t-statistic of 4.82). This result suggests that investors require higher premiums when Pure NGC earnings become more volatile.

Social Capital, Liquidity, and Past Growth Results

Social capital is statistically significant in 1997, 1998, and 2000. In 1997, 1998, and 2000, social capital has a negative effect on the earnings price ratio. In 1997, social capital is statistically significant at the 5% confidence level and has a parameter estimate of -7.59 (t-statistic of -2.29). In 1998, social capital is statistically significant at the 1% confidence level and has a parameter estimate of -3.19 (t-statistic of -3.66). In 2000, social capital is statistically significant at the 1% confidence level and has a parameter estimate of -18.81 (t-statistic of -2.78). The negative relationship between social capital and the earnings price ratio implies that Pure NGC investors might be willing to forego part of their monetary benefits in order to obtain non-monetary benefits in times of adverse market conditions.

Liquidity is only statistically significant in 2001 at the 1% confidence level and has a positive impact on the earnings price ratio in 2001. Its parameter estimate is 1.49 (t-statistic of 14.34). This result is counter-intuitive and implies that the Pure NGC earnings price increases as its stock liquidity increases. Given that Pure NGCs are closed-ended entities, investors could perceive high liquid stock as a threat to their ownership. High liquid stock might give large investors the opportunity to acquire a large part of the Pure NGC ownership, which might eventually lead to a takeover. Another possible reason is that investors might want to be compensated for the risk of a thin market for Pure NGCs stock.

Past growth has a positive impact on the earnings price ratio in 1999 and is statistically significant at the 5% confidence level. Its parameter estimate is 0.00 (t-statistic of 2.04). This result suggests that as Pure NGC earnings price is positively correlated with past performance. Investors might perceive that Pure NGCs had bad performance and want to be compensated.

Realized Return Results

In 1996, Table 6 reports a positive systematic risk effect and a positive social capital effect on the Pure NGC realized rate of return. Beta is statistically significant at the 5% confidence level and has a parameter estimate of 0.00065 (t-statistic of 2.42). This finding suggests that realized returns increase as systematic risk grows. Social capital has a positive effect on the realized rate of return and is statistically significant at the 1% confidence level. Its parameter estimate is 0.88616 (t-statistic of 27.36). This result suggests that realized returns increase when social capital increases and is counter-intuitive. A possible explanation might be that investors perceive social benefits as a threat to Pure NGC good performance.

In 1997, Table 6 reports a positive social capital effect, a positive liquidity effect, and a positive expectation effect on the Pure NGC realized rate of return. Social capital is statistically significant at the 1% confidence level and has a parameter estimate of 0.27336 (t-statistic of 5.33). As in 1996, this finding is counter-intuitive and suggests that realized returns increase when social capital increases. Investors might perceive social benefits to be a threat to Pure NGC good performance. Liquidity has a positive effect on realized returns. Liquidity is statistically significant at the 1% confidence level and has a parameter estimate of 0.02044 (t-statistic of 3.81). This result implies that realized returns increase as the Pure NGC stock becomes more liquid. Investors possibly perceive high Pure NGC stock liquidity as a threat to their ownership, or might require compensation for the risk of a thin market for Pure NGC stock. Expectations of changes in earnings growth have a positive effect on realized returns. Expectations of changes in earnings growth are statistically significant at the 1% confidence level with a parameter estimate of 0.01399 (t-statistic of 2.78). This finding suggests that realized returns grow as expectations of changes in earnings growth increase. Investors might expect Pure NGC to have negative growth in their future earnings. The first, second, and third trimesters negatively impact stock trades. They are all statistically significant at the 1% confidence level. Their parameter estimates are -0.25192 (t-statistic of -5.00), -0.19917 (t-statistic of -4.47), and -0.15491 (t-statistic of -4.28) for the first, second, and third trimesters, respectively.

In 1998, Table 6 reports a negative systematic risk effect on the Pure NGC realized rate of return. Beta is statistically significant at the 1% confidence level and has a parameter estimate of -0.00891 (t-statistic of -6.33). This result suggests that realized returns decrease as systematic risk increases. Pure NGC returns move in opposite direction from market returns.

In 1999, Table 6 reports a negative systematic risk effect and a negative expectation effect on the Pure NGC realized rate of return. Beta is statistically significant at the 10% confidence level and has a parameter estimate of -0.00065 (t-statistic of -1.82). This finding is consistent with expectations and implies that realized returns decrease as systematic risk increases. Expectations of changes in earnings growth have a negative effect on Pure NGC realized returns. Expectations of changes in earnings growth are statistically significant at the 1% confidence level with a parameter estimate of -0.00672 (t-statistic of -3.75). This finding suggests that realized returns decrease when expectations of changes in earnings growth increase. Investors might expect Pure NGCs to have positive changes in their future earnings.

Table 6. Pure NGC Realized Rate of Return Results for Each Year

Year	Beta	Social Capital	Expectations of Changes in			Season ₁	Season ₂	Season ₃	R ²
			Liquidity	Growth					
1996	0.0006** (2.42)	0.8862*** (27.36)	0.0012 (1.60)	-0.0000 (-0.78)	-0.0032 (-1.04)	-0.0090 (-0.80)	0.0049 (1.15)	90%	
1997	0.0008 (1.11)	0.2734*** (5.33)	0.0204*** (3.81)	0.0140*** (2.78)	-0.2519*** (-5.00)	-0.1992*** (-4.47)	-0.1540*** (-4.28)	44%	
1998	-0.0089*** (-6.33)	0.0189 (0.63)	0.00131 (0.34)	-0.0044 (-0.59)	-0.0068 (-0.21)	-0.02816 (-0.82)	-0.0260 (-0.85)	49%	
1999	-0.0006* (-1.82)	-0.0038 (-0.18)	-0.00022 (-0.17)	-0.0067*** (-3.75)	0.0034 (0.26)	0.00279 (0.22)	-0.0008 (-0.06)	13%	
2000	-0.0099*** (-5.37)	0.0060 (0.20)	-0.00156 (-0.51)	0.00036 (0.47)	0.0040 (0.14)	0.07160** (2.04)	-0.0016 (-0.06)	33%	
2001	-0.0224*** (-6.95)	0.0027 (1.46)	-0.0023** (-2.05)	-0.0007 (-0.47)	0.0306*** (6.32)			47%	
2003/ 2004	-0.0021 (-1.19)	-0.0507 (-1.53)	-0.0015 (-0.29)	-0.0004 (-1.15)	0.0286 (1.41)		0.0454* (2.03)	37%	

Numbers in parentheses are t-statistics.

* Indicates statistical significance at the 10% confidence level.

** Indicates statistical significance at the 5% confidence level.

*** Indicates statistical significance at the 1% confidence level.

In 2000, Table 6 also reports a negative systematic risk effect on the Pure NGC realized rate of return. Beta is statistically significant at the 1% confidence level and has a parameter estimate of -0.00986 (t-statistic of -5.37). This implies that Pure NGC realized returns decrease as systematic risk grows. The second trimester positively impacts stock trades. The second trimester is statistically significant at the 5% confidence level with a parameter estimate of 0.07160 (t-statistic of 2.04).

In 2001, Table 6 reports a negative systematic risk effect and a negative liquidity effect on the Pure NGC realized rate of return. Beta is statistically significant at the 1% confidence level and has a parameter estimate of -0.02245 (t-statistic of -6.95). This finding suggests that realized returns decrease as systematic risk increases. Liquidity is statistically significant at the 5% confidence level and has a parameter estimate of -0.00227 (t-statistic of -2.05). This result implies that Pure NGCs realized returns decrease as Pure NGC stock liquidity increases.

Investors might be willing to accept lower returns and have the ability to leave the Pure NGC more easily. The third trimester has a positive impact on Pure NGCs stock trades. The first trimester is statistically significant at the 1% confidence level with a parameter estimate of 0.03063 (t-statistic of 6.32).

