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Full Length Research Paper

How do managers improve farm performance during the economic slowdown: Survey results from New York agribusinesses

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This paper examines factors that affect agribusiness management behavior of a sample of dairy, equine, beef cattle, and hog farms in New York State to understand how they survive the ongoing economic hardship. Using a conceptual framework and a Heckman Selection model, this study analyzes the impact of managers' perceived pressure from the unfavorable economy, their personal traits and their self-assessed managerial skills on farm adaptation strategies and their help-seeking activities to agribusiness assistance programs. The analysis of self-assessed management skills led to three distinct management styles, labeled as production experts, marketing experts, and finance experts. The results demonstrate that managers who held a leadership position in agricultural organizations are more likely to feel pressure. This pressure negatively affects management actions to adapt the farm to the adverse economy. Our results suggest that the New York agricultural policy planners should address this negative impact of the current economic difficulties on farming practices to effectively support the economic health of its agricultural industry.

Key words: New York agribusiness, farm performance, economic slowdown, economy.

INTRODUCTION

Agribusiness researchers have lately recognized the role of managerial inputs in farm-level production. Some consider it a fourth factor of production after land, labor and capital and that they argued that without this new factor, production efficiency can be haphazard (Nuthall, 2006). On the one hand, the efficient use of scarce resources demands a high-level of key managerial skills. On the other hand, mounting evidence has shown that farm profitability varies with managerial skills. For example, New York dairy farms documented higher average return on assets (ROA: 6.46 vs. 3.51) if they managed to use an advanced farm finance practice (Gloy et al., 2002). Dairy farmers who focus on maximizing milk production per cow generate a lower ROA (3.33%) than those who practice a more advance method of accrual accounting (5.04%) (Gloy et al., 2002). Managerial skills are thus believed to determine the important portion of a farm's economic returns (Boehlje and Eidman, 1984).

During unfavorable economic situations, managerial skills surmount other production factors to help agribusinesses adapt to the new environment (Davis-Brown and Salamon, 1987; Schulman and Cotten, 1993; Franks, 1998). Several studies have examined the managerial survival tactics farms utilized to sustain economic difficulties. Brake and Boehlje (1985) categorized three specific adaptations that farms usually use during hard economy:

1) Increasing or stabilizing net income;
2) Restructuring liabilities; and
3) Restructuring assets.

Typical survival tactics they examined included off-farm work, part-time farming, land rental and selling land, and expenditure reduction. Social scientists have further identified farming units that experienced significant financial stress. Among them, Bultena et al. (1986) analyzed survey information gathered from 1,040 Iowa farms and concluded that younger, better educated operators of larger units are most likely to feel financial

stress. Besides financial difficulties, impact from psychological stress (or emotion stress) caused by reduced teamwork and farmers' worry about low returns is documented by family economists (Weigel and Weigel, 1987).

Though farm survival strategy studies have analyzed how farms practice specific tactics, little is known about what factors drive management behavior. Are these behaviors resulted from a variation in managerial skills, or they are caused by managers' personal characteristics, or behaviors result from farm traits? How do farmers rate their own management skills to survive economic difficulties? Are farmers with high self-assessed skills more likely to take adjustment actions or adaptations are mainly caused by high financial pressure? Which groups of farmers have the greatest likelihood of being financially stressed? Answers to these questions will serve agribusiness assistance programs to formulate strategies to aid the short- and long-term economic health of farm businesses. Findings are also critically useful for policy planners to devise macro-level agribusiness policies during the economic slowdown. This paper develops a two-step conceptual framework and uses a Heckman selection econometric approach to predict factors that affect managerial behavior of farm adjustments to enhance overall farm performance. Factors explaining farmers' participation in agricultural assistance programs are also analyzed.

Findings of this study are especially useful to New York state agribusiness administrators due to the fact that the current economic situation in this state have particularly demanded agribusinesses to make timely adjustments. Without a quick and efficient adaptation, businesses may be quickly marginalized. For instance, a dramatic milk price drop has threatened the financial viability of dairy farms in this region. In June 2009, dairy farms received a price hit of $11.5 per hundred weight, the lowest since 2006, down over $7 from a year earlier, and fell short to cover average operating costs of $17 per hundred weight (DiNapoli, 2010). As a result, a loss of $700 million in dairy revenues was reported for 2009, forcing many dairy farms to go into foreclosure. In Jefferson County, one of the largest dairy farming counties in New York, at least 10 farms were closed in January 2009, resulted in a loss of $27 million of farm income. This enormous loss of dairy income have created a ripple effect on the entire New York economy, hurting feed suppliers, service providers, and the sales tax base of the state (DiNapoli, 2010).

