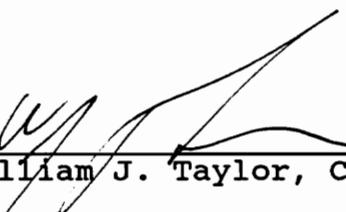


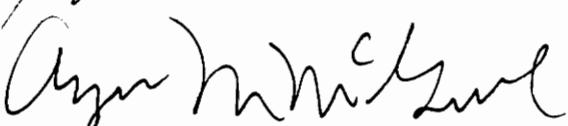
COMPENSATION IN AGRIBUSINESS:  
THE CASE OF THE RETAIL FERTILIZER INDUSTRY  
by  
Bradley P. Martens

Thesis submitted to the Faculty of the  
Virginia Polytechnic Institute and State University in  
partial fulfillment of the requirements for the degree of  
Master of Science  
in  
Agricultural Economics

APPROVED:

  
William J. Taylor, Chairman

  
Jeffrey Alwang

  
Anya McGuirk

  
Wayne D. Purcell

May 10, 1991  
Blacksburg, Virginia

LD

5655

V855

1991

M3185

C.2

COMPENSATION IN AGRIBUSINESS:  
THE CASE OF THE RETAIL FERTILIZER INDUSTRY  
by  
Bradley P. Martens  
Committee Chairman: William J. Taylor  
Agricultural Economics  
(ABSTRACT)

Identifying the determinants of compensation is important from employee and firm financial perspectives. This analysis examines the compensation of three different skill level categories - managerial, specialized, and general. The types of compensation examined include salaries, bonuses, benefits, and total compensation. Neoclassical theory is represented in the models by net return, managerialist theory by annual sales volume and form of ownership, and human capital theory by both education after high school and agribusiness work experience. Also controlled for in the models are the potential effect of salary on bonuses and benefits.

Major findings include that annual sales volume, education after high school, and agribusiness work experience are the important determinants of salaries and total compensation. Bonuses for managers tend to increase with annual sales volume, and bonuses for employees in specialized and

general skill level categories tend to be lower for those employed by cooperatives. Benefits tend to increase with salary.

From the employee's perspective, these findings indicate that, in order to maximize salary and total compensation, employees should seek employment in larger firms, attend college, and gain work experience. To decrease the variability of compensation associated with a high reliance on bonuses, specialized and general skill level employees may want to seek employment in a cooperative. Employees should realize that increases in benefits are linked to increases in salaries.

From the firm's perspective, smaller firms need to recognize that larger firms provide higher compensation. Hence, smaller firms may have to offer other amenities to attract, retain, and motivate employees. To attain more educated and experienced employees, firms will have to provide higher compensation. Cooperatives desiring performance oriented employees may have to alter their compensation packages to include higher bonuses.

#### ACKNOWLEDGEMENTS

First, of course, I give thanks to my family for their support and understanding. In particular, thanks to Dr. and Mrs. David C. Martens. I also wish to thank Karen O'Dell for her love and understanding.

I also wish to acknowledge aid received from members of the Va. Tech faculty and staff. I thank William J. Taylor, first of all, for his friendship, guidance, and suggestions. Also many thanks to Anya McGuirk, for her giving her time and assistance willingly; Jeff Alwang, for appropriate feedback; Wayne Purcell, for joining the committee at a late date; and the data lab staff and departmental secretaries for their help.

I also would like to thank my friends for their support, especially Jim Pavlik and David Edmonds. Also my thanks to Bagie Sherchand, for listening and feedback; Bob Parsons for his time and conversation; and Ernie Wade for his statistical assistance.

## TABLE OF CONTENTS

### **1. INTRODUCTION**

<b>1.1 Compensation Determinants: Employee and Firm Needs .....</b>	<b>1</b>
<b>1.2 Problem Statement .....</b>	<b>2</b>
<b>1.3 Objectives .....</b>	<b>4</b>
<b>1.4 Organization of Thesis .....</b>	<b>4</b>

### **2. REVIEW OF LITERATURE**

<b>2.1 Introduction .....</b>	<b>5</b>
<b>2.2 Neoclassical Theory .....</b>	<b>5</b>
<b>2.3 Managerialist Theory .....</b>	<b>8</b>
<b>2.4 Human Capital Theory .....</b>	<b>13</b>
<b>2.5 Research on Compensation in the Agribusiness Sector .....</b>	<b>15</b>
<b>2.6 Summary .....</b>	<b>19</b>

### **3. DATA SUMMARY AND MODEL SPECIFICATION**

<b>3.1 Introduction .....</b>	<b>20</b>
<b>3.2 Firm Characteristics .....</b>	<b>21</b>
<b>3.3 Employee and Compensation Characteristics .....</b>	<b>23</b>
<b>3.4 Comparisons of Compensation for Different Firms</b>	
<b>3.4.1 Comparison of Compensation with Firm Net Return .....</b>	<b>28</b>
<b>3.4.2 Comparison of Compensation with Annual Sales Volume .....</b>	<b>30</b>
<b>3.4.3 Comparison of Compensation with Form of Firm Ownership .....</b>	<b>33</b>
<b>3.4.4 Comparison of Compensation with Education After High School .....</b>	<b>35</b>

TABLE OF CONTENTS (cont.)

3.4.5 Comparison of Compensation with Agribusiness Work Experience .....	37
3.4.6 Conclusions for Comparisons of Compensation for Different Firms .....	40
3.5 Examination of the Correlations Between Various Firm, Employee, and Compensation Characteristics .....	41
3.6 Comparisons to Previous Studies .....	50
3.7 Model Specification .....	51
3.8 Conclusions .....	53
<b>4. RESULTS</b>	
4.1 Introduction .....	55
4.2 Results of Testing the Assumptions Underlying the Compensation Models .....	55
4.3 Results of the Compensation Models for Owners/Plant Managers .....	58
4.4 Results of the Compensation Models for Plant Managers .....	60
4.5 Results of the Compensation Models for Assistant Plant Managers .....	62
4.6 Results of the Compensation Models for Field Salespeople .....	62
4.7 Results of the Compensation Models for General Plant Personnel .....	65
4.8 Results of the Compensation Models for Secretaries/Bookkeepers .....	67
4.9 Summary of Results .....	69
4.10 Conclusions .....	72

TABLE OF CONTENTS (cont.)

**5. Conclusions**

<b>5.1 Introduction</b> .....	<b>73</b>
<b>5.2 Conclusions</b> .....	<b>74</b>
<b>5.3 Implications for Employees</b> .....	<b>75</b>
<b>5.4 Implications for Firms</b> .....	<b>77</b>
<b>5.5 Limitations of the Research</b> .....	<b>77</b>
<b>5.6 Suggestions for Further Research</b> .....	<b>78</b>
 <b>REFERENCES</b> .....	 <b>80</b>
 <b>APPENDIX I</b> .....	 <b>89</b>
 <b>VITA</b> .....	 <b>95</b>

## LIST OF TABLES

3.1	Firm Characteristics .....	22
3.2	Employee and Compensation Characteristics for the Managerial Skill Level Category .....	24
3.3	Employee and Compensation Characteristics for the Specialized Skill Level Category .....	25
3.4	Employee and Compensation Characteristics for the General Skill Level Category .....	27
3.5	Comparison of Compensation with Net Return ...	29
3.6	Comparison of Compensation with Annual Sales Volume .....	31
3.7	Comparison of Compensation with Form of Ownership .....	34
3.8	Comparison of Compensation with Education After High School .....	36
3.9	Comparison of Compensation with Agribusiness Work Experience .....	38
3.10	Correlation Coefficients Between Firm Characteristics .....	42
3.11	Correlation Coefficients for the Managerial Skill Level Category .....	43
3.12	Correlation Coefficients for the Specialized Skill Level Category .....	47
3.13	Correlation Coefficients for the General Skill Level Category .....	48
4.1	Parameter Estimates of the Compensation Models for Owners/Plant Managers .....	59
4.2	Parameter Estimates of the Compensation Models for Plant Managers .....	61
4.3	Parameter Estimates of the Compensation Models for Assistant Plant Managers .....	63

LIST OF TABLES (cont.)

4.4	Parameter Estimates of the Compensation Models for Field Salespeople .....	64
4.5	Parameter Estimates of the Compensation Models for General Plant Personnel .....	66
4.6	Parameter Estimates of the Compensation Models for Secretaries/Bookkeepers .....	68
4.7	Summary of the Result for the Compensation Models .....	70

## **1. INTRODUCTION**

### **1.1 Compensation Determinants: Employee and Firm Needs**

Identification of the determinants of compensation in agribusiness is important from the perspectives of both the employee and the firm. It assists employees in providing critical information on a number of issues. These include: the effects of firm profit and sales, the influence of form of firm ownership, and the impact of a college education or agribusiness work experience on compensation.

Agribusiness firms require knowledge of the determinants of compensation in order to provide compensation packages with external equity. External equity refers to whether a firm is paying a wage rate that is competitive with the wages in their relevant labor markets (Romanoff, Boehm, and Benson). Firms that fail to provide competitive compensation packages may experience high job rejection and turnover rates (Wallace and Fay). External equity may better motivate employees to support the firm's goals (Romanoff, Boehm, and Benson). Firms with external equity are in a better position to attract, retain, and motivate a productive workforce. While externally equitable compensation packages increase the attractiveness of the firm in labor markets, controlling labor costs is a concern of every firm. Labor, which accounts for approximately 45% of total

costs for a typical agribusiness, is the single largest controllable cost (Fiske and Hahn).

## 1.2 Problem Statement

Agribusinesses are defined as firms whose activities are related to the input supply, production, marketing, or retailing segments of agriculture (Downey and Erickson). These firms employ 22% of the total work force and, hence, constitute the single largest employer in the United States (Edmondson and Schluter). This analysis concentrates on those agribusinesses linked directly to agricultural production. Sonka and Hudson note that five factors distinguish the agribusiness sector from other sectors of the economy. These are: the unique cultural and institutional aspects of agriculture, the uncertainty arising from the biological basis of crop and livestock production, the alternative goals and forms of political intervention across subsectors and between nations, the institutional arrangements that place significant portions of the technology development in the public sector, and the diverse competitive structures within and among the subsectors of the agribusiness sector. These distinctive factors imply that, in comparison to other sectors, agribusinesses operate under unique circumstances that may require different compensation packages and employee requirements.

Most of the research on compensation in agribusiness has been limited to simple descriptive statistics. The few studies employing statistical models have either lacked a theoretical foundation or focused solely on managerial compensation. In contrast, studies of compensation in non-agribusiness sectors have analyzed managerial and non-managerial compensation from several viewpoints, including models which incorporate neoclassical, managerialist, and human capital theories. Neoclassical economic theory states that employees are compensated according to their marginal productivity. Managerialist theory supports a corporate growth hypothesis in which compensation increases with job responsibility. Human capital theory says that compensation is a function of productivity and that productivity is governed by investments in human capital.

Because unique circumstances lead agribusinesses to demand differing compensation packages and employee requirements, the results of compensation research in non-agribusiness sectors may not apply to the agribusiness sector. This analysis incorporates the different theories of the determinants of compensation to examine compensation in the agribusiness sector. The findings from this research will be used to develop effective compensation strategies for employees and firms.

