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# Are two heads better than one head in managing the farm business?

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**Abstract:** The objective was to compare the performance of farms that have more than one self-identified manager to the performance of similar farms with only one self-identified manager. The question to be answered is whether more managers enhance the performance of the farm. The technique used is a matching technique to compare similar farms which only vary in whether they have only one or more than one manager. The data set used was the New York Dairy Farm Business Summary data from the years 1998 through 2011. The partnerships as a group did not display higher or lower returns to labor and management income per operator compared to the sole proprietorships. A comparison of parent-child partnerships to non-parent-child partnerships resulted in the non-parent-child partnerships showing \$36,442 more labor and management income per manager. The conclusion is that two or more heads for management are better than one head for management, as long as the two heads does not include a parent and child. The results suggest that further data collection and studies that explores the management styles and practices of the non-family partnerships as compared to the family partnerships is warranted.

**Keywords:** Business partnerships; economies of management; family businesses; matching samples; return to management

**JEL:** L25, L26, M10, M21, Q12

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## **I. Introduction**

Partnerships are often used as a vehicle for succession when the next generation is brought into the family business.<sup>1</sup> At other times partnerships are used by siblings to support a larger business. Unrelated individuals may also operate with a partnership. The question is whether more than one manager enhances the performance of the business. More than one manager might lead to better management decisions either through joint decisions or by specialization of management tasks. Alternatively, more than one manager might lead to management conflicts resulting in lower business performance. Adding partners may also lead to dilution of earnings, especially in small businesses. The net impact may also be different if the partner is a child rather than a sibling or non-related individual.

The purpose of this research is to look at a group of businesses in a specific locality (New York) that produce a common commodity (milk) to determine if partnerships are more or less profitable than sole proprietorship. The intent is to compare the performance of farms with more than one manager to similar farms that only have one self-identified manager to determine whether there are increasing returns to management. That will be accomplished by matching similar partnership and non-partnership farms and comparing performance. The empirical results show that the partnerships as a group did not display higher or lower returns per operator compared to the sole proprietorships. However, a comparison of parent-child partnerships to non-parent-child partnerships resulted in the non-parent-child partnerships experiencing higher returns per manager.

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<sup>1</sup> Although I will use the term partnership throughout this paper the data that will be analyzed will be multiple operator farms which may be legally organized as a partnership or a corporation. The legal form is a management decision.

## II. Review of Literature

The literature comparing returns in sole and multiple managed businesses is scant, although research of the influence of family involvement on firm financial performance in publicly traded companies has been extensive. A review of this literature reveals mixed empirical evidence, although on average family involvement appears to have a small positive impact on firm performance (Gomez-Mejia, Cruz, Berrone and de Castro, 2011). Anderson and Reeb (2003) investigate the relationship between founding-family ownership and firm performance in S&P 500 companies and find that family firms perform better than nonfamily firms. These studies and others use data from larger companies than the typical family business and thus do not address the issue of management in the small non-publicly traded company.

Sciascia and Mazzola studied 620 privately held firms in Italy and found a negative relationship between family involvement in management and performance, but did not find any association between family involvement in ownership and performance. The implication is that family ownership of a business works well but not family management of the business. Hamelin (2013) finds that family owned small businesses experience low rates of growth and suggests that families have a tendency to limit business growth by adopting conservative growth behavior. However, Berent-Braun and Uhlaner (2012) studied 64 family businesses from 18 countries and find that when family members are unified in their actions that the financial health of both the family business and the business-owning family appears enhanced.

Barbera and Moores (2011) use a production function approach and find little difference in the total productivity of family and non-family business firms, although labor in the family business generated lower returns. Their approach was covered by Johannes and Mbebeb (2013) on family and non-family firms in Cameroon and found that family firms and even those

managed by families are on average less productive than externally managed firms and non-family firms.

An extensive literature has developed on team economics beginning with the seminal work by Holmstrom (1982), who discussed the moral hazard issues of free riding and competition. Block (2011) calculated optimal compensation contracts of nonfamily managers employed by family firms using principle-agent analysis. He concluded that contracts of family managers should include relatively greater incentives in terms of short-term performance measures. A review of research on teams can be found in Cohen and Bailey (1997) and more recently in Mathieu, Maynard, Rapp and Gilson (2008).