In a wider scope, the economic difficulty has greatly threatened the entire agricultural industry in New York and the U.S. (Thraen, 2010). Smaller farms from various agricultural sectors in different states have especially reported a detrimental impact (Thraen, 2010). Unlike large agricultural enterprises who are able to generate a higher return to offset the costs of production, smaller farms nationwide are mostly experiencing significant economic losses (MacDonald et al., 2007; Nehring et al., 2009) and they are looking for agricultural planners to provide them efficient assistance. This study emphasizes management efficiency of these small agribusiness farms. The purpose of this paper is to analyze factors that affect agribusiness management behavior of a sample of dairy, equine, beef cattle, and hog farms in New York State to understand how they survive the ongoing economic hardship.

LITERATURE REVIEW

Historically, commentators argued that managerial skill is determined by genetic traits of a manager's personality, a predominantly intrinsic orientation too difficult to alter (Johnson et al., 1961; Gasson, 1973). Lately, psychologists detected that gene determines only a little of (33 to 34%) personality traits. Rather, social settings and trainings reshape personality (Borkenau et al., 2001: 150; Matthews et al., 2003). Being aware of this, agricultural economists have argued that necessary trainings should be provided to less-skilled farm managers to help enhance managerial skills (Ohlmer et al., 1998; Nuthall, 2001). For example, Nuthall (2001: 248) stated that "individual (social) behavior and learning are clearly related to managerial ability". Thus, it is critical to appreciate farm managers' psychological aspects and develop necessary programs to aid learning.

In general, behavior reflects attitudes and objectives. And on the farm, managerial behavior can be assumed to reflect entrepreneurial goals (Boehlje and Eidman, 1984; Rougoor et al., 1998; Bergevoet et al., 2004). Bergevoet et al. applied the theory of planned behavior to examine how farmers' goals motivate managerial behavior. Their study of Dutch dairy farmers concludes that important farming goals, ranked from the highest to lowest, include "Enjoy my work", "Produce a good and safe product", "Work with animals", compared to goals to "realize an income as high as possible" which was ranked less important and the highest goals inspire managerial behavior. In terms of self-perceived actions planned to achieve these goals, "lowering cost", "producing high [output]", and "negotiating with buyers and suppliers" registered strongly on large and modern farms.

Farm managers operate the farm to adjust it to changes in a broad management environment of which Boehlje and Eidman (1984: 670) defined as having four dimensions of:

1) The institutional environment such as regulations on water, land and air pollutions;
2) The social environment such as the farm family;
3) The physical environment such as weather and technology availability; and
4) The economic environment such as prices of inputs and outputs.

To make timely and efficient changes, a skilled manager

must have a certain quality and appropriate personal characteristics and skills in order to "deal with the right problems and opportunities in the right moment and in the right way" (Rougoor et al., 1998: 262). A manager's cognitive and intellectual skills were listed, together with personal drives, motivations and biography, as the foremost factors contributing to farm success (Rougoor et al., 1998).

During unfavorable economic situations, managers perceive economic pressures and make corrective actions. Farm characteristics were used to explain pressure. Managers of sheep and crop farms were found to be more likely to feel economic pressure than dairy farm managers (Franks, 1998). Conversely, Walker and walker (1988) detected that dairy farmers are more likely to feel economic pressure than grain farmers. Davis-Brown and Salamon (1987) revealed that entrepreneurial farms are more likely to cope with economic stress than family farms, for which farm failure is also perceived as the failure of the individual manager. Economic hardship was believed to be a main reason for small and medium farms managers to work off farm (Albrecht et al., 1987). This may be explained by the fact that larger farms with bigger acres are less likely to feel pressure due to their stronger buying and selling bargaining powers (Runge, 1986; Rosenblatt and Keller, 1983). Besides the aforementioned factors, demographic features such as age, education, gender, farming experience are well documented as variables to explain perceived economic pressures (Weigel and Weigel, 1987; Walker and Walker, 1987; Weigel, 1981; Runge, 1986; Schulman and Cotten, 1993). For example, age is negatively related to North Carolina farmers' adaptation actions to economic hardships (Walker and Walker, 1987; Weigel and Weigel, 1987); men are more worried about keeping up with new production technologies and women are more concerned about farm community involvement (Walker and Walker, 1987); years in farming and participation in farming organizations positively correlated with managers' perceived economic pressure (Davis-Brown and Salamon, 1987).