### **1.3 Objectives**

The overall objective of this research is to examine the determinants of executive and non-executive compensation in agribusiness. Specific objectives include the following:

- 1. To describe the current state of compensation;**
- 2. To provide employees with strategies for improving their compensation packages;**
- 3. To provide firms with strategies for designing externally equitable compensation packages.**

### **1.4 Organization of Thesis**

Chapter Two reviews the literature on previous studies of compensation in industry. Chapter Three describes the data and presents the models used to estimate agribusiness compensation. Chapter Four contains the results of the models. Chapter Five discusses the conclusions and implications of the research for employees and firms. The limitations of the study and suggestions for further research are also discussed in Chapter Five.

## **2. REVIEW OF LITERATURE**

### **2.1 Introduction**

Studies of compensation in the non-agribusiness and agribusiness sectors are reviewed in this chapter. The studies of compensation in the non-agribusiness sectors generally use neoclassical, managerialist, or human capital theory. The purpose of examining the compensation studies of the non-agribusiness sector is to support the use of theories employed in these studies to explain compensation in agribusiness. The studies on compensation in the agribusiness sector are presented to substantiate the claim that these analyses have been limited to descriptive statistics and managerial compensation models. Appendix I presents a matrix of 75 models developed by previous researchers for those readers desiring detailed information on compensation models.

### **2.2 Neoclassical Theory**

According to neoclassical theory, compensation is a function of an employee's marginal productivity. Many studies of compensation incorporating neoclassical theory focus on executive compensation. These studies have used firm profit, the value of the firm's stock, and the residual of firm profit as proxies for the marginal productivity of

executives.

Larner examined the effect of firm profit on executive compensation. He represented executive compensation as the sum of salary, bonuses, corporate contributions to savings and stock plans, and value of stock options. His regression model consisted of executive compensation as a function of firm profit, firm profitability rate, firm assets, growth in firm assets, firm sales, growth in firm sales, and the market value of stockholdings. Firm profit and the firm profitability rate had a significant positive influence on compensation. Larner concluded that firm profit and the firm profitability rate were critical determinants of executive compensation.

An analysis by Lewellen and Huntsman supported the neoclassical theory. Lewellen and Huntsman argued that, because of executive ownership of the firm's stock, executives and shareholders shared the same profit maximization goal and, as a result, executive compensation was based on firm profit. They constructed two regression models. The results from both models were consistent with their theory. Firm profit and the value of outstanding stock were both significant, while firm sales were insignificant or only marginally significant. The authors thus found support for their belief that the profit maximizing interests of shareholders and executives were tied together through executive

ownership of their own firm's stock, and that this relationship was an important basis of executive compensation.

Murphy hypothesized a positive relationship between executive compensation and the market value of the firm's stock. His regression results indicated that, holding firm sales constant, an increase of 10 percent in the market value of a firm's stock would increase executive compensation by 1.6 percent. He concluded that the value of the firm's stock was an important determinant of executive compensation.

Ciscel and Carroll evaluated the use of the residual of firm profit to explain executive compensation. The residual of firm profit was defined as observed firm profit minus "firm profit as predicted by firm sales." They stated that the residual of firm profit could be interpreted as the firm profit due to reduced production costs or increased technical efficiency. Their model consisted of executive compensation as a function of the residual of firm profit and firm sales. Both the residual of firm profit and firm sales were significant determinants of compensation.

Thus, neoclassical theory has been viewed to explain executive compensation in studies measuring the effects of firm profit, the value of the firm's outstanding stock, and the residual of firm profit. The results of these studies support neoclassical theory.

### **2.3 Managerialist Theory**

Managerialist theory says that compensation increases with job responsibility. According, to this theory, compensation is a function of firm sales, firm employment, levels of responsibility, and form of firm ownership. Research into managerialist theory began when Baumol, in an examination of correlation coefficients, found that executive compensation was more closely correlated with firm sales than with firm profitability. He noted that larger firms had ownership that was separate from management and, as a result, management exercised greater bargaining power as firm size increased. Baumol theorized that this greater bargaining power allowed management to tie their compensation to firm sales which fluctuated less than firm profit. Since Baumol's study, there have been numerous studies examining these issues.

McGuire, Chiu, and Elbing evaluated the effect of firm sales on executive compensation. They examined the correlation coefficients between executive salaries and both firm sales and firm profit. The impact of firm sales and profit were analyzed over a four year period. The highest correlations were found between executive salaries and both current and past firm sales. McGuire, Chiu, and Elbing concluded that executive salaries were increased by both current and past firm sales.

Cooley also found evidence of a relationship between firm sales and compensation. He stated that the division between ownership and management could also exist in smaller firms and that, as a result, the executive compensation packages of smaller firms may be linked to firm sales. His model expressed of executive compensation as a function of firm sales and firm profit. Both firm sales and firm profit had a significant positive relationship with executive compensation.

An alternative body of research has explained the relationship between compensation and firm size by using the total number of employees in the firm as an indicator of firm size. Ciscel examined the correlation coefficients between executive compensation and firm employment, firm sales and firm profit. The highest correlation existed between executive compensation and firm employment.

Mellow hypothesized that compensation could be explained by firm and plant employment. Firm employment refers to the firm's total number of employees and plant employment to the number of employees at a single location. Mellow assumed that firm employment measures the firm's ability to provide compensation and that plant employment measures the premium provided to employees for working under more formal and regimented work rules, which they felt were prevalent in larger firms. Compensation was specified as a

function of plant employment, firm employment, and a vector of wage-influencing personal and job characteristics (e.g., education, work experience, race, union status, location, etc.). The variables representing firm and plant employment had a significant positive relationship with compensation, except for firms employing 25-99 employees. There was a 22 percent net difference between the compensation of the largest and smallest firm size categories. Mellow concluded that both firm and plant employment help explain compensation.

Other researchers have explained compensation by examining the influence of a firm's hierarchical levels. "Hierarchical levels" refer to the positions of the firm arranged in a graded series according to job responsibility. Mahoney theorized that hierarchical levels of formal organizations reflected status and position worth. Expectations of differences in status and position worth associated with hierarchical levels led to proportional differences between the compensation of adjacent hierarchical levels. The pyramidal organization structure of larger firms led to greater compensation packages for executives of larger firms, since these employees typically had more hierarchical levels beneath them (Mahoney).

Mahoney investigated his hypothesis in two ways. First, he sampled groups of upper division business administration students and corporate compensation administrators

to assign monetary values to the hierarchical levels of eleven different organizational structures. Then he surveyed managers at various levels in two divisions of a large Canadian manufacturing firm to attain estimates of the compensation differentials between the five different hierarchical levels of their division. Mahoney used this information to compute compensation differentials between adjacent hierarchical levels for each of the organizational structures. The results showed that status and position worth between adjacent hierarchical levels resulted in proportional differences in the compensation packages of adjacent hierarchical levels.

Rosen theorized that compensation could be explained by the effect of hierarchical levels on productivity. That is, managers transfer their talent to immediate subordinates, who transfer it to their subordinates and so on down the hierarchical structure. The ability of the manager to transfer talent to subordinates caused proportional differences in the compensation of adjacent hierarchical levels. Rosen constructed a model which expressed worker productivity at any hierarchical level as a function of the skill of the supervisor and an interaction term representing the amount of time the supervisor spends with a subordinate multiplied by the productivity of the subordinate. The results showed that constant or increased returns from

supervision resulted in increased productivity with each hierarchical level. Hence, the proportional differences in the compensation of adjacent hierarchical levels was the result of the increased productivity associated with each hierarchical level (Rosen).

Some studies have investigated the effect that form of ownership has on compensation. Gomez-Mejia, Tosi, and Hinkin considered the following two hypotheses: 1) firm profit was the primary determinant of executive compensation in shareholder controlled firms and 2) firm sales were the primary determinant of executive compensation in executive controlled firms. Executive compensation was expressed as a function of firm sales, firm profitability, and external hirings for both shareholder and executive controlled firms. Both hypotheses were supported. The authors concluded that form of ownership was an important determinant of executive compensation.

In summary, support for using managerialist theory in explaining compensation has been supplied by studies measuring the effects of firm sales, firm employment, levels of responsibility, and form of ownership. Firm sales (McGuire, Chiu, and Elbing; Cooley), firm employment (Ciscel; Mellow), hierarchical levels (Mahoney; Rosen), and form of ownership (Gomez-Mejia, Chiu, and Hinkin) were all found to affect compensation.

## 2.4 Human Capital Theory

Human capital theory, like neoclassical theory, suggests that compensation is a function of marginal productivity. According to human capital theory, investments made by individuals in human capital increase their marginal productivity and, as a result, their compensation. These investments in human capital take many different forms, including education, work experience, and tenure.

Research into human capital theory began when Becker analyzed the effects of investments in human capital on compensation. Among Becker's findings were that, in comparison to a high school graduate, a college graduate earned less in college age years (e.g., 18 to 22 years old), but 4 and 59 percent more in the age groups representing individuals 23 to 24 years old and 45 to 54 years old, respectively. Becker concluded that compensation increases with education.

Rumberger theorized that education which was required and, thus, fully used on the job (required education) was rewarded at a higher rate than education which exceeded the required qualifications and, thus, was underused on the job (surplus education). He tested his theory by modelling salary as a function of required education, surplus education, work experience, and work experience squared. Required education had a positive significant influence on compensation, while surplus education was either not signif-

icant or had little impact on compensation. Required education was rewarded at a higher rate than surplus education.

Medoff and Abraham theorized that more experienced employees received higher compensation because firms and employees enter into implicit contracts that provide earnings growth without changes in the relative productivity of the employees. One reason for such a contract may have been to deter turnover and increase the expected value of each employee's net contribution to the firm. Their model consisted of salary as a function of education, pre-company work experience, pre-company work experience squared, tenure, and tenure squared. An additional year of either pre-company work experience or tenure were found to lead to a salary differential of approximately 40 percent between employees within the same grade level. This finding supported Medoff and Abraham's hypothesis.

Kiker and Condon used a model which expresses earnings as a function of socioeconomic background factors, intervening variables, and exogenous control factors. Each variable had a positive significant influence on earnings. An additional year spent in firm-specific work experience yielded a greater return than one spent acquiring either education or general work experience, and an additional year spent acquiring education yielded a greater return than one spent acquiring general work experience.

In summary, support for human capital theory's explanation of compensation has been provided by studies measuring the effects of education, work experience, and tenure.

## 2.5 Research on Compensation in Agribusiness

Research on compensation in the agribusiness sector has focused primarily on descriptive statistics, and those studies using regression models have concentrated on managerial compensation. There have been several studies based on descriptive statistics (Fiske and Hahn; Keller and Hahn; Taylor and Akridge).

Fiske and Hahn used descriptive statistics to analyze compensation in Ohio agribusinesses. The employee categories in their study included manager, assistant plant manager, department manager, salesperson, elevator operator, and clerical employees. The most distinctive characteristic of agribusiness compensation revealed in their research was that a strong association existed between compensation and firm sales. Managers of firms with sales between \$2 and \$5 million averaged 19 percent higher salaries than managers of firms with sales less than \$2 million. The respective percentage differences in salary between assistant plant managers, salespeople, departmental managers, elevator operators, and clerical employees were 19, 9, 28, 25, and 30 percent, respectively.