In 2003/2004, Table 6 reports no significant effect on the Pure NGC realized rate of return. The third trimester positively impacts Pure NGC stock trades. The third trimester is statistically significant at the 10% confidence level and has a parameter estimate of 0.04536 (t-statistic of 2.03). The second trimester positively impacts stock trades.

LLCs Earnings Price Ratio and Realized Return Results

Table 7 presents LLC parameter estimates, t-statistics, and r-square values for equation (14) used to estimate the earnings price ratio for each year. Table 8 reports LLC parameter estimates, t-statistics, and r-square values for equation (2) used to estimate realized returns for each year.

Earnings Price Ratio Results

Risk Results

In 2003, Table 7 reports a positive size effect, a positive dividend effect, a positive leverage effect, and a negative earnings variability effect on the LLC earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of 133.93 (t-statistic of 5.05). This result is counter-intuitive and suggests that as the LLC size increases, its earnings price rises. Investors might require higher premiums to compensate for risky investments undertaken by LLC managers (some LLCs have invested in high technological plants). Another possible explanation is that as size increases, investors may think there is not much growth left and be unwilling to pay as much for the stock because. Dividend payout ratio is statistically significant at the 1% confidence level and has a positive effect on the LLC earnings price ratio. Its parameter estimate is 140.11 (t-statistic of 9.73). This finding implies that LLC earnings price increases as the dividend payout ratio grows. Investors might perceive a high dividend payout ratio as a threat to LLC growth. Leverage is statistically significant at the 1% confidence level and has a positive effect on the LLC earnings price ratio. Its parameter estimate is 942.10 (t-statistic of 6.75). This result suggests that the LLC earnings price increases when its degree of leverage increases. A possible explanation is that investors perceive a high degree of leverage as a threat to the LLC (repayment of debts) and require some compensation. Earnings variability is statistically significant at the 1% confidence level. It has a negative effect on the LLC earnings price ratio and a parameter estimate of -0.19 (t-statistic of -5.25). This result is counter-intuitive and implies that LLC earnings price increases when earnings volatility declines. Investors might be willing to accept some volatility in LLC earnings because LLCs are new investments.

In 2004, Table 7 reports a positive size effect, a positive dividend effect, and a negative leverage effect on the LLC earnings price ratio in 2004. Asset size is statistically significant at the 1% confidence level with a parameter estimate of 10.62 (t-statistic of 6.25). This result is

counter-intuitive and implies that the LLC earnings price increases as its size rises. A possible explanation is that investors require higher premiums to compensate for risky investments undertaken by LLC managers. Dividend payout ratio is statistically significant at the 10% confidence level and has a parameter estimate of 11.22 (t-statistic of 1.92). This result suggests that LLC earnings price increases as a dividend payout ratio grows. It is possible that investors perceive a high dividend payout ratio as a threat to LLC growth. Leverage is statistically significant at the 5% confidence level and has a parameter estimate of -74.27 (t-statistic of -2.38). This result was not expected and implies that LLC stock earnings price increases as leverage declines. Investors might perceive leverage as a sign of good financial standing, just as a person with a high becon score. The becon score is a credit rating measure used by financial institutions such as banks.

Table 7. LLC Earnings Price Ratio Results for Each Year

Year	Intercept	Asset Size	Dividend	Leverage	Earnings Variability	Beta	Social Capital	Liquidity	Past Growth	R ²
2003	-3007.3*** (-6.02)	133.9*** (5.05)	140.1*** (9.73)	942.1*** (6.75)	-0.2*** (-5.25)	2.5 (0.70)	-0.7 (-0.01)	4.3 (1.51)	10.4** (2.19)	74%
2004	-160.7*** (-4.36)	10.6*** (6.25)	11.2* (1.92)	-74.2** (-2.38)	-0.0 (-0.39)	0.2 (0.78)	155.8*** (22.82)	0.3* (0.51)	0.1 (0.51)	87%

The numbers in parentheses are t-statistics.

* Indicates statistical significance at the 10% confidence level.

** Indicates statistical significance at the 5% confidence level.

*** Indicates statistical significance at the 1% confidence level.

Social Capital, Liquidity, and Past Growth Results

Table 7 results show that social capital is only statistically significant in 2004. Social capital is statistically significant at the 1% confidence level and has a positive effect on the LLC earnings price ratio. This result implies that LLC earnings price increases as social capital grows. Investors might perceive social capital as a threat to their monetary profits.

Past growth is significant only in 2003 at the 5% confidence level and has a positive effect on the LLC earnings price ratio. Its parameter estimate is 10.38 (t-statistic of 2.19). This finding suggests that LLC earnings price has a positive relationship with past earnings growth. Investors' perception of LLCs might be influenced by past Pure NGC bad performance (most LLCs are formed to overcome Pure NGC limitations and bad performance).

Realized Return Results

In 2003, Table 8 reports a negative social capital effect and a negative expectation effect on the LLC realized rate of return. Social capital is statistically significant at the 5% confidence level and has a parameter estimate of -0.4214 (t-statistic of -2.03). This result implies that LLC realized returns decrease as social capital increases. Investors might be willing to forego part of their monetary benefits in order to obtain more social benefits from the LLC. Expectations of changes in earnings growth are statistically significant at the 5% confidence level with a parameter estimate of -0.0008 (t-statistic of -2.21). This finding suggests that LLC realized returns decrease as expectations of changes in earnings growth increase. A negative expectation of changes in earnings growth effect suggests that Pure NGCs and LLCs may experience positive

growth in their future earning prices. Adversely, a positive expectation of changes in earnings growth sign would imply that Pure NGCs and LLCs may experience negative growth in their future earnings, in which case investors might require premiums. The third trimester impacts LLC stock trades. The third trimester is statistically significant at the 10% confidence level and has a parameter estimate of -0.0674 (t-statistic of -1.80).

In 2004, Table 8 reports a negative systematic risk effect and a negative social capital effect on the LLC realized rate of return. Beta is statistically significant at the 1% confidence level and has a parameter estimate of -0.0473 (t-statistic of -28.03). This finding suggests that LLC realized returns rise as systematic risk declines. Investors might be willing to accept low returns from LLCs if LLCs achieve the goal of minimizing market risk. Social capital is statistically significant at the 1% confidence level and has a parameter estimate of -0.4122 (t-statistic of -3.92). This result suggests that LLC realized returns decrease as social capital increases. Investors are possibly willing to forego part of their monetary benefits in order to obtain more social benefits from the LLC.

The first, second, and third trimesters positively impact LLC stock trades. All trimesters are statistically significant at the 1% confidence level. The respective parameter estimates for the first, second, and third trimesters are 0.0894 (t-statistic of 6.96), 0.0917 (t-statistic of 7.64), and 0.0363 (t-statistic of 5.84).

Table 8. LLC Realized Return Results for Each Year

Year	Beta	Social Capital	Liquidity	Expectations of Change in Growth	Season ₁	Season ₂	Season ₃	R ²
2003	-0.0118 (-1.48)	-0.4214** (-2.03)	0.0044 (1.05)	-0.0008** (-2.21)	0.0531 (1.44)	-0.0176 (-0.52)	-0.0674* (-1.80)	16%
2004	-0.0473*** (-28.03)	-0.4122*** (-3.92)	-0.0001 (-0.17)	0.0004 (0.51)	0.0894*** (6.96)	0.0917*** (7.64)	0.0363*** (5.84)	89%

Numbers in parentheses are t-statistics.

* Indicates statistical significance at the 10% confidence level.

** Indicates statistical significance at the 5% confidence level.

*** Indicates statistical significance at the 1% confidence level.

LLCs and Pure NGCs Earnings Price Ratio and Realized Return Results Over All Years

Table 9 reports Pure NGC and LLC parameter estimates, t-statistics, and r-square values for the earnings price ratio over all years. Table 10 presents LLC and Pure NGC parameter estimates, t-statistics, and r-square values for the realized return over all years. The dummy variable year was added in the estimation of the earnings price ratio and the realized rate of return and entered as a random effect. The reason is that investors re-assess the performance of Pure NGCs and LLCs every year.