In the sociology and rural studies literature, age, education, gender, and farming experiences are popularly used variables to explain managerial actions taken (Jose and Crumly, 1993; Schulman and Cotten, 1993; Rougoor et al., 1998; Meert et al., 2005). For instance, Jose and Crumly (1993) studied men and women's psychological types and concluded that women farmers take more actions to achieve goals. In addition, membership status in farming organizations measures farmers' strength of the social network ties and explains farmers' management behavior. Farmers who have stronger social network ties are more likely to diversify management activities (Meert et al., 2005). Only a few studies have attempted to understand the linkage between managerial skills and management behavioral changes. Hedges (1963) revealed that capable managers are more willing to learn; they are self-confident and decisive to take actions. Responsible managers were also found to be more active in making adaptive changes (Bigras-Poulin et al., 1982; Goodgers et al., 1984).

METHODOLOGY

The conceptual model

Building on the literature, this study presents a conceptual framework to describe a two-step agribusiness management action-taking procedure (Figure 1). This framework aims to measure the impacts of selected variables on agribusiness managers' perceived pressures (step one) and their corrective actions to survive hard economic situations (step two). In the first step, five personal characteristics and four farm characteristics are selected to explain perceived economic pressure. The perceived pressure, along with personal traits and self-assessed managerial skills, are then used to explain adaptation actions taken. Selected self-assessed management skills are relevant to agribusiness production, marketing, and financial management. The theoretical framework is used to test the following four hypotheses:

H_1: Farm managerial skills affect actions taken to improve overall farm performance during the economic slowdown.
H_2: Farm managerial skills affect actions taken to seek help from agricultural assistance programs during the economic slowdown.
H_3: Managers' perceived economic pressure affects actions taken to improve overall farm performance during the economic slowdown.
H_4: Managers' perceived economic pressure affects actions taken to seek help from agricultural assistance programs during the economic slowdown.

Effects of manager's personal characteristics and farm traits on actions taken to improve farming efficiency and their help seeking to government support programs are also examined.

Econometric estimation

In the first stage, farm managers acquire information to understand the impact of the adverse economy on their farm. When information gathered exceeds a given threshold level of zero, managers may report that he/she feels "a strong pressure":

$$Y^{P*} \equiv X^{D} * \beta^{D} + \varepsilon^{D} > 0 \quad (1)$$

where X^{D} represents a vector of farm managers' demographic information of age, gender, education, farming experience, and leadership status. According to the literature, these variables explain farm perceived economic pressure. If the manager "feels a strong pressure", the perceived pressure, Y^{P} is equal to 1 with the latent variable Y^{P*} >0, and Y^{P} =0 otherwise.

In the second stage, the manager will decide whether to take corrective actions. The perceived benefits associated with the action should exceed the perceived costs of implementing it:

$$Y^{A*} \equiv X^{A} * \beta^{A} + \varepsilon^{A} > 0 \quad (2)$$

where X^{A} is a vector of farm managers' demographic information, perceived pressure and their self-assessed

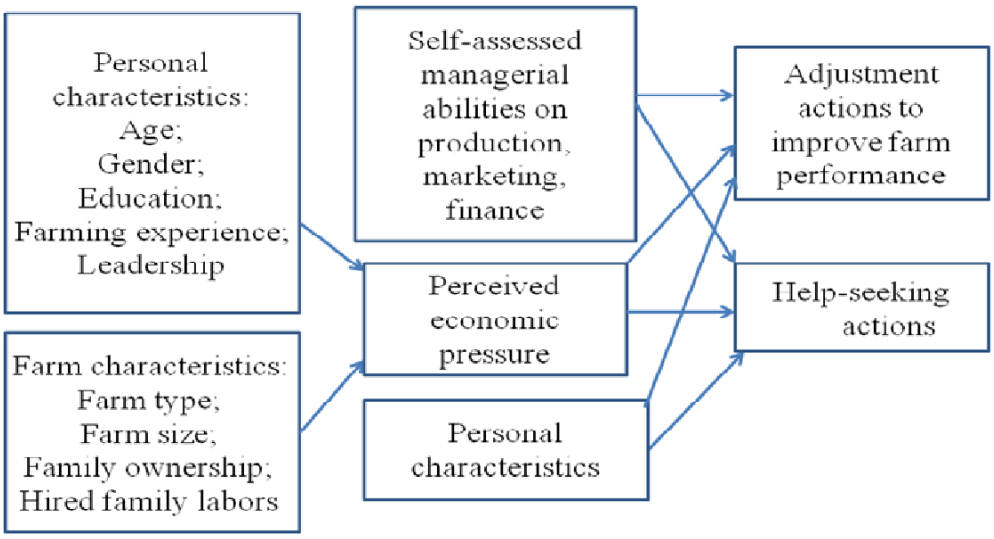

Figure 1. A conceptual model describing factors affect agribusiness managers' adjustment actions taken during the economic hardship