Keller and Hahn compared the means of compensation provided by Ohio agribusinesses. They found a positive relationship between compensation and firm sales. The salaries of managers of firms with sales between \$2 and \$5 million averaged 29 percent higher than managers of firms with sales less than \$2 million. The percentage differences in salary between assistant managers, salespeople, departmental managers, elevator operators, and clerical employees were 16, -31, 25, 10, and 34 percent, respectively. Since the salespeople category had only four observations, the results for this category may have been distorted. Keller and Hahn concluded that compensation had a positive association with firm sales.

Taylor and Akridge used descriptive statistics to examine compensation in the retail fertilizer industry. Their most significant findings were that, on a national scale, larger firms consistently paid higher salaries and work experience tended to increase salaries in managerial skill level positions. They also found that, in comparison with independent and company-owned outlets, cooperatives tended to provide lower bonuses, but comparable salaries.

Regression models used to explain compensation in the agribusiness sector have focused mainly on managerial compensation. Broder and Deprey examined the monetary returns of agricultural economics alumni from the University of Georgia. Work experience, a master's of science degree,

other formal education, sex, and employment outside the southeastern region of the United States were significant determinants of compensation. An additional year of work experience was found to yield a \$1,450 increase in average annual salary. Additionally, in comparison to alumni with a bachelor's of science degree, alumni with master's of science degrees earned an additional \$3,333 in average annual salary and other formal education yielded an increase of \$6,577 in average annual salary.

Preston, Broder, and Almero explained the earnings of former agricultural students at Virginia Tech. They examined starting salaries as well as incomes after work experience had been gained. The significant variables for the starting salary model were the year of entry into the labor market, education, sex, personal emphasis on earnings, and participation in profit-sharing. Starting income, tenure, marital status, urban residence, participation in profit-sharing, oral skills needed on the job, and technical skills needed on the job were the significant variables in explaining income after gaining work experience.

Studies on agribusiness compensation have also used models that integrate neoclassical, managerialist, and human capital theories (Akridge, Whipker, and Erickson; Martens and Taylor). Akridge, Whipker, and Erickson analyzed the compensation of managers in midwestern feed and grain firms.

Neoclassical theory was represented through firm profit. Managerialist variables were firm sales, number of branch facilities, and form of ownership. Human capital theory was accounted for by including the manager's years of education and agribusiness experience. They found that the variables representing neoclassical, managerialist, and human capital theories were key determinants of executive compensation.

Martens and Taylor developed models incorporating neoclassical, managerialist, and human capital theories for explaining compensation in the retail fertilizer industry. Neoclassical theory was represented by firm profit, and managerialist theory by the annual fertilizer sales of the firm and the cooperative form of ownership. Education after high school and work experience represented the human capital theory. Average annual salary, bonuses, benefits, and total compensation of single plant managers, field salespeople, and general plant personnel for the retail fertilizer industry were modeled. The variables representing managerialist and human capital theories were found to be the key determinants of compensation. Those representing neoclassical theory only influenced the bonuses of salespeople.

In summary, studies have used descriptive statistics and regression models to explain compensation in agribusiness. The studies using descriptive statistics have analyzed both managerial and non-managerial compensation, while studies using regression models have tended to focus on only

managerial compensation. Only two studies have explicitly incorporated elements of neoclassical, managerial, and human capital theories.

## 2.6 Summary

The previous review presents a sampling of research on neoclassical, managerialist, and human capital theories' ability to explain compensation. The purpose of examining the previous research was to justify the use of these theories in explaining compensation in the retail fertilizer industry.

### 3. DATA SUMMARY AND MODEL SPECIFICATION

#### 3.1 Introduction

This chapter describes the general compensation characteristics of the retail fertilizer industry and presents the specification of the conceptual model. The data under study are drawn from a 1988 salary survey of the United States retail fertilizer industry. As part of an annual survey, six thousand subscribers of The Fertilizer Institute (T.F.I.) magazine, Dealer Progress, were sampled in the summer of 1989 to obtain data on the compensation packages for nine different employee classifications and on the corresponding firm and employee characteristics for the previous fiscal year. Six hundred and fifty-one of the surveys were returned, a response rate of 10.9 percent. Since firms are reluctant to divulge compensation data, the low response rate is not surprising. In the five previous surveys of subscribers to Dealer Progress, the response rate averaged approximately 10 percent.

The analysis examines the compensation packages of managerial, specialized, and general skill level categories. The managerial skill level category is represented by owners/plant managers, plant managers of multiple outlets, plant managers of single outlets, and assistant plant managers. Plant managers of multiple and single outlets are

combined into a single position - plant managers. Field salespeople, agronomists/consultants, and accountants/controllers represent the specialized skill level category, and general plant personnel and secretaries/bookkeepers represent the general skill level category. The firm characteristics include net return on sales, annual sales volume, product mix, and form of ownership. The employee characteristics consist of the years of education after high school and the years of agribusiness work experience.

### 3.2 Firm Characteristics

The characteristics of the firms contained in the sample are presented in Table 3.1. The average annual sales volume of the respondents was \$3,985,206. The annual sales volume of the respondents ranges from \$100,000 to \$45,000,000, indicating that the sample contains both large and small firms. Agrichemicals, fertilizer, and grain sales constitute the majority of firm sales, making up approximately 19.7, 41.9, and 13.2 percent of total sales, respectively. Agronomic services, animal feed, custom harvesting, farm supplies, seeds, and other products make up 0.8, 7.0, 5.5, 3.4, 4.4, and 4.1 percent of total sales, respectively. The firms in the sample report an average net return of 8.2%. As shown by the range and standard deviation of the firms' net return, the profitability of the firms vary Table

### **3.1 Summary Statistics on Characteristics of Firms in the Sample**

#### **Firm Characteristics:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Net Return (%)	176	8.25	7.69	0.005	35.0
Annual Sales Volume (\$1,000)	176	3,985	5,265	100	45,000
Cooperatives	176	0.28	0.45	0	1

#### **Shares of Specific Products in Total Sales:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Agrichemicals	176	19.77	13.54	0.00	65.00
Agronomic Services	176	0.84	2.69	0.00	26.00
Animal Feed	176	6.98	14.27	0.00	75.00
Custom Harvesting	176	5.45	7.32	0.00	60.00
Farm Supplies	176	3.36	7.30	0.00	43.00
Fertilizer	176	41.85	22.23	4.50	98.00
Grain	176	13.23	24.04	0.00	91.00
Seeds	176	4.36	5.57	0.00	40.00
Other Products	176	4.08	10.12	0.00	77.00

greatly. The net return of the firms range from 0.005 to 35 percent and the standard deviation of the net return variable is 7.69 percent. Firms with negative responds were removed from the sample to allow net return to be transformed into natural logarithms.

### 3.3 Employee Characteristics

The compensation and employee characteristics for the managerial skill level category are reported in Table 3.2. Owners/plant managers receive the highest total compensation in the managerial category, followed consecutively by plant managers and assistant plant managers. This pattern of compensation is consistent in every form of managerial compensation, except benefits. The benefits of owners/plant managers are lower than any other managerial skill level position. Owners/plant managers have the greatest amount of education after high school in the managerial skill level category - 2.6 years. Plant managers and assistant plant managers have 2.0 and 1.3 years of education after high school, respectively. Owners/plant managers, plant managers, and assistant plant managers have 17.4, 14.6, and 11.5 years, respectively.

The compensation and employee characteristics for the specialized skill level category are contained in Table 3.3. Field salespeople earn the highest total compensation

**Table 3.2 Summary Statistics for the Employee and Compensation Characteristics of the Managerial Skill Level Category by Employee Type**

**Owners/Plant Managers:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary (\$)	72	32,478	13,769	15,000	80,000
Bonus (\$)	54	10,700	12,721	0	50,000
Benefits (\$)	58	3,415	1,679	750	10,000
Total Compensation(\$)	46	45,173	18,105	22,500	117,000
<b>Education After</b>					
High School (yrs.)	72	2.6	1.8	0.0	8.0
<b>Agribusiness Work</b>					
Experience (yrs.)	72	17.4	8.1	2.0	45.0

**Plant Managers:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary	115	28,872	7,808	13,500	52,000
Bonus	101	4,623	4,648	0	30,000
Benefits	97	4,174	2,20	1,000	10,000
Total Compensation	86	37,968	9,803	16,808	69,000
<b>Education After</b>					
High School	115	2.0	1.8	0.0	8.0
<b>Agribusiness Work</b>					
Experience	115	14.6	7.8	1.0	40.0

**Assistant Plant Managers:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary	81	22,129	4,854	15,000	40,000
Bonus	60	2,617	2,203	0	10,000
Benefits	76	3,547	1,7	1,200	9,200
Total Compensation	55	28,509	6,389	18,500	48,700
<b>Education After</b>					
High School	81	1.3	1.6	0.0	8.0
<b>Agribusiness Work</b>					
Experience	81	11.5	5.7	1.0	28.0

**Table 3.3 Summary Statistics for the Employee and Compensation Characteristics of the Specialized Skill Level Category by Employee Type**

**Field Salespeople:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary (\$)	72	22,927	6,286	12,000	47,000
Bonus (\$)	57	2,868	3,848	250	25,000
Benefits (\$)	61	3,429	1,948	800	8,500
Total Compensation (\$)	47	29,221	8,298	17,000	59,800
Education After High School (yrs.)	72	1.9	1.7	0.0	5.0
Agribusiness Work Experience (yrs.)	72	10.9	7.3	1.0	40.0

**Agronomists/Consultants:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary	9	21,937	3,125	18,736	27,700
Bonus	7	2,400	2,671	0	8,000
Benefits	6	3,476	504	3,000	4,158
Total Compensation	4	26,474	4,213	22,894	32,500
Education After High School	9	3.4	2.1	0.0	6.0
Agribusiness Work Experience	9	6.0	3.2	2.0	11.0

**Accountants/Controllers:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary	22	22,295	6,511	12,000	36,000
Bonus	18	2,547	2,898	0	10,000
Benefits	20	3,195	1,728	750	7,500
Total Compensation	16	25,636	7,990	13,500	45,000
Education After High School	22	2.3	1.9	0.0	7.0
Agribusiness Work Experience	22	9.8	6.7	1.0	30.0

in the specialized skill level category, followed consecutively by agronomist/consultants and accountant/controllers. Field salespeople also receive the highest salary and bonuses in this category followed by accountant/controllers, and then agronomists/consultants. While agronomists/consultants earn the lowest salary and bonuses, their benefits levels are higher than any other position in this specialized skill level category. The specialized skill level position with the greatest amount of education is the agronomists/consultants with 3.4 years of education beyond high school. Field salespeople and accountants/controllers have 1.9 and 2.3 years, respectively. Field salespeople have the greatest amount of agribusiness work experience - 10.9 years, agronomists/consultants and accountant/controllers have 6.0 and 9.8 years, respectively. Because of the small number of observations for agronomists/consultants and accountants/controllers, further analysis will not include these positions.

The employee and compensation characteristics for positions in the general skill level category are presented in Table 3.4. In this category, general plant personnel tend to earn higher compensation than secretaries/bookkeepers. Secretaries/bookkeepers have 1.0 years of education, which is higher than the 0.3 years of general plant personnel. There is little difference between the average years of agribusiness work experience for the two positions.