There is limited work on the financial returns to sole proprietorship farms compared to multiple managed farms including family partnerships. Mishra and Morehart (2001) studied the factors affecting the returns to labor and management on U.S. dairy farms and included as a variable whether the dairy farm was operated as a sole proprietorship and found that the sole proprietorship earned \$4,720 less than the multiple operated farms, where the average return was \$44,029.

### **III. Modeling Net Returns in Multiple Managed Businesses**

The utility  $U$  for a manager in a business can be specified as:

$$U=U(NR(L,S,P,F), L(S,P,F),F)$$

where  $NR$  is the net financial return to the manager and  $L$  is leisure;  $S$ ,  $P$ , and  $F$  are dichotomous variables representing a sole proprietorship, a non-parent-child partnership, and a parent-child partnership, respectively. As typical, utility is assumed increasing in  $NR$  and  $L$ , but that  $NR$  is decreasing in  $L$  such that with more leisure, fewer hours are available and used to manage and

operate the business. The impact of  $F$  on utility depends upon the impacts of the direct and partial derivatives. It is reasonable to assume  $\partial L/\partial F > 0$  and hopefully  $\partial NR/\partial F > 0$  and  $\partial U/\partial F > 0$ , although in a dysfunction parent-child the former derivative could be negative and the individual might remain in the parent-child business given offsetting effects from the first two positive derivatives.

If  $\partial NR/\partial P > \partial NR/\partial S$  and  $NR/\partial F > \partial NR/\partial S$ , then the presence of more than one manager (in either the non-parent-child or parent-child partnership) enhances  $NR$ . However, if  $\partial U/\partial F > 0$  and assuming  $\partial L/\partial P = \partial L/\partial F$ , then  $\partial NR/\partial F < \partial NR/\partial P$ , or net return of the parent-child partnership would be lower than a non-parent-child partnership such that the manager would be indifferent between a non-parent-child partnership and a parent-child partnership.

The hypothesis to be tested then is whether non-parent-child partnerships have higher managerial return per manager than parent-child partnerships which in turn have higher financial returns than sole proprietorships, although given the utility received from membership in a parent-child business, the net return of the parent-child partnership may be greater or lower than a comparable sized sole proprietorship. Any greater net return for the manager in a multiple managed business is presumed to be the result of scope economics to management, such that the interaction of managers, team management, or division of management responsibilities increases the return to each individual manager.

#### **IV. Estimating Returns to Management in Multiple Managed Businesses**

One method to measure the difference in performance between two distinct groups is matching samples, first proposed by Cochran (1953) and also Billewicz (1964), and further developed in economics by Rubin (1974), and Heckman, Ichimura and Todd (1997). The process entails

finding matching samples of individuals that were subject and not subject to a treatment, mimicking random placement into treatment and control groups, and comparing differences in performance. The assumptions necessary for effective evaluation after sorting into treatment and not treatment groups are that there is overlap in the characteristics of both groups to mimic random placement into treatment and control groups which would occur under experimental control (Imbens, 2004).

The application here is not a classical treatment regime, like a drug test, or educational impact, but rather to measure the performance differences between two types of businesses. We would like these businesses to be identical except that one of the businesses is operated as a sole proprietorship and the other business is operated as a partnership. Management benefit accruing because of a partnership organization rather than a sole proprietorship should be manifested in the performance variable, so matching must not be based on any management decision other than operating as a partnership.

The estimation procedure of matching samples we use is specified in Abadie, Drukker, Herr and Imbens (2004), and implemented in the STATA software command “nnmatch”. Let the observed measured performance be denoted by  $Y_i$ , so that:

$$Y_i = Y_i(W_i) = \begin{cases} Y_i(0) & \text{if } W_i = 0 \\ Y_i(1) & \text{if } W_i = 1 \end{cases}$$

Where  $W_i = 1$  if the business is a partnership and  $W_i = 0$  if the business is not a partnership, where only one of the states occur empirically for any specific business. The average treatment effect is then:

$$AT = \frac{1}{N} \sum_{i=1}^N (Y_i(1) - Y_i(0))$$

where each partnership is compared to a matching non-partnership

and vice versa, with  $N$  the total number of businesses. In practice each business may be

compared to m number of matching businesses and vice versa. We use m=4 given that Abadie and Imbens (2002) found four matches perform well in terms of mean-squared error.