Management abilities. Y^A =1 if the latent variable Y^{A*} >0, and Y^A =0 otherwise. We assume that action taken is conditional on having felt pressure from the adverse economy. Thus, Y^A and X^A are observable only if Y^P =1. Assume the error terms of Equations (1) and (2) follow a bivariate normal distribution:

$$\{\varepsilon^P, \varepsilon^A\} \sim BVN(0,0,\sigma,1,\varepsilon^A,\varepsilon^P)$$

where $\rho = corr(\varepsilon^A, \varepsilon^P)$. The conditional probability of actions taken is given by (Heckman 1976):

$$prob(Y^A = 1 \mid Y^P = 1) = E[Y^A \mid X^{AA}\beta > 0] = \Phi(X^{AA}\beta) + \rho\lambda_i(\alpha_i) \quad (3)$$

Where:

$$\alpha_i = -\frac{X_i^A \beta^A}{(\sigma^A)^{1/2}}, \lambda_i = \frac{\varphi(\alpha_i)}{1-\Phi(\alpha_i)} \quad (4)$$

where φ and Φ represent the cumulative distribution function and probability density function of a univariate normal distribution. λ is the inverse Mills ratio, which is the correlation between the PRESSURE (stage 1) and the ACTION (stage 2) equations. Equation (3) follows a truncated bivariate normal distribution. The estimate of the marginal effect on the conditional action probability is given by:

$$\frac{\partial prob(Y^A = 1 \mid Y^P = 1)}{\partial x_j} = \varphi(X^A\beta^A)\beta_j^A + \rho\beta_j^P(\lambda_i\alpha - \lambda_j) \quad (5)$$

The maximum likelihood estimates of parameters β^A, β^P and ρ can be obtained by maximizing the following log-likelihood function:

$$\begin{aligned} \mathrm{LN}L = & \sum_{Y^A=1,Y^P=1} \mathrm{LN}\Phi_2[X^A\beta^A, X^P\beta^P, \rho] \\ & + \sum_{Y^A=1,Y^P=0} \mathrm{LN}\Phi_2[X^P\beta^P, -X^A\beta^A, -\rho] \\ & + \sum_{Y^P=0} \mathrm{LN}\Phi_2[-X^P\beta^P] \end{aligned} \quad (6)$$

where Φ_2 is the bivariate normal cdf $\Phi(-X^P\hat{\beta}^P, -X^A\hat{\beta}^A, \hat{\rho})$.

Survey data and preliminary statistics

On-farm visits were conducted to collect questionnaire information from 51 counties in New York State in the fall of 2009. A selected list of management tactics was adapted from the management skills self-assessment checklists published by Purdue agricultural economists (Boehlje et al., 2001). This checklist includes management functions from production and marketing to financial management, and from risk management to farmers' leadership abilities. Respondents were asked to rate their skills on a Likert-type scale of 1 to 5. The goal of the questionnaire is to collect information to understand factors affecting management actions taken and to stimulate thinking and communicate useful management practices proposed by agricultural economists to real world farm managers. This communication may contribute to the adoption of effective practices that may lead to improved operation efficiency.

A total of 285 questionnaires were collected from livestock producers of dairy (127 farms), equine (145 farms), beef cattle (65 farms), hogs (30 farms), other animal producers (47 farms), corn

Table 1. Preliminary statistics of surveyed farms and farm managers (Data, fall 2009).