**Table 3.4 Summary Statistics for the Employee and Compensation Characteristics of the General Skill Level Category by Employee Type**

**General Plant Personnel:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary (\$)	151	16,561	3,429	8,320	26,000
Bonus (\$)	81	1,270	1,136	0	6,000
Benefits (\$)	132	2,857	1,454	300	7,500
Total Compensation(\$)	71	21,044	4,613	10,900	36,000
<b>Education After High School (yrs.)</b>	151	0.3	0.6	0.0	2.0
<b>Agribusiness Work Experience (yrs.)</b>	151	8.0	4.9	1.0	20.0

**Secretaries/Bookkeepers:**

<u>Variable</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>
Salary	176	13,906	3,207	7,800	24,000
Bonus	87	1,058	967	0	5,000
Benefits	140	2,529	1,166	200	5,700
Total Compensation	72	17,713	4,130	9,050	30,000
<b>Education After High School</b>	176	1.0	1.2	0.0	4.0
<b>Agribusiness Work Experience</b>	176	7.5	5.7	1.0	25.0

General plant personnel have 8.0 years of agribusiness work experience, and secretaries/bookkeepers 7.5 years.

### 3.4 Comparisons of Compensation for Different Firms

The review of previous studies led to the conclusion that levels of employee compensation should vary according to firm net return, annual sales volume, form of firm ownership, and according to investments in human capital. Here the data are used to compare compensation broken down by these firm and employee characteristics. The comparisons focus on the level of compensation and the percentage of employees who receive the various types of compensation.

#### 3.4.1 Comparison of Compensation by Firm Net Return

Neoclassical theory suggests that compensation is higher in more profitable firms. Table 3.5 contains a comparison of compensation for low and high net return levels for each of the skill level categories. A low net return is defined as being less than 5.5 percent, and a high net return is defined as being greater than or equal to 5.5 percent.

Compensation for the managerial skill level category tends to be higher in the more profitable firms. The percentage of employees who receive bonuses and benefits for managerial skill level positions tends to be higher in more

**Table 3.5 Employee Compensation by Net Return**

	Net Return Greater than or Equal to 5.5%		Net Return Less than 5.5%	
	Level(\$)	Percentage <sup>a</sup>	Level(\$)	Percentage
<b>Owners/Plant Managers:</b>				
Salary	33,250	100	31,987	100
Bonuses	14,610	71	8,212	64
Benefits	3,456	89	3,385	75
Total Compensation	50,670	71	40,945	59
<b>Plant Managers:</b>				
Salary	29,521	100	28,255	100
Bonuses	5,390	88	3,870	85
Benefits	4,284	86	4,066	83
Total Compensation	39,550	77	36,386	73
<b>Assistant Plant Managers:</b>				
Salary	21,908	100	22,315	100
Bonuses	2,754	70	2,497	73
Benefits	3,443	91	3,632	96
Total Compensation	29,822	68	27,415	68
<b>Field Salespeople:</b>				
Salary	22,914	100	22,936	100
Bonuses	2,113	83	3,417	77
Benefits	3,157	90	3,631	81
Total Compensation	29,234	72	29,210	61
<b>General Plant Personnel:</b>				
Salary	17,093	100	16,008	100
Bonuses	1,259	52	1,281	54
Benefits	2,809	88	2,907	87
Total Compensation	20,812	44	21,256	50
<b>Secretaries/Bookkeepers:</b>				
Salary	13,885	100	13,925	100
Bonuses	974	48	1,140	46
Benefits	2,442	80	2,611	79
Total Compensation	16,924	38	18,344	44

\* - indicates 5 or fewer observations and \*\* indicates 10 or fewer observations.

<sup>a</sup> - refers to the percentage of employees who receive a particular type of compensation.

profitable firms. The only exception is that the percentage of assistant plant managers who receive bonuses and benefits is slightly higher in less profitable firms.

In the specialized skill level category, there is little difference between the salary and total compensation provided in more and less profitable firms. However, more profitable firms provide lower bonuses and benefits. Compared with less profitable firms, more profitable firms tend to provide a higher percentage of their field salespeople with bonuses and benefits.

In the general skill level category, more profitable firms tend to provide the lower compensation. The only exception is that general plant personnel earn slightly higher salaries in the more profitable firms. The percentage of employees in the general skill level category who receive bonuses and benefits varies according to type of compensation and position.

### 3.4.2 Comparison of Compensation With Annual Sales Volume

Managerialist theory dictates that compensation should be higher in larger firms. Table 3.6 presents a comparison of compensation by low, medium, and high annual sales volume. A large annual sales volume is defined as being greater than \$3,000,000, a medium less than or equal to \$3,000,000 and greater than or equal to \$1,500,000, a small

**Table 3.6 Compensation by Annual Sales Volume**

<u>Annual Sales Volume<sup>a</sup>:</u>	<u>Large</u>		<u>Medium</u>		<u>Small</u>	
	Level(\$)	Percentage <sup>b</sup>	Level(\$)	Percentage	Level(\$)	Percentage
<b>Owners/Plant Managers:</b>						
Salary	38,165	100	34,312	100	22,483	100
Bonuses	14,917	71	9,792	70	5,864	61
Benefits	2,960	71	3,462	88	3,807*	88
Total Compensation	47,515	62	48,666	73	32,478*	50
<b>Plant Managers:</b>						
Salary	32,122	100	27,909	100	25,916	100
Bonuses	5,581	93	4,374	83	3,623	83
Benefits	4,309	88	3,766	85	4,660	79
Total Compensation	41,318	80	35,992	72	35,969	72
<b>Assistant Plant Managers:</b>						
Salary	23,053	100	22,117	100	18,749**	100
Bonuses	2,805	73	2,515	77	2,050*	50
Benefits	3,658	95	3,601	94	2,926**	90
Total Compensation	29,557	73	28,284	71	22,789*	40
<b>Field Salespeople:</b>						
Salary	25,386	100	21,477	100	20,789**	100
Bonuses	4,283	79	1,931	80	1,860**	77
Benefits	3,711	90	2,943	83	3,910**	77
Total Compensation	32,290	69	26,346	63	28,375**	62
<b>General Plant Personnel:</b>						
Salary	18,259	100	15,976	100	15,388	100
Bonuses	1,424	64	1,297	54	788	35
Benefits	3,026	94	2,624	87	2,989**	78
Total Compensation	23,161	60	19,552	48	18,591**	27
<b>Secretaries/Bookkeepers:</b>						
Salary	15,364	100	13,840	100	12,205	100
Bonuses	1,083	59	1,084	50	925	30
Benefits	2,806	91	2,383	79	2,318*	66
Total Compensation	19,279	53	16,965	45	14,978*	19

\* - indicates 5 or fewer observations and \*\* indicates 10 or fewer observations.

<sup>a</sup> - A large annual volume is defined as being greater than \$3,000,000, a medium annual sales volume is defined as being less than or equal to \$3,000,000 and greater than or equal to \$1,500,000, and a small annual sales volume is defined as being less than \$1,500,000.

<sup>b</sup> - refers to the percentage of employees who receive a particular type of compensation.

is defined as being less than \$1,500,000.

In the managerial skill level category, employees of larger firms receive higher compensation. The only forms of managerial compensation for which larger firms do not provide higher compensation levels are bonuses and total compensation for owners/plant managers and benefits for plant managers. The percentage of managerial skill level employees who receive bonuses and benefits also tends to be slightly higher in firms with higher annual sales volumes. The most notable exception is that a higher percentage of owners/plant managers in medium-sized firms receive benefits than those in larger firms.

In the specialized skill level category, field sales-people tend to earn higher compensation in larger firms. The percentage of employees who receive bonuses and benefits is higher for those in larger firms.

Larger firms provide higher compensation to general skill level employees. The only exceptions in the general skill level category are the lower benefits for general plant personnel and bonuses for secretaries/bookkeepers. The percentage of employees who receive bonuses and benefits is higher in larger firms.

### **3.4.3 Comparison of Compensation With Form of Firm Ownership**

Managerialist theory implies that investor-oriented firms (I.O.F.) may provide higher compensation than cooperatives. Table 3.7 presents a comparison of compensation broken down by form of firm ownership.

Cooperatives tend to provide plant managers with similar bonuses and benefits, but higher salaries and total compensation. Cooperatives provide assistant plant managers with lower bonuses and total compensation, and with slightly higher benefits. Overall, the level of compensation does not exhibit a clear pattern across form of firm ownership, except that bonuses tend to be lower in cooperatives. The percentage of managerial skill level employees who receive bonuses is lower in cooperatives, while the percentage that receive benefits is slightly higher in cooperatives.

In the specialized skill level category, cooperatives tend to provide field salespeople with lower compensation. Cooperatives also tend to provide a lower percentage of specialized skill level employees with bonuses and benefits.

Cooperatives tend to provide employees in the general plant personnel with slightly lower compensation, and secretaries/bookkeepers with slightly higher compensation. In both positions, cooperatives tend to give lower bonuses and higher benefits than investor-oriented firms. The percent-

**Table 3.7 Employee Compensation by Form of Ownership**

	<u>Cooperative</u>		<u>I.O.F.</u>	
	Level(\$)	Percentage <sup>a</sup>	Level(\$)	Percentage
<b>Owners/Plant Managers:</b>				
Salary	n/a	n/a	32,478	100
Bonuses	n/a	n/a	10,700	67
Benefits	n/a	n/a	3,415	81
Total Compensation	n/a	n/a	45,173	64
<b>Plant Managers:</b>				
Salary	32,165	100	27,047	100
Bonuses	4,424	76	4,711	92
Benefits	4,113	85	4,208	84
Total Compensation	42,781	66	35,765	80
<b>Assistant Plant Managers:</b>				
Salary	22,125	100	22,130	100
Bonuses	1,676	64	3,052	76
Benefits	3,614	96	3,510	93
Total Compensation	27,544	64	28,980	70
<b>Field Salespeople:</b>				
Salary	22,227	100	23,235	100
Bonuses	1,537	55	3,222	90
Benefits	3,192 <sup>**</sup>	82	3,528	86
Total Compensation	27,969 <sup>**</sup>	36	29,477	70
<b>General Plant Personnel:</b>				
Salary	16,168	100	16,712	100
Bonuses	968	55	1,398	52
Benefits	2,861	91	2,855	86
Total Compensation	20,702	48	21,178	47
<b>Secretaries/Bookkeepers:</b>				
Salary	14,244	100	13,775	100
Bonuses	932	49	1,111	47
Benefits	2,764	86	2,428	77
Total Compensation	17,743	45	17,700	39

\* - indicates 5 or fewer observations and \*\* indicates 10 or fewer observations.

<sup>a</sup> - refers to the percentage of employees receiving a particular type of compensation.

age of general skill level employees who are paid benefits is slightly higher in cooperatives.

#### 3.4.4 Comparison of Compensation With Education After High School

According to human capital theory, compensation increases with investments in education. A comparison of compensation broken down by education after high school is presented in Table 3.8. Compensation is broken down into three groups - respondents with zero, one to three, or more than four years of education after high school.