Earnings Price Ratio Results

Risk Results

For Pure NGCs, Table 9 reports a negative size effect, a positive dividend effect, a positive leverage effect, and a positive earnings variability effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of -213.12 (t-statistic of -13.73). The result suggests that as Pure NGC size increases, Pure NGC earnings price decreases. Investors might perceive large Pure NGC as less risky than smaller Pure NGCs. The dividend payout ratio is statistically significant at the 1% confidence level with a parameter estimate of 89.90 (t-statistic of 6.98). This result implies that as the dividend payout ratio rises, Pure NGC earnings price increases. It is possible that investors perceive a high dividend payout ratio as a threat to Pure NGC performance. Leverage is statistically significant at the 1% confidence level with a parameter estimate of 763.22 (t-statistic of 13.21). This finding suggests that Pure NGC earnings price rises as the degree of leverage increases. A possible explanation is that investors perceive high leverage as a threat to Pure NGC performance (volatility of interest rates and repayment of debts acquired). Earnings variability is statistically significant at the 5% confidence level with a parameter estimate of 0.19 (t-statistic of 2.24). This result implies that Pure NGC earnings price rises as earnings volatility increases. Investors might require higher returns to compensate for high volatility in earnings.

For LLCs, Table 9 reports a positive size effect, a positive dividend effect, a positive leverage effect, and a negative earnings variability effect on the earnings price ratio over the years. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of 44.36 (t-statistic of 3.50). The result suggests that as LLC size increases, LLC earnings price increases. This result is counter-intuitive and a possible explanation is that investors require higher premiums in compensation to risky investments undertaken by LLC managers (some LLCs have invested in high technological plants). The dividend payout ratio is statistically significant at the 1% confidence level with a parameter estimate of 59.95 (t-statistic of 6.04). This finding implies that as the dividend payout ratio rises, LLC earnings price increases. Investors might perceive a high dividend payout ratio as a threat to LLC growth. Leverage is statistically significant at the 1% confidence level with a parameter estimate of 233.67 (t-statistic of 2.88). This result suggests that LLC earnings price rises as the degree of leverage increases. Investors might perceive high leverage as a source of risk (volatility of interest rates and repayment of debts acquired). Earnings variability is statistically significant at the 1% confidence level with a parameter estimate of -0.14 (t-statistic of -5.45). This result implies that LLC earnings price rises as earnings volatility decreases. Investors might be willing to accept some variability in LLC earnings because LLCs are new investments.

Social Capital, Liquidity, Past Growth, and Year Results

For Pure NGCs, Table 9 reports a positive social capital effect on the earnings price ratio. Social capital is statistically significant at the 1% confidence level and has a parameter estimate of 17.05 (t-statistic of 2.99). This result implies that Pure NGC earnings price increases as social capital grows. A possible explanation is that investors perceive high social benefits as a source of risk to Pure NGCs. The years significantly impact Pure NGC stock trades. They are all

statistically significant at the 1% confidence level. The parameter estimates are 3616.27 (t-statistic of 13.34), 3754.48 (t-statistic of 13.56), 3754.52 (t-statistic of 13.63), 3676.15 (t-statistic of 13.57), 3755.05 (t-statistic of 13.57), 3751.86 (t-statistic of 13.52), 4109.14 (t-statistic of 14.54), for 1996, 1997, 1998, 1999, 200, 2001, and 2003/2004, respectively.

For LLCs, Table 9 reports a positive social capital effect and a positive liquidity effect on the earnings price ratio. Social capital is statistically significant at the 10% confidence level and has a parameter estimate of 83.78 (t-statistic of 1.91). This result implies that LLC earnings price increases as social capital grows. Investors might perceive social capital as a threat to their monetary profits. Liquidity is statistically significant at the 10% confidence level with a parameter estimate of 2.25 (t-statistic of 1.87). This finding suggests that LLC earnings price rises as its stock becomes more liquid and this was not expected. Probably, investors want to be compensated for the risk of thinly traded LLC stock. The years significantly impact LLC stock trades. They are all statistically significant at the 1% confidence level. The parameter estimates are -968.56 (t-statistic of -4.11) and -936.51 (t-statistic of -3.98) for 2003 and 2004, respectively.

Table 9. LLC and Pure NGC Earnings Price Ratio Results Over All Years

Type	Asset Size	Dividend	Leverage	Earnings Variability	Beta	Social Capital	Liquidity	Past Growth	Year 1
LLC	44.4*** (3.50)	59.9*** (6.04)	233.7*** (2.88)	-0.1*** (-5.45)	-2.6 (-1.23)	83.8* (1.91)	2.3* (1.87)	1.5 (0.87)	-968.6*** (-4.11)
Pure NGC	-213.1*** (-13.73)	89.9*** (6.98)	763.2*** (13.21)	0.2** (2.24)	0.1 (0.21)	17.0*** (2.99)	-4.0 (-1.62)	-0.0 (-0.51)	3616.3*** (13.34)

Type	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	R ²
LLC	-936.5*** (-3.98)						43%
Pure NGC	3754.5*** (13.56)	3754.5*** (13.63)	3676.2*** (13.54)	3755.1*** (13.57)	3751.8*** (13.52)	4109.1*** (14.54)	62%

Numbers in parentheses are t-statistics.

* Indicates statistical significance at the 10% confidence level.

** Indicates statistical significance at the 5% confidence level.

*** Indicates statistical significance at the 1% confidence level.

Realized Return Results

For Pure NGCs, Table 10 reports a negative systematic risk effect and a positive expectation effect on the Pure NGC realized rate of return. Beta is statistically significant at 1% confidence level and has a parameter estimate of -0.0015 (t-statistic of -4.35). This result suggests that Pure NGC realized returns rise as systematic risk declines. Expectations of changes in earnings growth are statistically significant at 1% confidence level with a parameter estimate of 0.0001 (t-statistic of 2.87). This finding implies that Pure NGC realized returns rise as expectations of changes in earnings growth increase. A possible explanation is that investors expect Pure NGC to have negative changes in their earnings growth.

For LLCs, Table 10 reports a negative systematic risk effect on the realized rate of return. Beta is statistically significant at the 1% confidence level and has a parameter estimate of

-0.0314 (t-statistic of -8.25). This result suggests that LLC realized returns rise as systematic risk declines. Investors might be willing to accept low returns from LLCs if they perceive that LLCs minimize market risk. The first and second trimesters positively impact LLC stock trade. Both trimesters are statistically significant at the 5% confidence level and have parameter estimates of 0.0339 (t-statistic of 2.06) and 0.0298 (t-statistic of 2.00) for the first and second trimesters, respectively.

Table 10. LLC and Pure NGC Realized Return Results Over All Years

Type	Beta	Social Capital	Liquidity	Expectations of Changes in Growth	Season ₁	Season ₂	Season ₃	R ²
Pure	-0.0015***	0.0022	-0.0014	0.0001***	0.0031	-0.0034	0.0082	6.2%
NGC	(-4.35)	(0.58)	(-1.64)	(2.87)	(0.65)	(-0.36)	(1.40)	
LLC	-0.0314***	-0.1186	0.0014	0.0001	0.0339**	0.0298**	0.0100	30.3%
	(-8.25)	(-1.17)	(0.89)	(0.43)	(2.06)	(2.00)	(0.68)	

Numbers in parentheses are t-statistics.

* Indicates statistical significance at 10% confidence level.

** Indicates statistical significance at 5% confidence level.

*** Indicates statistical significance at 1% confidence level.

Pure NGCs that Transformed into LLCs Earnings Price Ratio and Realized Return Results

Table 11 reports parameter estimates, t-statistics, and r-square values of the earnings price ratio for Pure NGCs that transformed into LLCs prior to and after the transformation. Table 12 presents parameter estimates and t-statistics of the realized return for Pure NGCs that transformed into LLCs prior to and after the transformation.