Farm manager characteristics	Mean	Standard deviation
Age	45-54 years	11
Gender	61% (male)	0.48
Education	2-year college	2.1
Years in Farming	24.5 years	2.1
Years of family farm	39.6 years	34.5
Household size	4.4	3.86
Leadership position	34.5% (have a position)	0.47
Farm characteristics (number of animals own)		
Cow farm (127 farms)	286	528
Horse farm (27 farms)	188	337
Beef (65 farms)	32	42
Hog (30 farms)	11	16
Other farm (47 farms)	77	132
Number of acres own		
Total acres own (214 farms)	289	454
Total acres rent (111 farms)	304	814

growers (119 farms), and soybean growers (42 farms). The number of farms does not total 285 because responses were not mutually exclusive. A total of 282 useful observations are used in this analysis. Preliminary statistics is presented in Table 1. Our surveyed managers are between 45 and 54 years old and 61% are male. On average, our respondents have a 2-year college degree. This education is higher than the New York State county-level statistics on the overall population (not just farm managers) which shows that about 30% of the rural population has completed high school and 20% completed a 2-year college (USDA, ERS, 2000). Thus, on average, our surveyed agribusiness managers have an education that is above the average level in the rural New York population. Our surveyed managers have extensive farming experience. On average, the surveyed managers have worked over twenty four years with a very small standard deviation of about two years. On average, they manage a farm of 40 years of family history and a household size of four family members. About 35% of our respondents hold at least one leadership position in local, state or national agribusiness organizations. This percentage is consistent with survey results from a nationwide interview with U.S. crop expendable input producers in Indiana, Iowa, Nebraska, and Illinois (35%) (Xu et al., 2009).

The two farm traits variables we included are number of animal owned and acres owned. Our sample contains more small to mid-size dairy farms and has only a small percentage of both very small farms (own less than 50 cows, 22 farms) and large farms (own 1000 cows or more, 8 farms). According to Tauer (2001), on average, very small dairy farms (50 cows or fewer) in New York are less efficient than larger farms (500 or more cows). However, Tauer also noted that the frontier production cost for a 50-cow farm was only slightly greater than the cost for the larger farms and that efficient small dairy farms can compete with larger farms (Tauer, 2001; Tauer and Mishra, 2006). Given our dairy samples are mainly from small to mid-size dairy farms, we propose managerial skills can contribute to the economic efficiency of these farms. On average, equine farms own 188 horses with a noticeable variation of 10 small farms which own less than 50 horses and seven large farms own over 200 horses. Among the 282 surveyed farms, 214 reported that they own land (289 acres on average) and 111 reported that they rent land (304 acres on average). Table 2 presents statistics regarding the top three self-assessed management skills and the top-three most important skills. We only selected three highest-scored skills, from a list of seven or more skills. After presenting to our respondents the list of researchers proposed useful management skills, we asked them “How do you rate your own skills based on a Likert type scale of 1 to 5?” We then asked them to choose, from the same list, the three most important skills. We found that the top three self-assessed production management skills are the same as the selected three most important skills. This indicates that our respondents believe that “the farm production management skills we currently have” are “the most important production management skills”. Specifically, the mean rating for the skill of “knowing what factors contribute to quality” is 3.7/5.0 (n=277). 64% of our respondents perceived this skill as the second most important skill in production management, next to the ability to “quickly identify problems and take corrective actions”, which was perceived by 71% of the respondent as the most important skill.

Farm managers on average rated themselves as having relatively low marketing skills (mean=2.8/5.0). 91% of the respondents reported that they believe “developing a positive relationship with suppliers” is the most important marketing skill. The average self-assessed rating for this skill is 3.7/5.0. 84% of the respondents reported that “using group buying with 2 to 3 other farmers” are important marketing skills. However, the self-assessed rating for this skill is low (2.6/5). Compared to the relatively low rating of risk management skills (mean=2.8/5.0), the mean rating for leadership skills and financial management skills is higher, 3.1/5.0 and 3.0/5.0, respectively. In general, the surveyed respondents reported low ratings for their management skills (lower than 4.0/5.0 on average). This may indicate a potential high demand for agricultural assistance to sharpen the desired skills.

RESULTS AND DISCUSSION

Basic statistics for selected variables in the Heckman

Table 2. Top-three self-assessed skills vs. the top three most important skills on production, marketing, finance, leadership and risk management (Data, 2009 fall).