Compensation in the managerial skill level category tends to increase with education after high school. The most notable exception is that bonuses for plant managers and assistant plant managers without education after high school are higher than those with four or more years of education after high school. The percentage of owners/plant managers who receive bonuses and benefits tends to increase with average firm levels of education after high school. There is no pattern for the percentage of employees earning bonuses and benefits by education after high school in the plant manager and assistant plant manager positions.

Compensation tends to increase with education after high school for specialized skill level employees. The percentage of field salespeople who receive benefits is

**Table 3.8 Compensation by Education After High School**

Years of Education <u>After High School:</u>	0		1-3		4+	
	Level(\$)	Percentage <sup>a</sup>	Level(\$)	Percentage	Level(\$)	Percentage
<b>Owners/Plant Managers:</b>						
Salary	31,056	100	27,892	100	36,302	100
Bonuses	5,136	** 50	7,011	63	12,900	77
Benefits	3,011	** 64	3,153	88	3,742	82
Total Compensation	42,916	* 36	39,313	67	49,376	74
<b>Plant Managers:</b>						
Salary	25,228	100	29,961	100	31,089	100
Bonuses	5,136	81	4,210	90	4,622	88
Benefits	3,825	83	4,160	90	4,516	80
Total Compensation	34,573	69	38,432	85	40,453	70
<b>Assistant Plant Managers:</b>						
Salary	20,507	100	23,161	100	24,896	100
Bonuses	2,288	73	3,495	68	1,845	** 77
Benefits	3,116	93	4,137	93	3,596	** 100
Total Compensation	26,390	68	30,802	64	30,105	** 77
<b>Field Salespeople:</b>						
Salary	21,290	100	23,648	100	24,000	100
Bonuses	1,250	80	2,840	78	4,925	80
Benefits	2,946	84	3,848	82	3,481	90
Total Compensation	26,533	64	30,400	63	30,861	70
<b>General Plant Personnel:</b>						
Salary	16,318	100	23,648	100	n/a	n/a
Bonuses	1,159	50	2,840	63	n/a	n/a
Benefits	2,838	86	3,848	91	n/a	n/a
Total Compensation	20,314	43	23,011	60	n/a	n/a
<b>Secretaries/Bookkeepers:</b>						
Salary	13,624	100	14,084	100	14,541	100
Bonuses	1,019	50	1,011	45	1,633	** 43
Benefits	2,696	79	2,505	83	1,490	** 64
Total Compensation	17,633	42	17,782	41	17,800	* 36

\* - indicates 5 or fewer observations and \*\* indicates 10 or fewer observations.

<sup>a</sup> - refers to the percentage of employees who receive a particular type of compensation.

higher for those with more than four years of education after high school.

In the general skill level category, compensation increases with education in each of the skill level positions. The percentage of general plant personnel who earn bonuses and benefits is higher for firms with more educated employees. The percentage of secretaries/bookkeepers who earn each form of compensation follows no pattern across education levels.

#### **3.4.5 Comparison of Compensation With Agribusiness Work Experience**

Human capital theory states that investments in work experience also increase compensation. Table 3.9 presents a comparison of compensation broken down by agribusiness work experience for each of the three skill level categories. Compensation is broken down into three groups - respondents with either one to five, six to ten, eleven to twenty, or twenty-one or more years of agribusiness work experience.

For the managerial skill level category, salaries and total compensation tend to be higher for firms with more experienced employees, while bonuses and benefits show no pattern. The percentage of managerial skill level employees who earn bonuses and benefits tends to decrease with years of agribusiness work experience.

In the specialized skill level category, compensation

**Table 3.9 Compensation by Average Agribusiness Work Experience**

Years of Agribusiness

<u>Work Experience:</u>	1-5		6-10		11-20		21+	
	Level(\$)	% <sup>a</sup>	Level(\$)	%	Level(\$)	%	Level(\$)	%
<b>Owners/Plant Managers:</b>								
Salary	28,250*	100	27,766	100	33,258	100	37,026	100
Bonuses	2,000*	47	5,920	78	10,963	61	17,364	71
Benefits	2,975*	81	3,527	83	3,499	82	3,077**	71
Total Compensation	36,750	38	37,575	77	49,042	63	46,967**	57
<b>Plant Managers:</b>								
Salary	26,463	100	26,564	100	28,387	100	35,331	100
Bonuses	4,250**	91	4,243	88	3,869	84	7,461	85
Benefits	3,665**	91	4,389	88	4,077	80	4,323	85
Total Compensation	34,667	82	34,438	77	37,292	70	47,040	80
<b>Assistant Plant Managers:</b>								
Salary	20,518	100	22,509	100	22,047	100	24,100*	100
Bonuses	2,829**	64	2,452	73	2,394	70	4,625*	100
Benefits	3,160	100	3,608	91	3,669	97	3,200*	100
Total Compensation	24,577**	64	28,547	61	29,055	73	31,925*	100
<b>Field Salespeople:</b>								
Salary	17,684	100	25,200	100	24,536	100	24,167**	100
Bonuses	2,604	73	3,773	80	2,470	91	717*	50
Benefits	2,704**	73	3,890	84	3,556	91	3,083*	100
Total Compensation	23,925**	53	31,103	64	29,546	82	34,883*	50
<b>General Plant Personnel:</b>								
Salary	15,736	100	17,023	100	17,184	100	n/a	n/a
Bonuses	1,251	46	1,340	54	1,168	63	n/a	n/a
Benefits	2,690	81	2,978	91	2,888	93	n/a	n/a
Total Compensation	20,598	38	21,796	51	20,203	57	n/a	n/a
<b>Secretaries/Bookkeepers:</b>								
Salary	13,366	100	14,164	100	14,349	100	17,060*	100
Bonuses	821	48	1,390	44	1,091	38	1,350*	100
Benefits	2,362	72	2,749	87	2,398	85	3,383*	80
Total Compensation	15,990	40	19,057	37	18,649	44	21,696*	80

\* - indicates 5 or fewer observations and \*\* indicates 10 or fewer observations.

<sup>a</sup> - refers to the percentage of employees receiving a particular type of compensation.

tends to be higher in firms whose employees have an average of 6 to 10 years of agribusiness work experience than those with an average of 1 to 5 years of agribusiness work experience. However, employees with more than 10 years of agribusiness work experience tend to be compensated at a slightly lower rate than those with less experience. In the field salespeople position, the percentage of employees who receive bonuses and benefits tends to be higher for more experienced employees.

Compensation for the general skill level category parallels that in the specialized skill level category. Compensation increases with agribusiness work experience in the classifications for employees with 10 years or less of agribusiness work experience. However, as in the specialized skill level category, compensation is slightly lower in the classifications for employees with more than 10 years of agribusiness work experience. The percentage of general plant personnel who earn bonuses and benefits is higher for more educated employees. For secretaries/bookkeepers, the percentage earning bonuses and benefits is not influenced by agribusiness work experience.

### **3.4.6 Conclusions for Comparisons of Compensation for Different Firms**

Comparing compensation across the various firm and employee factors has revealed several trends. In the managerial skill level category, compensation tends to follow a pattern that is concurrent with neoclassical, managerialist, and human capital theories. Employment in a cooperative tends to decrease the bonuses for managerial skill level positions. The percentage of managerial skill level employees who receive bonuses and benefits is higher for those who work for more profitable and/or larger firms and for those who have higher levels of agribusiness work experience. In comparison to investor-oriented firms, cooperatives provide a lower percentage of managerial skill level employees with bonuses and benefits.

Compensation for the specialized skill level category tends to be consistent with managerialist and human capital theories. Specialized skill level employees working for cooperatives tend to receive lower bonuses than those working for investor-oriented firms. Cooperatives also tend to provide a lower percentage of their employees with bonuses and benefits. The percentage of employees earning bonuses and benefits tends to be higher for those employed in more profitable and/or larger firms and for those better educated and/or more experienced.

Compensation for general skill level employees tends to conform neoclassical, managerialist, and human capital theories. In comparison to investor-oriented firms, cooperatives provide general skill level employees with lower bonuses. The percentage of general skill level employees who receive bonuses and benefits tends to be higher in larger firms and cooperatives.

### 3.5 Examination of the Correlations Between Various Firm, Employee, and Compensation Characteristics

The correlation coefficients between firm characteristics are presented in Table 3.10. An examination of the correlation coefficients between these factors - the firm's net return, annual sales volume, and the cooperative form of ownership - reveals that the only significant positive correlation is between annual sales volume and the cooperative form of ownership. The firm's net return is not significantly correlated to the other firm characteristics.

The correlation coefficients for compensation and employee characteristics of the managerial skill level category are given in Table 3.11. In the managerial skill level category, total compensation tends to have a significant positive correlation to the other forms of compensation: salaries, bonuses, and benefits. The only exception is that total compensation for owners/plant managers is not correlated to their benefits. Salary tends to have a sig-

**Table 3.10 Correlation Coefficients Between Firm Characteristics**

**Firm Characteristics:**

	COOPERATIVE	ANN. SALES VOLUME	NET RETURN
COOPERATIVE	1.0000 (0.00) <sup>a</sup>		
ANNUAL SALES VOLUME	0.2994 (0.00)	1.0000 (0.00)	
NET RETURN	-0.0808 (0.29)	-0.0854 (0.26)	1.0000 (0.00)

<sup>a</sup> - Probability > |R| under H<sub>0</sub>: Rho = 0.

**Table 3.11 Correlation Coefficients for the Managerial Skill Level Category**

Owners/Plant Managers:

	SALARY	BONUS	BENEFITS	TOTAL COMPENSATION	EDUCATION	WORK EXPERIENCE	COOPER- ATIVE	ANN.SALES VOLUME	NET RETURN
SALARY	1.0000 (0.00)*								
BONUS	0.4025 (0.00)	1.0000 (0.00)							
BENEFITS	0.0761 (0.57)	-0.1917 (0.20)	1.0000 (0.00)						
TOTAL COMPENSATION	0.7838 (0.00)	0.7813 (0.00)	-0.0083 (0.96)	1.0000 (0.00)					
EDUCATION	0.1992 (0.09)	0.1297 (0.35)	0.2030 (0.13)	0.2043 (0.17)	1.0000 (0.00)				
WORK EXPERIENCE	0.1957 (0.10)	0.3463 (0.01)	-0.0558 (0.68)	0.2060 (0.17)	-0.0793 (0.51)	1.0000 (0.00)			
COOPERATIVE	n/a	n/a	n/a	n/a	n/a	n/a	1.0000 (0.00)		
ANNUAL SALES VOLUME	0.3458 (0.00)	0.2544 (0.06)	-0.0540 (0.68)	0.1273 (0.40)	0.1292 (0.28)	0.0917 (0.45)	n/a	1.0000 (0.00)	
NET RETURN	-0.0528 (0.66)	0.0428 (0.76)	0.0048 (0.97)	0.0735 (0.63)	-0.1282 (0.28)	0.0826 (0.49)	n/a	-0.1139 (0.34)	1.0000 (0.00)

\* - Probability > |R| under  $H_0$ : Rho = 0.