Earnings Price Ratio Results

Risk Results

Prior to LLC transformation, Table 11 reports a negative size effect, a negative dividend effect, a positive leverage effect, and a negative earnings variability effect on the earnings price ratio. Asset size is statistically significant at the 1% confidence level and has a parameter estimate of -1.25 (t-statistic of -9.57). This result implies that as the size of the Pure NGC increases, its earnings price decreases. Investors might perceive large Pure NGCs as safer investments as compared to smaller Pure NGCs. The dividend payout ratio is statistically significant at the 1% confidence level and has a parameter estimate of -2.02 (t-statistic of -4.22). This finding suggests that as the dividend payout ratio increases, the Pure NGC earnings price declines. A possible reason is that investors are attracted by Pure NGCs that pay larger dividends. Leverage is statistically significant at the 1% confidence level and has a parameter estimate of 3.56 (t-statistic of 8.12). This result suggests that earnings price rises as the degree of leverage increases. Investors might perceive high leverage as a threat to Pure NGC performance (volatility of interest rates and repayment of debts acquired). Earnings variability is statistically significant at the 1% confidence level and has a parameter estimate of -0.64 (t-statistic of -2.66). This finding implies that earnings price declines as earnings become more volatile. Investors might be willing to accept some variability in earnings probably because of some new investments (building of new plants).

After LLC transformation, Table 11 reports a positive leverage effect, a negative earnings variability effect, and a negative systematic risk effect on the earnings price ratio. Leverage is statistically significant at the 1% confidence level and has a parameter estimate of 45.92 (t-statistic of 5.61). This result suggests that LLC earnings price rises as the degree of leverage increases. A possible explanation is that investors perceive leverage as a source of risk to LLCs. Earnings variability is statistically significant at the 5% confidence level and has a parameter estimate of -1.02 (t-statistic of -5.00). This result implies that earnings price declines as earnings become more volatile. Investors might be willing to accept some variability in earnings probably because LLCs are new investments. Beta is statistically significant at the 1% confidence level with a parameter estimate of -0.03 (t-statistic of -4.73). This finding suggests that LLC earnings price increases as systematic risk declines. Investors might be willing to accept low returns from LLCs because they are low risk investments.

Table 11. Earnings Price Ratio Results for Pure NGCs that Transformed into LLCs

Year	Intercept	Asset Size	Dividend	Leverage	Earnings Variability	Beta	Social Capital	Liquidity	Past Growth	R ²
Prior	25.1*** (10.56)	-1.3*** (-9.57)	-2.0*** (-4.22)	3.6*** (8.12)	-0.6*** (-2.66)	0.0 (0.33)	-4.3 (-6.81)	0.1** (2.41)	-1.4** (-2.48)	68%
After	-21.7*** (-5.08)			45.9*** (5.61)	-1.0** (-5.00)	-0.0*** (-4.73)	-0.7 (-1.64)	-0.0 (-1.27)	-0.2 (-0.52)	97%

The numbers in parentheses are t-statistics.

** Indicates statistical significance at the 5% confidence level.

*** Indicates statistical significance at the 1% confidence level.

Social Capital, Liquidity, and Past Growth Results

Prior to LLC transformation, Table 11 reports a positive liquidity effect on the earnings price ratio. Liquidity is statistically significant at the 5% confidence level and has a parameter estimate of 0.07 (t-statistic of 2.41). This result implies that as stock liquidity increases, stock value increases. A possible explanation is that investors perceive high liquidity as a threat to their ownership, or require some compensation for thinly traded Pure NGC stocks. Liquidity is not statistically significant after LLC transformation. Past growth is statistically significant at the 5% confidence level and has a negative effect on the earnings price ratio prior to LLC transformation. Past growth has a parameter estimate of -1.40 (t-statistic of -2.48). This result implies that earnings price values and past performance are negatively correlated. Possibly, Pure NGCs with good history are viewed as having good future growth. Past growth is not statistically significant after LLC transformation, probably because LLCs are new.

Realized Return Results

Prior to LLC transformation, Table 12 reports a negative systematic risk effect and a positive liquidity effect on the realized rate of return. Beta is statistically significant at the 1% confidence level and has a parameter estimate of -0.00439 (t-statistics of -2.78). This result suggests that stock realized returns decrease when market risk increases. Prior to LLC transformation, liquidity is statistically significant at the 10% confidence level and has a parameter estimate of 0.01408 (t-statistic of 1.88). This result implies that as stock liquidity increases, stock realized returns increase. Investors might require some compensation for the risk of thinly traded Pure NGC stock.

After LLC transformation, Table 12 also reports a negative systematic risk effect on the realized rate of return. Beta is statistically significant at the 10% confidence level and has a parameter estimate of -0.02154 (t-statistic of -2.22). This result suggests that stock realized returns decline when systematic risk rises. A possible explanation is that investors are willing to get lower returns from the LLC because they perceive it as a low risk investment as compared to the stock market.

Table 12. Realized Return Results for Pure NGCs that Transformed into LLCs

Type	Beta	Social Capital	Liquidity	Expectations of Change in Growth	Season ₁	Season ₂	Season ₃	R ²
Prior	-0.00439*** (-2.78)	0.12805 (0.95)	0.01408* (1.88)	-0.02843 (-1.09)	-0.13235 (-1.95)	-0.13231 (-1.84)	-0.14492 (-2.04)	13%
After	-0.02154* (-2.22)	0.26083 (0.64)	0.02282 (0.74)	-0.71297 (-0.92)	0.10013 (0.32)	-0.29804 (-1.29)	-0.18300 (-0.84)	72%

The numbers in parentheses are t-statistics.

* Indicates statistical significance at 10% confidence level,

** Indicates statistical significance at 5% confidence level, and

*** Indicates statistical significance at 1% confidence level.

Summary and Implications

Summary for Pure NGCs

Earnings Price Ratio Estimation

This section summarizes earnings price ratio results obtained for Pure NGCs over the years and presented in Table 9. Risk variables (asset size, dividend payout ratio, leverage, and earnings variability) and social capital are the important factors in explaining Pure NGC earnings price ratio variability. Risk variables have a significant impact on the Pure NGC earnings price ratio. All the risk variables except earnings variability (significant at the 5% confidence level) are statistically significant at the 1% confidence level. Social capital is also significant in predicting the Pure NGC earnings price ratio at the 1% confidence level. These results imply that the Pure NGC earnings price ratio might be predicted by risk factors (asset size, dividend payout ratio, leverage, and earnings variability) and social capital. Liquidity and past growth might not be important for Pure NGCs.

Realized Rate of Return Estimation

This section summarizes realized returns results obtained for Pure NGCs and presented in Table 10. Beta and expectations of changes in earnings growth are the key variables in explaining Pure NGC realized returns. Beta and expectations of changes in earnings growth are statistically significant at the 1% confidence level over the years and have a negative effect on the Pure NGC realized rate of return. Pure NGC stock trades might not be impacted by seasonality.

Summary for LLCs

Earnings Price Ratio Estimation

This section summarizes the earnings price ratio results obtained for LLCs over the years and presented in Table 9. Risk (asset size, dividend payout ratio, leverage, and earnings variability), social capital, and liquidity are important factors in explaining LLC earnings price ratio variability. Based on the magnitude of coefficients, risk variables have a significant impact on the LLC earnings price ratio. In effect, all risk variables are statistically significant at the 1% confidence level. Social capital and liquidity are also significant but have a smaller effect on the LLC earnings price ratio (social capital and liquidity are statistically significant at the 10% confidence level). These findings suggest that the LLC earnings price ratio might be estimated by risk factors (asset size, dividend payout ratio, leverage, and earnings variability), social capital, and liquidity. Past growth might not be important.