In the treatment literature two additional types of matching can be performed. One is to compute the average treatment effect of the treated and the other is the average treatment effect of the control. The first is estimated to determine what the impact would be if the treated ceased to be treated. The second is estimated to determine what impact would occur if the control was treated. These are interesting and useful concepts when opportunities exist to easily cease or begin a treatment, but the purpose here is not to determine the impact of forming or dissolving a partnership, which has significant costs of formation or dissolution, but rather to only determine whether the partnership with more than one manager produces greater returns to management.

Matching is done based upon a set of k variables. Given that more than one variable is used to match businesses, a weighting matrix is needed to find closest matches. The weighting index used is the k by k diagonal matrix of the inverse sample standard errors of the k variables in the matching list. This allows for normalization of the variables by their standard deviations and thus the distance is unit free in standard deviations. If a base business has covariate values indicated by x, and a potential match for that business has covariate values s, then  $\|s-x\|_v$  represents the distance between vectors s and x. The closest 4 businesses are matched.

## **V. Data**

Data are from the New York Dairy Farm Business Summary (DFBS) for the years 1998 through 2011 (Knoblauch, et. al, 2011). This is a voluntary farm record project primarily meant to assist dairy farmers in managing their operations and represents a sample from a population of farmers that actively participate in agricultural extension and research programs. The farms in this data

set are larger than New York dairy farms on average and they experience higher levels of production per cow. It is also an unbalanced data set since farms can participate in some but not all years. The number of farms participating each averaged 246. We use the data for all farms and all years.

The variables are summarized in Table 1. The performance variable used was labor and management income per operator/manager. This value reflects the earnings of the managers from the labor and management they provide to the business after all other paid and unpaid factors are subtracted from net farm income. Net farm income was measured on an accrual basis. Appreciation of real estate was excluded as income since asset appreciation is believed to be outside the control of the manager or management team. The total cost of production includes the opportunity cost of equity capital and unpaid family labor not recorded as a manager. Labor and management income per operator is indexed to the year 2011 using the CPI. Labor and management income per operator averaged \$48,651 over the period in 2011 dollars.

One control variable used for matching is the number of cows on the farm since past research has shown that business performance does vary by the size of the dairy farm, possibly from technology differences (Mosheim and Lovell, 2009). The average number of cows on these farms was 334. The farm size with just one manager ranged from 17 to 3,605 cows with an average number of 317 cows. The farm size with more than one manager ranged from 22 to 3,656 cows with an average number of 447 cows. There was considerable overlap of the distribution of cows between single and multiple manager farms.

Another variable used to match similar farms was the number of full time equivalent workers on the farm, including operators, which averaged 8 over this period. This insures that comparison farms have a similar number of total workers since operators may complete some

manual tasks in addition to management, especially on smaller farms. The farm operators in our data are full time farmers, although some may have spouses who work off the farm.

Only data from the same year were used in matching farms because agriculture production performance and prices can vary significantly from year to year. Thus three variables used to match farms – number cows, number of workers, and year. A number of other farm characteristics such as the type of milking system, barn type, record system, and cropping system are collected, but these are clearly the result of management decisions and the intent is not to determine how partnerships may manage differently at this time, but rather whether the management in partnerships leads to greater or lower returns to managers. The number of cows to milk is also a management decision but this variable was used as a proxy for farm size given the possible economies (Mosheim and Knox, 2009).

The DFBS allows up to 6 managers to be recorded. Any farm that identified more than one manager was identified as a partnership. The number of sole proprietor observations over the time period numbered 1,581 while the number of partnership observations over the time period numbered 1,858 as summarized in Table 2. Further analysis was done on whether the partnerships were parent-child or not a parent-child partnership. The DFBS does not make this identification but the age of the various managers are recorded. A partnership that included any partner that was 21 or more years younger than the next youngest partner is designated a multiple-generation partnership which we label as a parent-child partnership, although in a few cases these may be unrelated individuals. The number of parent-child partnership observations then numbered 1,643, while the number of non-parent-child partnership observations numbered 215.