**Table 3.11 (cont.) Correlation Coefficients for the Managerial Skill Level Category**

Plant Managers:

	SALARY	BONUS	BENEFITS	TOTAL COMPENSATION	EDUCATION	WORK EXPERIENCE	COOPERA- TIVE	ANN.SALES VOLUME	NET RETURN
SALARY	1.0000 (0.00)*								
BONUS	0.1780 (0.08)	1.0000 (0.00)							
BENEFITS	0.2074 (0.04)	-0.0547 (0.62)	1.0000 (0.00)						
TOTAL COMPENSATION	0.8941 (0.00)	0.4897 (0.00)	0.3700 (0.00)	1.0000 (0.00)					
EDUCATION	0.2444 (0.01)	-0.0269 (0.79)	0.1500 (0.14)	0.1737 (0.11)	1.0000 (0.00)				
WORK EXPERIENCE	0.3616 (0.00)	0.2111 (0.03)	0.0800 (0.44)	0.4384 (0.00)	-0.1638 (0.08)	1.0000 (0.00)			
COOPERATIVE	0.3154 (0.00)	-0.0286 (0.78)	-0.0209 (0.84)	0.3341 (0.00)	0.0532 (0.57)	0.3132 (0.00)	1.0000 (0.00)		
ANNUAL SALES VOLUME	0.3480 (0.00)	0.0425 (0.67)	-0.0588 (0.57)	0.2701 (0.01)	0.0031 (0.97)	0.1614 (0.08)	0.2348 (0.01)	1.000 (0.00)	
NET RETURN	0.0077 (0.93)	0.1585 (0.11)	-0.0429 (0.68)	0.0589 (0.59)	0.0160 (0.87)	0.2006 (0.03)	-0.1094 (0.26)	-0.1776 (0.06)	1.0000 (0.00)

\* - Probability > |R| under  $H_0$ : Rho = 0.

**Table 3.11 (cont.) Correlation Coefficients for the Managerial Skill Level Category**

Assistant Plant Managers:

	SALARY	BONUS	BENEFITS	TOTAL COMPENSATION	EDUCATION	WORK EXPERIENCE	COOPERA- TIVE	ANN.SALES VOLUME	NET RETURN
SALARY	1.0000 (0.00)*								
BONUS	0.2130 (0.10)	1.0000 (0.00)							
BENEFITS	0.2624 (0.02)	0.2615 (0.05)	1.0000 (0.00)						
TOTAL COMPENSATION	0.8772 (0.00)	0.5792 (0.00)	0.6147 (0.00)	1.0000 (0.00)					
EDUCATION	0.3154 (0.00)	-0.0279 (0.83)	0.1446 (0.21)	0.2173 (0.11)	1.0000 (0.00)				
WORK EXPERIENCE	0.0908 (0.42)	0.1165 (0.38)	0.0296 (0.80)	0.2575 (0.06)	-0.1394 (0.21)	1.0000 (0.00)			
COOPERATIVE	-0.0006 (1.00)	-0.2931 (0.02)	0.0281 (0.81)	-0.1065 (0.44)	0.0063 (0.96)	0.3133 (0.00)	1.0000 (0.00)		
ANNUAL SALES VOLUME	0.1846 (0.10)	-0.0170 (0.90)	-0.0755 (0.52)	0.0856 (0.53)	0.0473 (0.67)	0.1064 (0.34)	0.2105 (0.06)	1.0000 (0.00)	
NET RETURN	-0.0404 (0.72)	0.0410 (0.76)	-0.0830 (0.48)	0.0904 (0.51)	-0.1477 (0.19)	0.0431 (0.70)	-0.0081 (0.94)	-0.0784 (0.49)	1.0000 (0.00)

\* - Probability > |R| under  $H_0$ : Rho = 0.

nificant positive correlation with annual sales volume and education after high school. A significant positive correlation is also present between the cooperative form of ownership and agribusiness work experience.

The correlation coefficients for compensation and employee characteristics of the specialized skill level category are contained in Table 3.12. For specialized skill level employees, total compensation has a significant positive correlation to each form of compensation. Salary tends to have a significant positive correlation with annual sales volume and agribusiness work experience. Annual sales volume and agribusiness work experience also have significant positive correlations with bonuses and total compensation, respectively. There is also a significant positive correlation to annual sales volume and both the cooperative form of ownership and education after high school, and a significant negative correlation to the firm's net return and education after high school.

The correlation coefficients for compensation and employee characteristics of the general skill level category are presented in Table 3.13. As with the managerial and specialized skill level categories, total compensation tends to have a significant positive correlation to each form of compensation. Salary and total compensation tend to have significant positive correlations with annual sales volume and agribusiness work experience. There is also a signifi-

**Table 3.12 Correlation Coefficients for the Specialized Skill Level Category**

Field Salespeople:

	SALARY	BONUS	BENEFITS	TOTAL COMPENSATION	EDUCATION	WORK EXPERIENCE	COOPERA- TIVE	ANN.SALES VOLUME	NET RETURN
SALARY	1.0000 (0.00) <sup>a</sup>								
BONUS	0.3896 (0.00)	1.0000 (0.00)							
BENEFITS	0.4964 (0.00)	0.3858 (0.01)	1.0000 (0.00)						
TOTAL COMPENSATION	0.9123 (0.00)	0.5904 (0.00)	0.7386 (0.00)	1.0000 (0.00)					
EDUCATION	0.2084 (0.08)	0.3902 (0.00)	0.1274 (0.33)	0.2429 (0.10)	1.0000 (0.00)				
WORK EXPERIENCE	0.2556 (0.03)	-0.1011 (0.45)	0.0822 (0.53)	0.3217 (0.03)	-0.0901 (0.45)	1.0000 (0.00)			
COOPERATIVE	-0.0744 (0.53)	-0.1801 (0.18)	-0.0795 (0.54)	-0.0691 (0.64)	-0.0537 (0.65)	0.0610 (0.61)	1.0000 (0.00)		
ANNUAL SALES VOLUME	0.2844 (0.02)	0.4047 (0.00)	0.0429 (0.74)	0.2415 (0.10)	0.2752 (0.02)	0.0103 (0.93)	0.1498 (0.21)	1.0000 (0.00)	
NET RETURN	-0.0984 (0.41)	-0.1793 (0.18)	-0.1550 (0.23)	-0.1869 (0.21)	-0.3034 (0.01)	0.1880 (0.11)	-0.0017 (0.98)	0.0350 (0.77)	1.0000 (0.00)

<sup>a</sup> - Probability > |R| under H<sub>0</sub>: Rho = 0.

**Table 3.13 Correlation Coefficients for the General Skill Level Category**

General Plant Personnel:

	SALARY	BONUS	BENEFITS	TOTAL COMPENSATION	EDUCATION	WORK EXPERIENCE	COOPERA- TIVE	ANN.SALES VOLUME	NET RETURN
SALARY	1.0000 (0.00) <sup>a</sup>								
BONUS	0.3548 (0.00)	1.0000 (0.00)							
BENEFITS	0.2226 (0.01)	0.1993 (0.10)	1.0000 (0.00)						
TOTAL COMPENSATION	0.9186 (0.00)	0.5662 (0.00)	0.4974 (0.00)	1.0000 (0.00)					
EDUCATION	0.0560 (0.49)	0.1632 (0.15)	0.0164 (0.85)	0.2076 (0.08)	1.0000 (0.00)				
WORK EXPERIENCE	0.1772 (0.03)	-0.0116 (0.92)	0.0722 (0.41)	-0.0137 (0.91)	-0.0752 (0.36)	1.0000 (0.00)			
COOPERATIVE	-0.0714 (0.38)	-0.1738 (0.12)	0.0018 (0.98)	-0.0467 (0.70)	-0.0118 (0.89)	0.0083 (0.92)	1.000 (0.00)		
ANNUAL SALES VOLUME	0.3323 (0.00)	0.1982 (0.08)	0.0401 (0.63)	0.4156 (0.00)	0.1597 (0.05)	0.0477 (0.56)	0.2942 (0.00)	1.0000 (0.00)	
NET RETURN	0.0952 (0.25)	-0.1235 (0.27)	-0.1033 (0.24)	-0.0481 (0.69)	-0.0390 (0.63)	0.0256 (0.76)	-0.0967 (0.24)	-0.1028 (0.21)	1.0000 (0.00)

<sup>a</sup> - Probability > |R| under H<sub>0</sub>: Rho = 0.

**Table 3.13 (cont.) Correlation Coefficients for the General Skill Level Category**

Secretaries/Bookkeepers:

	SALARY	BONUS	BENEFITS	TOTAL COMPENSATION	EDUCATION	WORK EXPERIENCE	COOPER- ATIVE	ANN.SALES VOLUME	NET RETURN
SALARY	1.0000 (0.00) <sup>a</sup>								
BONUS	0.2225 (0.04)	1.0000 (0.00)							
BENEFITS	0.2666 (0.00)	0.2678 (0.02)	1.0000 (0.00)						
TOTAL COMPENSATION	0.9151 (0.00)	0.4652 (0.00)	0.5424 (0.00)	1.0000 (0.00)					
EDUCATION	0.0676 (0.37)	0.1694 (0.12)	-0.2100 (0.01)	0.0300 (0.80)	1.000 (0.00)				
WORK EXPERIENCE	0.1944 (0.01)	0.2040 (0.06)	0.0984 (0.25)	0.3365 (0.00)	-0.0820 (0.28)	1.000 (0.00)			
COOPERATIVE	0.0658 (0.39)	-0.0850 (0.43)	0.1324 (0.12)	0.0049 (0.97)	-0.122 (0.11)	0.0552 (0.47)	1.000 (0.00)		
ANNUAL SALES VOLUME	0.3010 (0.00)	0.1472 (0.17)	0.1198 (0.16)	0.3202 (0.01)	-0.0822 (0.28)	0.0192 (0.80)	0.2994 (0.00)	1.0000 (0.00)	
NET RETURN	-0.0861 (0.26)	-0.1097 (0.31)	-0.1424 (0.09)	-0.1856 (0.12)	0.0334 (0.66)	0.1023 (0.18)	-0.0808 (0.29)	-0.0854 (0.26)	1.0000 (0.00)

<sup>a</sup> - Probability > |R| under H<sub>0</sub>: Rho = 0.

cant positive correlation between annual sales volume and education after high school in the general plant personnel position.

In conclusion, total compensation tends to be correlated to salaries, bonuses, and benefits. Salary and total compensation tend to be correlated to annual sales volume and agribusiness work experience, which supports managerialist and human capital theories.

### 3.6 Comparisons to Previous Studies

This section compares the current research with results of previous studies using T.F.I. salary survey data. Taylor and Akridge presented a series of these articles, beginning in 1986, on the effects of firm sales, agribusiness work experience, form of ownership, and region of the country on compensation. Their results indicated that compensation was consistently higher for those employed in larger firms and for those with more experience, which is consistent with managerialist and human capital theories. In their 1988 and 1989 analyses, cooperatives provided lower bonuses. These results concur with the findings in the current research.

### 3.7 Model Specification

This analysis uses four compensation models for six different employee classifications of the retail fertilizer industry. The employee classifications consist of 1) owners/plant managers; 2) plant managers; 3) assistant plant managers; 4) field salespeople; 5) general plant personnel; and 6) secretaries/bookkeepers.

The dependent variables in the four compensation models are average annual salary, bonuses, benefits, and total compensation. Average annual total compensation is the sum of average annual salary, bonus, and benefits, when all three are reported.