Realized Rate of Return Estimation

This section summarizes the realized returns results obtained for LLCs and presented in Table 10. Beta is the core variable for LLC realized returns. Beta is statistically significant at the 1% confidence level over the years and has a negative effect on the LLC realized rate of return. Most LLC stock trades happen during the first and second trimesters.

Summary for Pure NGCs that Transformed into LLCs

Earnings Price Ratio Estimation

This section summarizes the earnings price ratio results obtained for Pure NGCs that changed to LLCs and are presented in Table 11. Prior to LLC transformation, the earnings price ratio might be predicted by risk factors (asset size, dividend, leverage, and earnings variability), liquidity, and past growth. Risk factors are important in the estimation of the earnings price ratio because they are all statistically significant at the 1% confidence level. Liquidity and past growth are also significant in explaining earnings price ratio variability. They are statistically significant at the 5% confidence level. Social capital and systematic risk might not be important in estimating the earnings price ratio. These results suggest that prior to LLC transformation, the Pure NGC earnings price ratio might be predicted by risk factors (asset size, dividend, leverage, and earnings variability), liquidity, and past growth. Social capital might not be important.

After LLC transformation, risk variables (leverage, earnings variability, and beta) are the core variables in explaining earnings price ratio variability. The risk factors to the exception of earnings variability (statistically significant at the 5% confidence level) are all statistically significant at the 1% confidence level. Social capital, liquidity, and past growth might not be important.

Realized Rate of Return Estimation

This section summarizes the realized returns results obtained for Pure NGCs that changed to LLCs and are reported in Table 12. After LLC transformation, beta is the core variable. Beta is statistically significant at the 10% confidence level. There is no seasonality effect on stock trades.

Prior to LLC transformation, beta and liquidity are the key variables in explaining realized returns. Beta is statistically significant at the 1% confidence level. Liquidity is statistically significant at the 10% confidence level. Seasonality of trades has no impact on realized returns.

Comparative Performance

Pure NGC Performance Versus LLC Performance

This section compares Pure NGC and LLC performances over all the years. The expected performance was measured by the earnings price ratio and the realized performance by the realized rate of return.

Earnings Price Ratio Estimation

The Pure NGC earnings price ratio can be predicted by risk factors (asset size, dividend, leverage, earnings variability), and social capital. The LLC earnings price ratio can be estimated by risk factors also (asset size, dividend, leverage, earnings variability), and by social capital and liquidity.

Asset size has a negative effect on the Pure NGCs earnings price ratio and a positive effect on the LLCs earnings price ratio. The negative effect of asset size on the Pure NGC earnings price ratio suggests that as Pure NGC size increases, its earnings price declines. Investors might perceive large Pure NGCs as less risky than small Pure NGCs. The opposite relationship is observed for LLCs and suggests that LLC earnings price value rises as its size increases. A possible explanation is that LLC managers undertook risky projects since LLCs are new firms. Investors probably require to be compensated for that risk.

The dividend payout ratio has a positive effect on the Pure NGC and the LLC earnings price ratios. This implies that as the dividend payout ratio increases, Pure NGC and LLC earnings price values rise. Investors of both types of NGCs might perceive high dividend payout ratios as a threat to growth and performance.

Leverage has a positive effect on the Pure NGC and the LLC earnings price ratios. This result suggests that Pure NGC and LLC earnings price values rise as the degree of leverage increases. Investors might perceive high leverage as a source of risk and require some compensation.

Earnings variability has a positive effect on the Pure NGC earnings price ratio and a negative effect on the LLC earnings price ratio. The positive effect on the Pure NGC earnings price ratio suggests that Pure NGC earnings price increases as earnings become more volatile. This is consistent with investment theory of high returns in compensation to high risks. The opposite relationship observed for LLCs implies that LLC earnings price declines as earnings volatility increases. This relationship is counter-intuitive. Investors might be willing to accept some volatility in LLC earnings because they are new investments.

Social capital has a positive effect on both the Pure NGC and the LLC earnings price ratio. Social capital is significant at the 1% confidence level for Pure NGCs and at the 10% confidence level for LLCs. The positive sign suggests that Pure NGC and LLC earnings price values increase as social capital grows. Investors might perceive social capital as a threat to performance.

Realized Rate of Return Estimation

Beta and expectations of changes in earnings growth affect Pure NGC realized returns. Beta has a negative effect on the Pure NGC realized return and is statistically significant at the 1% confidence level, which suggests that Pure NGC realized returns increase as systematic risk decreases. This result suggests that Pure NGCs returns move in opposite direction from market returns.

Expectations of changes in earnings growth have a positive effect on Pure NGC realized returns and are statistically significant at the 1% confidence level. This suggests that realized returns increase as expectations of changes in earnings growth increase. A possible explanation is that investors expect Pure NGCs to have negative growth in their earnings. LLC realized returns (as Pure NGCs realized returns) are negatively affected by systematic risk. Beta is statistically significant at the 1% confidence level and has a negative sign. This implies that LLC realized returns decrease when market risk rises. The first and second trimesters impact LLC stock trades.

Performance of Pure NGCs that Transformed into LLCs

Earnings Price Ratio Estimation

This section analyzes the performance of Pure NGCs that switched to LLCs. Prior to LLC transformation, the Pure NGC earnings price ratio is affected by non-systematic risk (asset size, dividend, leverage, and earnings variability), liquidity, and past growth. After LLC transformation, the earnings price ratio is affected by risk variables (leverage, earnings variability, and beta).

Asset size has a negative effect on the earnings price ratio prior to LLC transformation. This finding suggests that as the size increases, Pure NGC earnings price declines. A possible explanation might be that investors perceived large Pure NGCs as less risky than small Pure NGCs.

The dividend payout ratio has a negative effect on the Pure NGC earnings price ratio prior to LLC transformation. This implies that the Pure NGC earnings price decreases as dividend payout ratio increases. Investors might favor large dividend payments prior to LLC transformation.

Leverage has a positive effect on the earnings price ratio prior to and after LLC transformation. This suggests that as the degree of leverage increases, LLC earnings price rises. Investors might perceive a high degree of leverage as a threat to good performance prior to and after LLC transformation.

Earnings variability has a negative impact on the earnings price ratio prior to and after LLC transformation. This finding implies that LLC earnings price declines when earnings variability increases. Investors might be willing to accept some volatility in earnings because of new investments (building new plants, etc.).

Beta has a negative effect on the earnings price ratio after LLC transformation. This implies that LLC earnings price increases as systematic risk decreases. Investors might consider LLCs as low risk investments.

Liquidity has a positive effect on the earnings price ratio prior to LLC transformation, which suggests that Pure NGC earnings price increases as liquidity increases. A possible reason is that Pure NGC investors might require some compensation for the risk of thinly traded LLC stock.

Past growth has a negative impact on the earnings price ratio prior to LLC transformation. This implies that Pure NGC earnings price and Pure NGC earnings growth history are negatively correlated. Investors might perceive that Pure NGCs had good performance prior to LLC transformation.

Realized Rate of Return Estimation

Prior to LLC transformation, beta and liquidity are the core variables in explaining realized returns. Beta is statistically significant at the 1% confidence level and has a negative relationship with realized returns. This result suggests that realized returns increase when systematic risk declines. Liquidity is statistically significant at the 10% confidence level and has a positive effect on realized returns. This suggests that Pure NGC value is positively correlated with Pure NGC stock liquidity. A possible reason might be that investors perceive liquidity as a threat to their ownership.

After LLC transformation, beta is the significant variable. Beta is statistically significant at the 10% confidence level and has a negative impact on realized returns. This result suggests that realized returns decrease when systematic risk increases. Investors might also perceive LLCs as low risk investments. Another explanation might be that investors require to be compensated for the risk of thinly traded Pure NGC stock.

Implications

This section presents implications for Pure NGC and LLC management and policy makers in federal agencies. Implications are derived from Tables 6 and 7 and are organized into risk, social capital, liquidity, and growth expectations.