Top-three self-assessed	Mean	STD	Top-three most important	%
Production Skills (mean=3.0)			**Production Skills (based on % chosen)**	
Know what factors contribute to quality (n=277)	3.7	0.8	Quickly identify problems and take corrective actions (n=254)	71
Quickly identify problems and take corrective actions (n=277)	3.6	0.9	Know what factors contribute to quality (n=258)	64
Know what factors contribute to production output (n=277)	3.5	1.1	Know what factors contribute to production output (n=258)	48
Marketing Skills (mean=2.8)			**Marketing Skills (based on % chosen)**	
Develop positive relationships with suppliers (n=276)	3.7	1.1	Develop positive relationships with suppliers (n=245)	91
Develop positive relationships with buyers (n=272)	3.4	1.3	Using group buying with 2-3 other farmers (210)	84
Manage price risks in buying inputs (n=274)	2.9	1.2	Manage price risks in selling farm produced products (n=210)	69
Financial Management Skills (mean=3.0)			**Financial Management Skills (based on % chosen)**	
Maintain a positive relationship with lenders (n=277)	3.3	1.1	Control cash expenditure effectively (n=255)	59
Manage income taxes effectively (n=277)	3.3	1.1	Make effective use of equity capital (253)	50
Control cash expenditure effectively (n=275)	3.2	1.1	Maintain positive relation with lender (n=250)	50
			Use an effective financial accounting system (n=250)	50
Leadership Skills (mean=3.1)			**Leadership Skills (based on % chosen)**	
Have a clear business vision (n=277)	3.4	1.1	Have a clear business vision (n=254)	58
Take responsibility for achieving results (n=277)	3.3	1	Get plans put into action (n=254)	54
Instill a sense of confidence in peers and subordinates (n=277)	3.3	1.1	Be willing to change (n=254)	49
Risk Management Skills (mean=2.8)			**Risk Management Skills (based on % chosen)**	
Maintain proper levels of life, health, property, and liability insurance	3.3	1.2	Effectively manage financial risk (n=251)	67
Develop contingency plans to deal with future uncertainties	2.6	1.5	Maintain proper levels of life, health, property, and liability insurance (n=251)	66
Use crop insurance to protect against weather risks	2.4	1.8	Maintain financial reserves (n=251)	65

selection model appear in Table 3 and estimation results from STATA are shown in Table 4. Besides the personal characteristics and farm characteristic variables, three variables are used to explain farm management skills:

1) Production expertise,
2) Marketing expertise, and
3) Finance expertise.

Factor analysis was applied to generate these variables. Principal-component factor analysis and a pattern matrix were used to compute correlations between each selected variable and the dominant factor. Rotated factor loading was computed to confirm the significance of each selected variable (Gorsuch, 1983). Three variables loaded to the factor of production expertise, representing the self-rated skills of:

1) Knowing what factors contribute to quality;
2) Being able to identify production problems and correct them; and
3) Keeping good records.

These three variables were then combined to form a new variable of production expertise. A mean value of 0.57 for the production expertise factor means that based on the three loaded production

Table 3. Summary statistics for selected variables (Data 2009 fall).

Variable name	Variable description	Variable statistics
		Mean (n=279)
Pressure	1 if perceived economic pressure >=4 (1-5 likert-scale); 0 otherwise	0.69
Action	1 if take action to improve farm performance; 0 otherwise	0.93
Assistance	1 if sought help from ag assistance program; 0 otherwise	0.27
	Personal characteristics	
Age	1 if Age>=45; 0 otherwise	0.79
Gender	1 if male, 0 if female	0.61
Education	1 if some 4-year college or above; 0 otherwise	0.33
Leadership	1 if hold at least one leadership position; 0 otherwise	0.56
	Farm characteristics	
Farming experience	Years in farming	24.56
animal farm	1 if animal farm; 0 otherwise	0.93
grain farm	1 if grain farm; 0 otherwise	0.62
hired farm labor	continuous variable: number of hired family labor	1.57
total acre	total acre own and rent (1 if >=340; 0 otherwise)	0.29
history	history of farm under family ownership	39.63
	Loaded factors (1 if rate is greater than the mean; 0 otherwise)	
Production expertise	Know what factors contribute to quality, quickly identify problems and correct them, keep good records	0.57
Market expertise	Manage selling price risks, record selling strategies, keep positive relationships with buyers, use value added;	0.60
Finance expertise	Control cash expenditure, use effective financial accounting systems, manage income taxes	0.53

variables (1 to 5 Likert type), 57% of the respondents have a mean rating above average for this factor. Using the same method, the variables for marketing expertise and finance expertise were generated. The mean rating indicates that 60% of respondents perceive themselves as having above-average marketing skills compared to 53% for financial skills. Though managers perceive themselves as having above average skills, the mean rating itself is low for all three loaded factors. Specifically, the average marketing expertise is 2.97/5.0, financial expertise is 3.2/5.0, and production expertise is 3.5/5.0.