Neoclassical theory is represented in the models through a variable measuring the net return of the firm (NETRET). The net return of the firm is defined as the pre-tax net profit divided by annual sales volume. The NETRET variable is entered in the models as a continuous variable and hypothesized to have a positive influence on compensation.

Managerialist theory is accounted for in the compensation models by a continuous variable measuring the dollar value of annual sales volume of the firm (VOLUME) and a zero-one binary variable in which one represents employment by either an affiliated or local cooperative (COOP). The VOLUME variable is expected to have a positive effect on

compensation. The COOP variable is expected to have a positive influence on salary, benefits, and total compensation, and a negative influence bonuses.

Human capital theory is accounted for by years of education after high school (EDAHS) and years of agribusiness work experience (WORKEXP). Both variables are continuous and are hypothesized to have positive influences on compensation. Since some employees in the sample have zero years of education after high school and the natural logarithm of zero is undefined, the EDAHS variable is formed by adding twelve to the reported number of years of education after high school.

The compensation models also have variables accounting for the influence of salaries (SALARY) on bonuses and benefits and for the employment of a plant manager in a firm with multiple branches (MULTI). The SALARY variable is continuous and included only in the benefits and bonuses models. The MULTI variable is a zero-one binary variable where the one represents employment in a multiple branch firm. The MULTI variable is include only in the compensation models for plant managers. Both the SALARY and MULTI variables are expected to have a positive effect on these aforementioned forms of compensation.

In sum, the models consist of:

- 1)  $\text{SALARY} = f(\text{NETRET}, \text{VOLUME}, \text{COOP}, \text{EDAHS}, \text{WORKEXP})$ ,

- 2) BONUS =  $f(\text{NETRET}, \text{VOLUME}, \text{COOP}, \text{EDAHS}, \text{WORKEXP}, \text{SALARY})$ ,
- 3) BENEFITS =  $f(\text{NETRET}, \text{VOLUME}, \text{COOP}, \text{EDAHS}, \text{WORKEXP}, \text{SALARY})$ ,
- 4) TOTAL COMPENSATION =  $f(\text{NETRET}, \text{VOLUME}, \text{COOP}, \text{EDAHS}, \text{WORKEXP})$ ,

where:

SALARY = the average annual salary of the firm's employees,

BONUS = the average annual bonuses of the firm's employees,

BENEFITS = the average annual benefits of the firm's employees,

TOTAL COMPENSATION = the average annual total compensation of the firm's employees,

NETRET = the net return of the firm,

VOLUME = the dollar value of the annual sales volume of the firm,

COOP = the firm being structured as a cooperative,

EDAHS = the average years of education after high school for the firm's employees plus twelve, and

WORKEXP = the average years of agribusiness work experience for the firm's employees.

The functional form used during estimation is a double-log.

All continuous variables are transformed and entered as natural logarithms.

### 3.8 Conclusions

This section presented a summary of the data, a comparison of compensation with certain firm and employee factors, an examination of correlation coefficients, and an

outline of the compensation models. The comparison of compensation with certain firm and employee factors revealed that the data tend to support neoclassical, managerialist, and human capital theories. The examination of correlation coefficients indicated support for managerialist and human capital theories. These results are further supported by previous researchers using similar data.

## **4. RESULTS**

### **4.1 Introduction**

This chapter contains the results from estimating the compensation models presented in the previous chapter. The models express average annual salaries, bonuses, benefits, and total compensation as a function of several independent variables, including firm profit and size and information on the average levels of human capital for these firms. Each of these four types of compensation are estimated for the six different employee types already presented.

### **4.2 Results of Testing the Assumptions Underlying the Compensation Models**

The usefulness of the results from the compensation models depends on the fulfillment of the statistical assumptions made during estimation. The purpose of this section is to present findings from testing these assumptions. Each of the compensation models can be summarized mathematically as follows,  $y_t = B'X_t + u_t$ , where  $y_t$  is either natural logarithm of salary, bonuses, benefits, and total compensation,  $B'$  are unknown parameters,  $X_t$  is a relevant vector of natural logarithms of independent variables explaining  $y_t$ , and  $u_t$  is a random disturbance term. The underlying assumptions of the regression models are:

- 1)  $f(y_t/x_t; \theta)$  is normally distributed, implying that  $f(u_t/x_t; \theta)$  is normally distributed,
- 2)  $E(y_t/x_t=x_t) = B'x_t$ , is linear in  $x_t$ ,
- 3)  $Cov(y_t/x_t=x_t) = E(u_t^2/x_t=x_t) = \sigma^2$  is homoskedastic,
- 4)  $(y_1, y_2, \dots, y_T)$  is an independent sample drawn from  $f(y_t/x_t; \theta)$ .

Normality is tested by using the skewness-kurtosis test (see Spanos). The test for linearity is based on the significance of the coefficients on  $\hat{y}^2$  and  $\hat{y}^3$  in an auxillary regression of  $Y$  on these variables and the original independent variables. The test for homoskedasticity is based on the significance of the coefficients on  $\hat{u}^2$  and  $\hat{u}^3$  in an auxillary regression of  $\hat{u}^2$  on these variables and the original independent variables. Independence is tested using the Durbin Watson statistic. Although the data are cross sectional, the Durbin Watson statistic is a relevant test statistic for independence (See Spanos). This test for independence is most useful when the data are sorted in some logical manner (e.g., sorted by one of the dependent variables). In this particular case, the data were sorted by salary. In addition to assuming the relevance of testing the independence assumption via the Durbin Watson statistic, graphical methods are also employed.

Normality is rejected in every bonus model, except the field salespeople's model. Additional models rejecting normality include the salary models for field salespeople

and general plant personnel, and the benefits model for secretaries/bookkeepers. In all models, linearity and homoskedasticity could not be rejected. In contrast, the Durbin Watson statistic from the salary and total compensation models indicated that the assumption of independence is violated in these models. This was confirmed by graphing  $\hat{Y}$  against  $Y$ . These graphs indicate that the models over predict for low values of  $y_t$  and under predict for higher values of  $y_t$ .

There are two approaches to viewing violations of independence: 1) the autocorrelation approach and 2) an approach developed by Spanos. Under the autocorrelation approach, violations of independence are tackled by assuming first order autocorrelation, and making appropriate adjustments using estimation techniques such as the Cochrane-Orcutt technique. However, Spanos shows that these types of solutions are only appropriate in very few, if any, situations. The second approach views violations of independence as a consequence of a misspecified model. If the dependence problem cannot be cured by respecifying the model, then the estimates of  $B$  and  $\sigma^2$ , as well as their standard errors are all biased and inconsistent. Thus, the results cannot be interpreted. The models were respecified many different times, but the independence problem could not be corrected. To cure this problem, further research may require information on the employees' starting or previous year's salary.

Hence, these tests for the assumptions indicate that the use of the results from these compensation models are invalid because the samples used by the models reject independence. In addition, normality is rejected in several models, which leads to an additional question on the validity of the results. Thus, the models are misspecified and the results are interpreted knowing that the models are biased.

#### 4.3 Results of the Compensation Models for Owners/Plant Managers

Table 4.1 shows the results of the owners/plant managers' compensation models. Annual sales volume is the only statistically significant determinant of salary for owners/plant managers. A one percent increase in annual sales volume leads to a 0.17 percent increase in salary. Bonuses and benefits for owners/plant managers are not explained successfully. The adjusted r-squared for each of these models is negative. Annual sales volume is the only statistically significant determinant of total compensation. A one percent increase in annual sales volume increases total compensation by 0.12 percent.

In conclusion, owners/plant managers' salary and total compensation conform to managerialist theory and the models are successful in explaining salary and total compensation.

**Table 4.1 Parameter Estimates of the Compensation Models  
for Owners/Plant Managers.**

Dependent Variable	Salary	Bonus	Benefits	Total Compensation
Intercept	6.078425 ** (1.0260) <sup>a</sup>	0.628597 (13.935)	4.583434 * (2.2571)	6.672374 ** (1.4470)
NETRET	0.012248 (0.0283)	0.146307 (0.2816)	0.031366 (0.0411)	0.055847 (0.0308)
VOLUME	0.172279 ** (0.0408)	0.364239 (0.4761)	-0.050285 (0.0686)	0.120140 * (0.0540)
COOP	-----	-----	-----	-----
EDAHS	0.491770 (0.3204)	-2.530741 (3.9146)	0.810746 (0.5590)	0.632220 (0.4613)
WORKEXP	0.138403 (0.0775)	0.162457 (0.8615)	-0.060644 (0.1248)	0.157744 (0.1010)
SALARY	-----	0.767241 (1.2947)	0.207297 (0.2079)	-----
N	72	54	58	46
R-squared	0.272	0.046	0.082	0.260
Adj. R-squared	0.228	-0.053	-0.006	0.187

<sup>a</sup> - Values for the standard errors appear in parentheses.

\* - indicates significance at 0.05 or less under traditional t-test.

\*\* - indicates nominal significance at .05 or less under Bonferroni's test statistic, which adjusts the usual significance level for the fact that four hypotheses are being tested simultaneously.

However, bonuses and benefits for owners/plant managers are not explained successfully.

#### 4.4 Results of the Compensation Models for Plant Managers

Table 4.2 presents the parameter estimates for the plant managers' compensation models. Annual sales volume, education after high school, and agribusiness work experience are the statistically significant determinants of salary for plant managers. Annual sales volume is the only statistically significant variable in the bonuses model, and salary is the only statistically significant variable in the benefits model. Education after high school and agribusiness work experience are important determinants of total compensation for plant managers. A one percent increase in education after high school and agribusiness work experience increases total compensation by 0.48 and 0.11 percent, respectively.

Plant managers's salary and total compensation conform to human capital theory. Managerialist theory is important in explaining salary and bonuses. Salary has a positive impact on benefits. Each form of compensation for plant managers is explained successfully.

**Table 4.2 Parameter Estimates of the Compensation Models  
for Plant Managers.**

Dependent Variable	Salary	Bonus	Benefits	Total Compensation
Intercept	7.076002 ** (0.6046) <sup>a</sup>	-4.896318 (6.2562)	1.361415 (2.4933)	8.178003 ** (0.7596)
NETRET	-0.000198 (0.0156)	0.166154 (0.1033)	-0.059640 (0.0400)	0.001705 (0.0183)
VOLUME	0.079224 ** (0.0246)	0.353060 * (0.1785)	-0.007193 (0.0647)	0.051152 (0.0304)
EDAHS	0.637850 ** (0.1722)	-0.075196 (1.2474)	0.663540 (0.4589)	0.479767 * (0.2092)
WORKEXP	0.109463 ** (0.0375)	-0.091831 (0.2551)	0.036655 (0.0985)	0.109944 * (0.0431)
COOP	0.076306 (0.0498)	-0.224791 (0.3726)	-0.142783 (0.1272)	0.082233 (0.0641)
SALARY	-----	0.759137 (0.6372)	0.512998 * (0.2505)	-----
MULTI	0.025709 (0.0525)	0.025695 (0.3782)	-0.012128 (0.1319)	0.028520 (0.0667)
N	115	101	97	86
R-squared	0.291	0.090	0.117	0.232
Adj. R-squared	0.252	0.021	0.048	0.174

<sup>a</sup> - Values for the standard errors appear in parentheses.