In terms of risk, Pure NGC and LLC management need to monitor asset size, dividend payout ratio, leverage, earnings variability, and beta because they affect their earnings price values. Pure NGCs might need to grow in size because investors perceive larger Pure NGCs as less risky than small Pure NGCs. This could be achieved by retaining more earnings. The size positively affected LLC earnings price, but this is probably due to the fact that LLCs are new and important investments were undertaken. Also, Pure NGCs and LLCs might need to reduce their levels of dividend payout ratio because investors perceive it as a potential source of risk. This could be achieved by reducing the level of dividend payments to investors.

Furthermore, management of Pure NGCs and LLCs should reduce their firm's degree of leverage to acceptable limits (Nganje et al., 2002). Investors seem to perceive high leverage as a source of risk to both Pure NGCs and LLCs. In LLCs, this might be achieved by attracting more outside investors.

In addition, Pure NGC management should reduce the variability of their earnings. Investors seem to require higher premiums in compensation to high volatility in earnings. This might be achieved by using futures and contracts to reduce price volatility or by diversification. LLC investors seem to tolerate some variability in LLC earnings as suggested by the negative relationship between earnings variability and earnings price. The fact that LLCs are still new might be a possible explanation to this finding.

Next, Pure NGCs and LLCs are both low risk investments compared to the market (Pure NGCs and LLCs have beta values less than one). However, Pure NGCs are much lower risk than LLCs as shown by their smaller beta values. Tables 9 and 10 report lower beta estimates for Pure NGCs compared to LLCs. In Table 10, the beta reported for Pure NGCs is -0.0015 while that reported for LLCs is -0.0314. Managers of Pure NGCs and LLCs should maintain this feature in order to build loyalty among current investors and attract more investors.

Social capital does not affect Pure NGC and LLC realized returns, but significantly and positively impact the prediction of Pure NGC and LLC earning prices. Social capital is statistically significant at the 1% confidence level for Pure NGCs and at the 10% confidence level for LLCs). As social capital increases, earnings price increases. This suggests that higher social capital may lead to higher expectations of stock values. This finding might adversely impact Pure NGCs and LLCs if the returns on cooperatives assets are lower than the returns of the market index.

Stock liquidity is important in predicting LLC stock prices. From Table 9 results, it seems that LLC management should consider getting market makers in the future to improve stock liquidity. Liquidity is positively correlated with the earnings price value. This might imply that LLC investors perceive LLC stocks as not liquid enough.

Past growth might not be important in predicting Pure NGC and LLC earnings price because its coefficient is not statistically significant. However, expectations of changes in earnings growth positively affect Pure NGC realized returns. This suggests that Pure NGCs are expected to have negative growth in their future earnings. Pure NGC management needs to implement actions that will improve on earnings growth and good performance. A possible solution might be to reduce the level of dividend payments to members.

Federal agencies are interested in improving NGC performance. It was found in this report that risk factors (asset size, dividend payout ratio, leverage, earnings variability, and beta), social capital, and expectations of changes in earnings growth affect Pure NGC stock values and realized returns. LLCs are affected by risk variables (asset size, dividend payout ratio, leverage, earnings variability, and beta), and social capital. To improve Pure NGC and LLC performance, federal agencies should assist in training management and farmers. This could be done by organizing training sessions between management and field experts serving as a means to increase social capital and/or risk management for these NGCs.

Summary

This report analyzed the impact of risk, social capital, liquidity, and new information or growth expectations on Pure NGC and LLC performance. New cooperative laws, demutualization, and development of alternative trading systems may affect investment decisions in NGCs and additional infusion of equity capital for expansion and growth. Previous research suggested that investors/members are primarily influenced by profits and risk when they make investment decisions. However, the possibility to obtain equity from outside investors for expansion or growth prospects, the existence of social capital benefits, the limited market for NGCs stocks, and risk considerations suggest that factors other than risk and profits may influence NGC investors.

One of the challenges faced by NGC, LLC managements, and alternative trading systems is to provide efficient pricing of stocks. The overall objective of this report was to develop a valuation model that would capture investors' expectations of NGC stock values and to derive implications for long-run infusion of additional equity capital. Following Chaddad and Cook (2004), NGCs were separated into LLCs and Pure NGCs. The specific objectives were:

- 1) To use secondary data to evaluate the significant determinants of the NGC stock value and compute investors' expectations of change in NGC earnings growth.
- 2) To develop a model to analyze the impact of growth, market risk, liquidity, and social capital on the NGC realized rate of return.
- 3) To compare Pure NGCs' performance to that of LLCs' and analyze the performance of Pure NGCs that transformed into LLCs.
- 4) To derive implications for long-run infusion of additional equity.

A two-step least square econometric procedure was used for the analysis. The first step was used to estimate investors' expectations of changes in earnings growth. The second step was to evaluate the impact of earnings growth expectations, NGC risk, stock liquidity, and social

capital on the NGC stock realized rate of return. In both cases, linear regression was used because, for empirical purposes, the relationship between the stock price and its variables was assumed linear.

It was found in this study that expectations of changes in earnings growth positively impact Pure NGC realized returns and have no effect on LLC realized returns. Moreover, social capital has a positive effect on Pure NGC and LLC predicted stock values and no effect on their realized returns. In addition, liquidity positively impacts LLC stock value, but has no impact on LLC realized returns, Pure NGC earnings price, and Pure NGC realized returns. Finally, systematic risk negatively impacts both Pure NGCs and LLCs realized returns. These findings may lead to a better understanding of the interactions among NGC and LLC risk, performance, social capital and liquidity and may significantly improve current valuation methods. Dividends have been mostly used to predict or price NGC and LLC stocks. However, this study has shown that investors' expectations of changes in earnings growth, liquidity, and social capital significantly impact realized returns and earnings prices, and should be incorporated in NGC and LLC stock valuation models.

Pure NGC and LLC Performance

The analysis has shown that Pure NGCs and LLCs have a similar performance in terms of dividend payout ratio, leverage, and social capital. Investors seem to perceive current dividend payout ratio and leverage as sources of risk to Pure NGCs and LLCs. Pure NGCs and LLCs have a different performance in terms of asset size and earnings variability. Pure NGC investors seem to favor large Pure NGCs, while LLC investors seem to perceive the size as a source of risk, possibly because LLCs are still new investments. Pure NGC investors seem to consider earnings volatility as a source of risk and might require some compensation. On the other hand, LLC investors seem to accept some volatility in LLC earnings, possibly because LLCs are new and undertook large initial investments. Social capital is significant at the 1% confidence level for Pure NGCs and at the 10% confidence level for LLCs. Social benefits might be perceived by Pure NGC and LLC investors as a threat to good performance. In consequence, investors might require some compensation. Investors expect Pure NGCs to have negative growth in their future earnings as shown by the positive relationship between expectations of changes in earnings growth and realized returns. Expectations were not significant for LLCs probably because they are still new.

Performance of Pure NGCs that Transformed into LLCs

No major difference was observed in the predicted value of Pure NGC prior to and after LLC transformation in terms of risk. The stock might be predicted by risk factors (asset size, dividend, leverage, earnings variability, and beta). However, liquidity and past growth are only important prior to LLC transformation. After LLC transformation, beta impacts realized returns.

This has implications for investors, management, and policymakers in federal agencies. Pure NGCs might need to grow in size because investors perceive larger Pure NGCs as less risky than small Pure NGCs. This might be achieved by retaining more earnings. The size positively affected LLC earnings price probably because LLCs are new. Next, Pure NGCs and LLCs might

need to reduce their levels of dividend payout ratio because investors perceive it as a potential source of risk. This could be achieved by reducing the level of dividend payments to investors. Moreover, management of Pure NGCs and LLCs might reduce their firms' degree of leverage because investors seem to perceive high leverage as a source of risk. In LLCs, this might be achieved by attracting more outside investors. Furthermore, Pure NGC management might reduce earnings variability because investors seem to perceive it as a source of risk and might require higher premiums in compensation. This might be achieved by using futures and contracts to reduce price volatility or by diversification. On the other hand, LLC investors seem to tolerate some variability in LLC earnings. A possible explanation might be that LLCs are still new. In addition, Pure NGCs and LLCs returns of stock traded among members at alternative trading systems move in opposite direction from market returns and may be less risky than the market index (Pure NGCs and LLCs have beta values less than one). However, Pure NGCs are much lower risk than LLCs as shown by their smaller beta values. Managers of Pure NGCs and LLCs could maintain this feature in order to build loyalty among current investors and attract more investors.