In Table 4, the coefficient estimates for the inverse mills ratio (lambda) for the “actions to improve farm performance” variable indicate that the conditional model specification is appropriate for the two-stage (the first stage of perceived economic pressure and the second stage of action taken) specification. The null hypothesis that the coefficient for the inverse mills is equal to zero is rejected. There is a pronounced selection bias problem in estimating the “action function” if the function is estimated separately, that is not estimated with the “pressure function” (Heckman, 1976). The first stage model of “perceived pressure” was not significantly correlated with the second stage of “seek for assistance function”, which indicates that the selection bias problem will not be significant if we only use the subsample of

Table 4. Heckman selection model results (Data, 2009 fall).

Parameter	Pressure	Actions to improve farm performance	Seek for assistance
(n=229)	Phrase 1: factors affect pressure	Phrase 2: factors affect actions to improve farm performance	Phrase 2: factors affect assistance-seeking
Constant	0.027(0.06)	1.256*** (7.50)	0.256 (0.80)
Age	0.315(1.40)	-0.052(-0.82)	-0.104(-0.91)
Gender	0.202(0.99)	-0.069(-1.34)	-0.033 (-0.36)
Education	-0.031(-0.16)	0.031(0.66)	-0.007 (-0.08)
Leadership	0.178* (1.74)	-0.022(-0.85)	0.053 (1.18)
Farming experience	0.001(0.25)	0.001(0.31)	0.004* (1.97)
animal farm	-0.256(-0.71)	--	--
grain farm	-0.142(-0.65)	--	--
hired farm labor	0.131** (2.16)	--	--
total acre	0.198(0.83)	--	--
history	0.001(0.27)	--	--
Production expert	--	-0.016(-0.71)	0.014 (0.30)
Marketing expert	--	0.014(1.05)	0.030 (1.03)
Finance expert	--	-0.018(-0.86)	-0.011 (-0.22)
Mills Lambda	--	-0.287** (-1.88)	-0.14 (-0.53)
Chi-square	--	5.59 (d.f.=8)	8.62 (d.f.=8)

*, ** Represent statistically significant at 10 and 5% levels, respectively.

156 observations, instead of 229 observations (Table 4). In the first stage, factors affecting managers' perceived pressures are estimated. Two factors appear to have a significant impact on perceived pressure:

1) Leadership ($\alpha<0.1$); and
2) Hired farm labor ($\alpha<0.05$).

The significant coefficient for the leadership variable suggests that managers who hold at least one leadership position in local, state, regional or national agricultural organizations are more likely to feel pressures from the adverse economy. This strong linkage between leadership and perceived pressures is worth careful explanation. Previous agribusiness research has concluded that leaders have the ability to instill a sense of confidence in peers and subordinates (Hedges, 1963). However, little if any research has studied the impact of leadership on farm managers' perceived economic pressure, and how this leadership/pressure linkage would affect farm organizational health. Psychologists detect a "contagious" effect of leaders' mood on subordinate individuals and groups (Sy et al., 2005; Johnson, 2008). For example, Johnson (2008) detected a significant impact of leaders' emotional contagion on followers' job performance and organizational outcomes. Their study revealed that a positive emotional connection between leaders and followers can result in extraordinary increases in followers' work performance (Weber, 1920; Bass, 1990). Conversely, leaders' pressure may cause low wellbeing among following subordinates (Yukl, 1989). Thus, the high pressure that leaders reported in our sample and the potential detrimental impacts this could have on followers' work performance should be carefully understood and taken into account when planning agricultural assistance programs. The number of hired family members is another key factor that significantly influences farm managers' perceived pressure. The more family labor the farm hires, the more likely the manager feels a high pressure. The computed marginal effects indicate that a manager is twice more likely to feel a strong pressure if the farm hires one more family labor ($\alpha<0.05$). It could be the detected lower productivity associated with hired family labor that causes this response. Previous studies found that the productivity of hired non-family labor is much higher than that of family labor (Nath, 1974; Deolalikar and Vijverberg, 1983; Khandker, 1988).