## **VI. Results and Discussion**

Four different comparisons were performed: (1) difference in labor and management income of partnerships compared to sole proprietorships, (2) difference in labor and management income for parent-child partnerships compared to sole proprietorships, (3) difference in labor and management income of non-parent-child partnerships compared to sole proprietorships, and (4) difference in labor and management income of parent-child partnerships compared to non-parent-child partnerships. The empirical estimates of these comparisons are reported in Table 3. In all cases the difference is relative to the labor and management income of the manager of the sole proprietorship farms.

Statistically, the partnerships collectively did not experience any difference in labor and management income per operator compared to the sole proprietorships, although numerically the non-parent-child partnerships produced \$36,419 more labor and management income per operator than did sole proprietorship (probability=0.16) and parent-child partnerships produced \$2,835 less labor and management income operator than did sole proprietorships. Because of those differences a comparison of parent-child partnerships to non-parent-child partnerships resulted in the non-parent-child partnerships showing \$36,442 more labor and management income per manager, and this difference was statistically significant at the probability level of 0.03.

Thus it appears that non-parent-child partnerships result in greater returns to management compared to the solely managed farm, while parent-child partnerships result in lower returns to management compared to solely managed farms. This may be the result of division of management responsibilities or management relationships in partnerships without children managers such that returns are enhanced. Although not documented in the data, some dairy

partnerships divvy out management of crops to one partner and management of cows to another partner, and possibly young stock management to a third partner. In other cases one partner may be responsible for purchases and sales (marketing) while another partner may be responsible for production. Partnerships with children as partners might also follow these same division of management patterns, but with a child there may be a management learning curve that results in lower returns to management. Unfortunately the data set employed does not contain the necessary information to ferret out these various arrangements or relationships to test which might be the most effective since the data set mostly includes income and balance sheet information.

## **VII. Conclusion**

This paper investigated whether the partnership is more profitable than the sole proprietorship of the same size using dairy farm data over the period 1998 through 2011. This was tested by matching partnership and sole proprietorship farms of the same size and comparing the earned returns to the manager's labor and management.

Statistically, the partnerships as a group did not display higher or lower returns to labor and management income per operator compared to the sole proprietorships. However, a comparison of parent-child partnerships to non-parent-child partnerships resulted in the non-parent-child partnerships showing a statistically significant \$36,442 more labor and management income per manager.

These results suggest that further data collection and studies that explores the management styles and practices of the non-family partnerships as compared to the family partnerships is warranted.

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Table 1. Definition of Variables for Matching Samples

Variable	Mean	SD
Labor and Management Income per Operator (2011 dollars)	48,651	20,343
Number of Cows	334	408
Worker Equivalent (Number of workers converted to full time years)	7.96	8.26
Year (1998 through 2011)	NA	NA

Table 2. Number of Sole Proprietorships and Partnerships  
Observations from the New York Dairy Farm Business Summary,  
1998 through 2011

Type of Business	Number of Observations
Sole Proprietorships	1581
Partnerships	1858
Parent-Child Partnerships	1643
Non-Parent Child Partnerships	215
Total Number of Observations	3439

Table 3. Impact of Partnership Organizational Form on Labor and Management Income per Operator on New York Dairy Farms

Estimate of Average Treatment Effect	
Difference in labor and management income for all partnerships over all sole proprietorships (in real 2011dollars)	
Estimate	-2,964
Standard Error	6,656
z-Score	-0.45
Probability	0.66
Difference in labor and management income for non-parent-child partnerships over all sole proprietorships (in real 2011 dollars)	
Estimate	36,419
Standard Error	25,648
z-Score	1.42
Probability	0.16
Difference in labor and management income for parent-child partnership over all sole proprietorship (in real 2011 dollars)	
Estimate	-6,855
Standard Error	9,469
z-Score	-0.72
Probability	0.47
Difference in labor and management income for parent-child partnerships over non-parent-child partnerships (in 2011 real dollars)	
Estimate	-36,442
Standard Error	16,899
z-Score	-2.16
Probability	0.03