Social capital does not affect Pure NGC and LLC realized returns but are important in predicting Pure NGC and LLC stock values. Pure NGC and LLC managers could try to reduce the level of social benefits granted by their cooperatives. (Social capital has a positive relationship with Pure NGC and LLC stock values). LLC management could consider getting market makers in the future to improve stock liquidity because it is important in predicting LLC earnings price. (Liquidity is positively correlated with the earnings price ratio, which might imply that LLC investors perceive LLC stocks as not liquid enough). Past growth might not be important in predicting Pure NGC and LLC earnings price ratios because its coefficient is not statistically significant. However, expectations of changes in earnings growth positively affect Pure NGC realized returns. This suggests that Pure NGCs are expected to have negative growth in their future earnings. Pure NGC management needs to implement actions that will improve on earnings growth and good performance. A possible solution might be to reduce the level of dividend payments to members.

Federal agencies are interested in improving NGC performance. It was found that risk factors (asset size, dividend payout ratio, leverage, earnings variability, and beta), social capital, and expectations of changes in earnings growth affect Pure NGC stock values and realized returns. LLCs are affected by risk variables (asset size, dividend payout ratio, leverage, earnings variability, and beta), and social capital. To improve Pure NGC and LLC performance, federal agencies could assist in training management and farmers. This might be done by organizing training sessions between management and field experts serving as a means to increase social capital and/or risk management for these NGCs.

Limitations and Suggestions for Further Research

The amount of data collected is a limitation to this report. There are some trades that do not take place at alternative trading systems. Approximately, 75% of stocks traded between members are traded by alternative trading systems. Furthermore, some NGCs are not currently using alternative trading systems for secondary stock sales. This limited our report to just a certain number of NGCs. In this report, only two-year periods were available for LLCs. It might

be appropriate to observe these transformations for many years and re-do the same analysis. More regional and NGC data could be collected from surveys to capture the regional impact on NGC stock trades. It might be appropriate to extend this analysis to other NGC regions in the United States.

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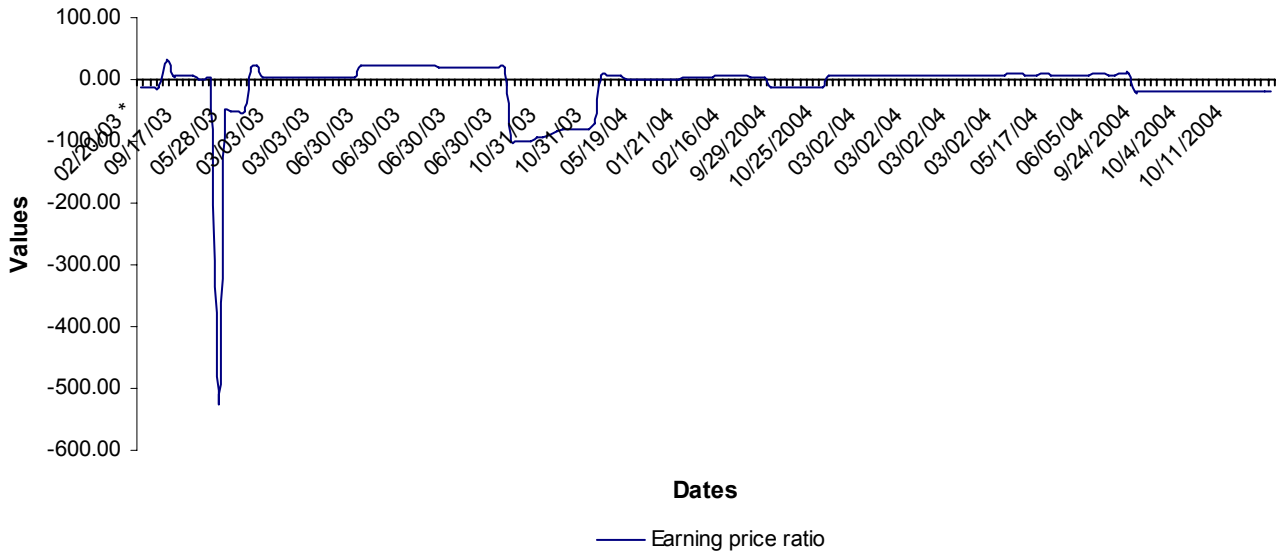
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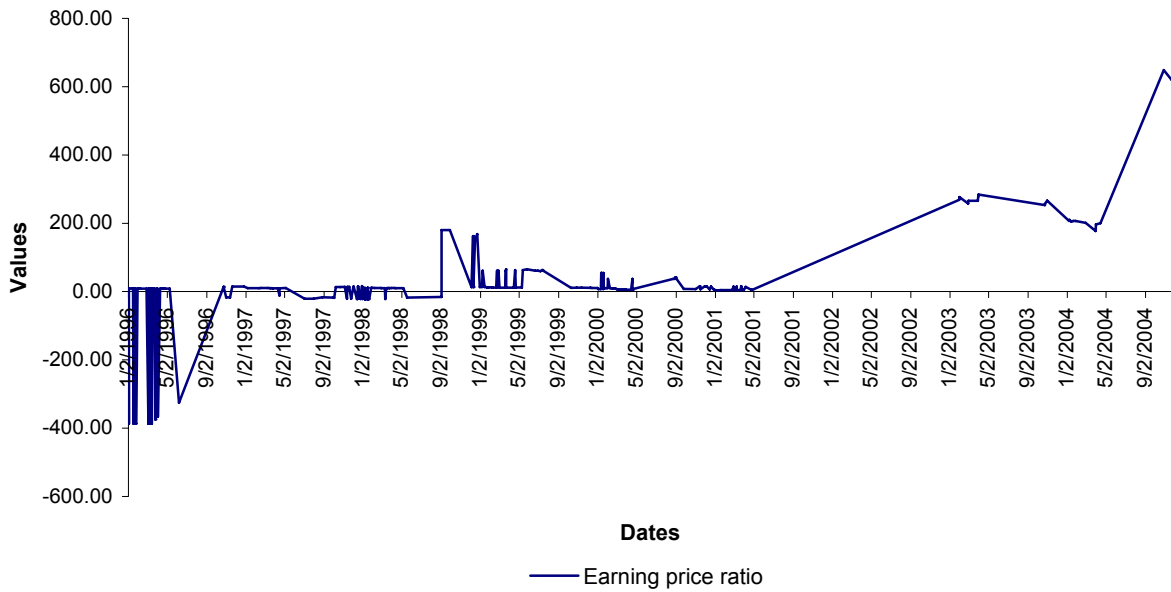
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APPENDIX



Appendix Figure 1. LLC Time Series Plot



Appendix Figure 2. Pure NGC Time Series Plot

Table A.1. Correlations between independent variables, Pure NGC 1996

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.99*	1.00						
Leverage	0.99*	1.00*	1.00					
Earnings variability	-0.71	-0.72	-0.71	1.00				
Beta _{sp}	-0.36	-0.38	-0.35	0.36	1.00			
Social capital _{sp}	0.00	0.01	-0.01	0.12	-0.38	1.00		
Liquidity	-0.90	-0.91	-0.92	0.61	0.33	-0.05	1.00	
Past growth	0.03	0.01	-0.04	-0.13	-0.35	0.18	0.08	1.00

*denotes very strong correlation coefficient.