In the second stage "action function", perceived pressure stands out to be the only significant factor that explains farm managers' actions taken to improve farm overall performance (through Mills Lambda, $\alpha<0.05$). The negative coefficient indicates that the more pressure the manager feels, the less likely he/she will take adaptation actions. Though reasons behind this are not clear, previous studies did document that increased pressure negatively impacts farm performance, which in turn, adds further economic pressure to farm operators (Gorgievski-Duijvesteijn, 2002; Wallis and Dollard, 2008). Conversely,

Schulman and Cotton (1993) found that perceived economic hardship motivates farm adaptations to mitigate financial and marketing difficulties. However, Schulman and Cotton then found that adaptation was associated with increased odds of leaving farming for non-farm employment. Perceived pressure does not affect managers' help-seeking activities from agricultural assistance programs. The key factor behind help-seeking is managers' farming experience ($\alpha<0.1$). The odds of seeking assistance increase by 40% with each additional year of farming ($\alpha<0.05$). Available agricultural assistance programs include New York States' agricultural management assistance program, Northern New York Agricultural Development Program, Dairy Economic Loss Assistance Program, and university cooperative extension. Among these programs, cooperative extension provides educational assistance to aid small farm productivity, increase farm sales, and improve family farm living standards. Farmers receive assistance in farm production, planning, management and marketing assistances from cooperative extension. A previous study documented that farm sales revenue is positively associated with the length of a farmer's participation in cooperative extension programs (Orden and Buccola, 1980).

Interestingly, none of the three self-assessed skills variables significantly change management actions taken during economic difficulties. The hypotheses that managerial skills affect actions taken to improve farm performance (H_1) and that managerial skills change farmers' help-seeking activities (H_2) were not established using the selected sample. Though the linkage between input management ability and overall production efficiency was previously established (Boehlje and Eidman, 1984; Olsson, 1988; Khandker, 1988), little is known about how skilled managers take actions to improve farm efficiency. Our sample revealed that under the adverse economy, self-assessed skilled managers are not different from unskilled managers in taking adaptive actions. We found that what drives management actions is managers' perceived economic pressure (H_3 and H_4). Farmers who feel less pressure are more motivated to take adaptive actions compared to those who feel great pressure.

Conclusions

The application of a two-stage Heckman selection model to survey data gathered from 282 New York agribusinesses reveals an important linkage between a manager's perceived economic pressure and his/her adaptive actions to improve farm performances. Perceived pressure, rather than self-assessed skills, is the key factor to explain management actions taken in New York's agricultural industry. Specifically, our study shows that the more pressure managers feel, the less likely he/she takes adaptive actions to adjust the farm to the new environment. The New York agricultural industry should be aware of this negative impact of the current economic difficulties on New York farming practices. Farmers in New York State are confronted with remarkable challenges. As a state that devotes nearly one-quarter of its total land in agriculture to support 36,350 farms and a total sales of $4.4 billion of its dairy, vegetable and fruits industry (2007 statistics), New York policy planners should be mindful about the great impact of the current economic slowdown on farm management practices. Many farmers have already been forced to supplement their income by lending or selling farmland (DiNapoli and Bleiwas, 2010). Given the fact that New York farming is primarily done by family businesses who own less than 200 acres of land, the pressure and the lack of adaptation could fatally affect the thousands of farms that are already piqued.

To provide timely assistance, agribusiness policy planners need to understand which group of farm operations desires an urgent help. Our sample revealed that farmers who held a leadership position in local, state, regional, or national agricultural organizations/ cooperatives are more likely to feel a high pressure. These organizations/cooperatives could be used as venues to provide pressure relief or management enhancement programs. Further attention should be given to farms that heavily rely on hired family labor. Hired family labor is usually composed of unskilled females and children. This may add further pressure to agribusiness managers who eagerly seek assistance to improve production efficiency. A key factor behind the help seeking activities from agricultural assistance programs is farming experience. This help seeking could result in improved participation in agricultural assistance programs especially the agricultural extension service, which is already popularly used by many small- and mid-sized New York farms located in less modernized rural areas (Patrick and Kehrberg, 1973; Lockheed et al., 1980).

The availability of farm extension service in New York State may be critical to help facilitate trainings in specific managerial skills. This training could raise the low self-assessed skills revealed by our sample. In deciding which skills to emphasize, our analysis reveals that farmers are least confident about their marketing skills and risk management skills, compared to production, financial management and leadership skills. Our study identifies commonly interested skills from academic researchers and farm managers and the comparison of the ratings can be carefully used to proposed training and educational programs. Samples used for this study are from New York State only and are from farms that are still in operation. Thus, our sample could be bias in representing the overall New York farming industry, given the fact that many farms are closed. Nevertheless, findings reported and coping strategies discussed could

help policy planners plan useful assistance mechanisms to aid efficient adaptation to the unfavorable macro-economic hardships.

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