Table A.2. Correlations between independent variables, Pure NGC 1997

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.32	1.00						
Leverage	1.00*	0.24	1.00					
Earnings variability	0.99*	0.29	0.98*	1.00				
Beta _{sp}	-0.16	-0.07	-0.16	-0.12	1.00			
Social capital _{sp}	0.21	0.02	0.22	0.15	-0.01	1.00		
Liquidity	-0.94	-0.25	-0.94	-0.93	0.15	-0.18	1.00	
Past growth	0.56	-0.60	0.63	0.57	-0.08	0.17	-0.57	1.00

*denotes very strong correlation coefficient.

Table A.3. Correlations between independent variables, Pure NGC 1998

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	1.00*	1.00						
Leverage	1.00*	1.00*	1.00					
Earnings variability	-0.51	-0.51	-0.50	1.00				
Beta _{sp}	-0.06	-0.05	-0.06	-0.27	1.00			
Social capital _{sp}	0.17	0.15	0.17	-0.07	-0.18	1.00		
Liquidity	-0.95	-0.95	-0.95	0.53	0.03	-0.17	1.00	
Past growth	0.61	0.62	0.62	0.36	-0.30	0.09	-0.55	1.00

*denotes very strong correlation coefficient.

Table A.4. Correlations between independent variables, Pure NGC 1999

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	1.00*	1.00						
Leverage	0.97	0.98	1.00					
Earnings variability	-0.69	-0.69	-0.67	1.00				
Beta _{sp}	0.25	0.25	0.24	-0.45	1.00			
Social capital _{sp}	0.02	0.02	0.04	0.06	0.02	1.00		
Liquidity	-0.87	-0.87	-0.86	0.57	-0.19	-0.05	1.00	
Past growth	-0.96	-0.97	-1.00*	0.66	-0.24	-0.04	0.85	1.00

*denotes very strong correlation coefficient.

Table A.5. Correlations between independent variables, Pure NGC 2000

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	1.00*	1.00						
Leverage	1.00*	1.00*	1.00					
Earnings variability	-0.78	-0.78	-0.78	1.00				
Beta _{sp}	-0.28	-0.28	-0.27	0.22	1.00			
Social capital _{sp}	0.07	0.07	0.07	-0.04	-0.48	1.00		
Liquidity	-0.92	-0.92	-0.92	0.72	0.23	-0.02	1.00	
Past growth	-0.90	-0.91	-0.91	0.76	0.17	-0.01	0.82	1.00

*denotes very strong correlation coefficient.

Table A.6. Correlations between independent variables, Pure NGC 2001

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	1.00*	1.00						
Leverage	1.00*	1.00*	1.00					
Earnings variability	-0.44	-0.44	-0.44	1.00				
Beta _{sp}	-0.14	-0.14	-0.14	0.10	1.00			
Social capital _{sp}	-0.03	-0.03	-0.03	0.04	0.15	1.00		
Liquidity	-0.92	-0.92	-0.92	0.45	0.14	0.00	1.00	
Past growth	-1.00*	-1.00*	-1.00*	0.44	0.14	0.03	0.92	1.00

*denotes very strong correlation coefficient.

Table A.7. Correlations between independent variables, Pure NGC 2003/2004

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1							
Dividend	-0.68	1.00						
Leverage	0.72	-0.18	1.00					
Earnings variability	-0.89	0.79	-0.56	1.00				
Beta _{sp}	0.29	-0.68	-0.18	-0.18	1.00			
Social capital _{sp}	0.54	-0.35	0.48	-0.50	0.13	1.00		
Liquidity	-0.67	0.30	-0.61	0.52	-0.10	-0.61	1.00	
Past growth	-0.06	-0.41	-0.12	-0.06	0.46	0.00	0.12	1.00

*denotes very strong correlation coefficient.

Table A.8. Correlations between independent variables, LLC 2003

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.22	1.00						
Leverage	0.52	-0.16	1.00					
Earnings variability	0.05	0.14	-0.42	1.00				
Beta _{sp}	-0.42	0.09	-0.23	0.52	1.00			
Social capital _{sp}	-0.04	-0.18	0.04	-0.28	-0.25	1.00		
Liquidity	0.02	-0.14	-0.09	0.16	0.00	-0.11	1.00	
Past growth	0.17	-0.31	0.27	-0.68	-0.72	0.20	-0.07	1.00

*denotes very strong correlation coefficient.

Table A.9. Correlations between independent variables, LLC 2004

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.11	1.00						
Leverage	0.19	0.15	1.00					
Earnings variability	0.07	0.15	0.95	1.00				
Beta _{sp}	0.08	0.22	0.45	0.44	1.00			
Social capital _{sp}	0.05	0.20	-0.05	-0.04	0.04	1.00		
Liquidity	-0.03	-0.07	0.02	0.01	-0.02	-0.95	1.00	
Past growth	-0.02	-0.33	-0.56	-0.58	-0.26	0.02	0.01	1.00

*denotes very strong correlation coefficient.

Table A.10. Correlations between independent variables, Prior to LLC transformation.

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	-0.59	1.00						
Leverage	-0.46	0.55	1.00					
Earnings variability	0.17	0.27	0.12	1.00				
Beta _{sp}	0.02	-0.31	-0.05	-0.10	1.00			
Social capital _{sp}	-0.05	0.01	0.18	-0.01	-0.13	1.00		
Liquidity	0.26	-0.17	-0.17	0.10	-0.16	-0.18	1.00	
Past growth	0.14	-0.13	0.10	-0.27	-0.10	-0.09	0.18	1.00

*denotes very strong correlation coefficient.

Table A.11. Correlations between independent variables, after LLC transformation.

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.29	1.00						
Leverage	0.47	0.04	1.00					
Earnings variability	0.69	-0.15	0.79	1.00				
Beta _{sp}	0.22	-0.60	0.52	0.80	1.00			
Social capital _{sp}	-0.56	-0.01	0.10	-0.09	0.08	1.00		
Liquidity	0.75	0.62	0.32	0.37	-0.11	-0.49	1.00	
Past growth	-0.17	0.31	-0.20	-0.16	-0.11	0.04	0.09	1.00

*denotes very strong correlation coefficient.

Table A.12. Correlations between independent variables, Combined Pure NGCs

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.21	1.00						
Leverage	0.14	0.73	1.00					
Earnings variability	0.17	0.97	0.71	1.00				
Beta _{sp}	-0.07	-0.35	-0.26	-0.37	1.00			
Social capital _{sp}	-0.05	-0.12	-0.12	-0.13	0.07	1.00		
Liquidity	-0.01	0.00	-0.01	0.01	0.01	-0.02	1.00	
Past growth	-0.17	-0.89	-0.64	-0.89	0.34	0.11	-0.01	1.00

*denotes very strong correlation coefficient.

Table A.13. Correlations between independent variables, Combined LLCs

	Asset size	Dividend payout ratio	Leverage	Earnings Variability	Beta _{sp}	Social capital _{sp}	Liquidity	Past growth
Asset size	1.00							
Dividend	0.16	1.00						
Leverage	0.29	-0.07	1.00					
Earnings variability	-0.02	0.08	0.24	1.00				
Beta _{sp}	-0.41	0.07	0.05	0.51	1.00			
Social capital _{sp}	-0.02	0.06	-0.01	-0.16	-0.16	1.00		
Liquidity	0.03	-0.09	-0.08	0.08	-0.02	-0.41	1.00	
Past growth	0.08	-0.33	-0.07	-0.56	-0.45	0.09	-0.03	1.00

*denotes very strong correlation coefficient.

Table A.14. Variables removed from equation (14) due to high correlation coefficients.

Type	Period	Variables removed
Pure NGCs	1996	Dividend payout ratio, leverage
	1997	Earnings variability, leverage
	1998	Dividend payout ratio, leverage
	1999	Dividend payout ratio, leverage
	2000	Dividend payout ratio, leverage
Pure NGCs to LLCs	2001	Asset, dividend payout ratio, leverage
	Prior	Asset, dividend payout ratio, leverage