\* - indicates significance at 0.05 or less under traditional t-test.

\*\* - indicates nominal significance at .05 or less under Bonferroni's test statistic.

#### **4.5 Results of the Compensation Models for Assistant Plant Managers**

Table 4.3 shows the parameter estimates of the assistant plant managers' compensation models. Annual sales volume, education after high school, and agribusiness work experience are significant in the salary model. Bonuses and benefits for assistant plant managers are not explained successfully. Annual sales volume, education after high school, and agribusiness work experience are the statistically significant determinants of total compensation. A one percent increase in annual sales volume, education, and agribusiness work experience leads to increases in total compensation of 0.07, 0.47, and 0.11 percent, respectively.

In conclusion, salary for assistant plant managers is consistent with managerialist and human capital theories. Total compensation conforms to human capital theory. Bonuses and benefits for assistant plant managers are not explained successfully.

#### **4.6 Results of the Compensation Models for Field Salespeople**

Table 4.4 presents the parameter estimates for the field salespeople's compensation models. Annual sales volume and agribusiness work experience are the statistically significant determinants of salary for field salespeople. The cooperative form of ownership, education after high

**Table 4.3 Parameter Estimates of the Compensation Models  
for Assistant Plant Managers.**

Dependent Variable	Salary	Bonus	Benefits	Total Compensation
Intercept	7.598748 ** (0.5615) <sup>a</sup>	1.184834 (11.339)	1.749785 (2.6844)	7.763917 ** (0.7590)
NETRET	0.007524 (0.0134)	-0.049001 (0.1243)	0.009516 (0.0344)	0.023172 (0.0148)
VOLUME	0.052466 * (0.0226)	-0.011296 (0.2739)	-0.006732 (0.0626)	0.066541 (0.0350)
COOP	-0.052680 (0.0470)	-0.674071 (0.4795)	0.032228 (0.1237)	-0.086479 (0.0595)
EDAHS	0.557650 ** (0.1888)	-1.054582 (1.9488)	0.641175 (0.5087)	0.466897 * (0.2201)
WORKEXP	0.072474 * (0.0363)	-0.130836 (0.3947)	0.075049 (0.0951)	0.110267 * (0.0443)
SALARY	-----	0.966106 (1.2932)	0.456058 (0.2969)	-----
N	81	60	76	55
R-squared	0.207	0.056	0.097	0.259
Adj. R-squared	0.154	-0.051	0.018	0.184

<sup>a</sup> - Values for the standard errors appear in parentheses.

\* - indicates significance at 0.05 or less under traditional t-test.

\*\* - indicates nominal significance at .05 or less under Bonferroni's test statistic.

**4.4 Parameter Estimates of the Compensation Models  
for Field Salespeople.**

Dependent Variable	Salary	Bonus	Benefits	Total Compensation
Intercept	7.659584 ** (0.6437) <sup>a</sup>	-12.62802 ** (4.8303)	-4.179655 (2.8610)	7.078250 ** (0.9332)
NETRET	0.000624 (0.0169)	0.030193 (0.0605)	0.038097 (0.0454)	0.012402 (0.0213)
VOLUME	0.112506 ** (0.0335)	0.071549 (0.1633)	-0.019441 (0.0842)	0.104383 * (0.0504)
COOP	-0.069016 (0.0586)	-0.578692 * (0.2628)	-0.019866 (0.1439)	-0.085825 (0.0906)
EDAHS	0.147233 (0.2494)	2.749652 ** (0.9719)	0.496472 (0.5882)	0.501711 (0.3005)
WORKEXP	0.141330 ** (0.0357)	-0.417196 * (0.1722)	-0.054677 (0.0908)	0.134528 ** (0.0459)
SALARY	-----	1.277694 * (0.5490)	1.121571 ** (0.2938)	-----
N	72	57	61	47
R-squared	0.348	0.412	0.265	0.300
Adj. R-squared	0.299	0.341	0.183	0.214

<sup>a</sup> - Values for the standard errors appear in parentheses.

\* - indicates significance at 0.05 or less under traditional t-test.

\*\* - indicates nominal significance at .05 or less under Bonferroni's test statistic.

school, agribusiness work experience, and salary are important determinants of bonuses. A one percent increase in agribusiness work experience decreases bonuses by 0.42 percent. The only statistically significant variable in the benefits model for field salespeople is salary. The results from the field salespeople's total compensation and salary model are similar. As with the salary equation, annual sales volume and agribusiness work experience are significant. A one percent increase in annual sales volume and agribusiness work experience lead to 0.10 and 0.13 percent increases in total compensation, respectively.

Salary, bonuses, and total compensation for field salespeople tend to conform to managerialist and human capital theories. Agribusiness work experience has a negative impact on bonuses. Salary has a positive impact on bonuses and benefits.

#### 4.7 Results of the Compensation Models for General Plant Personnel

Table 4.5 provides the parameter estimates of the compensation models for general plant personnel. Annual sales volume, the cooperative form of ownership, and agribusiness work experience are the statistically significant determinants of salary for general plant personnel. In the bonus model, the cooperative form of ownership is the only statistically significant variable. Benefits are best

**Table 4.5 Parameter Estimates of the Compensation Models  
for General Plant Personnel.**

Dependent Variable	Salary	Bonus	Benefits	Total Compensation
Intercept	7.582613** (0.9219) <sup>a</sup>	-14.83401* (7.4694)	0.501543 (3.3220)	5.286697** (1.3884)
NETRET	0.018330 (0.0111)	-0.003200 (0.0882)	-0.023813 (0.0360)	-0.023470 (0.0200)
VOLUME	0.084507** (0.0171)	0.183937 (0.1372)	0.012537 (0.0543)	0.116798** (0.0262)
COOP	-0.087888* (0.0377)	-0.662994* (0.2640)	0.060562 (0.1134)	-0.105782 (0.0544)
EDAHS	0.306515 (0.3580)	3.877985 (2.7091)	-0.035805 (1.0495)	1.190939* (0.5286)
WORKEXP	0.048814* (0.0224)	-0.084556 (0.1706)	0.060752 (0.0675)	-0.016544 (0.0347)
SALARY	-----	0.978002 (0.5791)	0.733948** (0.2489)	-----
N	151	81	132	71
R-squared	0.188	0.201	0.091	0.304
Adj. R-squared	0.160	0.136	0.048	0.250

<sup>a</sup> - Values for the standard errors appear in parentheses.

\* - indicates significance at 0.05 or less under traditional t-test.

\*\* - indicates nominal significance at .05 or less under Bonferroni's test statistic.

explained by salary. Annual sales volume and education after high school are the statistically significant determinants of total compensation for general plant personnel. A one percent increase in annual sales volume and education after high school leads to an increase of 0.12 and 1.19 percent in total compensation, respectively.

In conclusion, salary and total compensation for general plant personnel conform to managerialist and human capital theories. The cooperative form of ownership has a negative impact on salaries. Bonuses are consistent with managerialist theory. Benefits for general plant personnel increase with salary.

#### **4.8 Results of the Compensation Models for Secretaries/Bookkeepers**

Table 4.6 presents the parameter estimates of the secretaries/bookkeepers' compensation models. Annual sales volume and agribusiness work experience are the important determinants of secretaries/bookkeepers' salary.

Bonuses for secretaries/bookkeepers are not estimated successfully. Education after high school and salary are statistically significant in the benefits model. A one percent increase in education after high school decreases benefits for secretaries/bookkeepers by 1.28 percent. Annual sales volume and agribusiness work experience are the statistically significant determinants of total compensation

**Table 4.6 Parameter Estimates of the Compensation Models  
for Secretaries/Bookkeepers.**

Dependent Variable	Salary	Bonus	Benefits	Total Compensation
Intercept	7.216040** (0.5613) <sup>a</sup>	-7.071083 (8.2244)	4.396875* (2.1835)	7.104122** (0.8642)
NETRET	-0.008770 (0.0114)	-0.045347 (0.1161)	-0.006691 (0.0298)	-0.030647 (0.0163)
VOLUME	0.093738** (0.0182)	0.179365 (0.2145)	0.054651 (0.0483)	0.116152** (0.0275)
COOP	-0.019378 (0.0390)	-0.481356 (0.3947)	0.110858 (0.0971)	-0.050860 (0.0544)
EDAHS	0.335757 (0.1843)	3.052617 (1.9948)	-1.287607** (0.4872)	0.330770 (0.2774)
WORKEXP	0.044892* (0.0189)	0.184755 (0.2112)	0.018490 (0.0504)	0.070026* (0.0285)
SALARY	-----	0.303392 (0.7772)	0.603284** (0.2126)	-----
N	176	87	140	72
R-squared	0.172	0.068	0.152	0.310
Adj. R-squared	0.148	-0.002	0.114	0.258

<sup>a</sup> - Values for the standard errors appear in parentheses.

\* - indicates significance at 0.05 or less under traditional t-test.

\*\* - indicates nominal significance at .05 or less under Bonferroni's test statistic.

for secretaries/bookkeepers. A one percent increase in annual sales volume and agribusiness work experience increases total compensation by 0.12 and 0.07 percent, respectively.

Salary and total compensation for secretaries/bookkeepers conform to managerialist and human capital theories. Benefits decrease with education after high school and increase with salary. Bonuses for secretaries/bookkeepers are not explained successfully.

#### 4.9 Summary of Results

Table 4.7 summarizes the results of the compensation models. Salary in each of the skill level categories tends to conform to managerialist and human capital theories. The exception is that salary for owners/plant managers adheres to only managerialist theory. In terms of human capital theory, salary increases with both education after high school and agribusiness work experience in the managerial skill level category and with agribusiness work experience in the specialized and general skill level categories. Salary is not consistent with neoclassical theory.

Bonuses tend to adhere to managerialist theory. Increases in annual sales volume tend to increase bonuses for managerial skill level employees, and employment in a cooperative tends to decrease bonuses for specialized and gener-

**Table 4.7 Summary of the Results for the Compensation Models.**

	Neoclassical	Managerialist	Human Capital	Salary
<b>Managerial Skill Level:</b>				
Salary	*	*	*	
Bonuses	*			
Benefits				*
Total Compensation	*		*	
<b>Specialized Skill Level:</b>				
Salary	*	*	*	
Bonuses	*			
Benefits				*
Total Compensation	*		*	
<b>General Skill Level:</b>				
Salary	*	*	*	
Bonuses	*			
Benefits				*
Total Compensation	*		*	

\* - indicates that the theory or variable tended to explain the specific types of compensation.

al skill level employees. Bonuses for owners/plant managers, assistant plant managers, and secretaries/bookkeepers are not explained successfully. The unsuccessful explanation of bonuses for owners/plant managers may reflect a return to ownership.

Benefits for each skill level category tend to be influenced by salary. Increases in salary result in additional benefits. Benefits for owners/plant managers and assistant plant managers are not explained successfully. The unsuccessful explanation of benefits for these positions may result from the measurement of benefits in terms of firm cost, as opposed to the value placed on the benefits by the employee. In the owners/plant managers position, benefits may have been additionally difficult to explain due to the personal purchases outside of the firm of various types of insurance by owners/plant managers.

Total compensation tends to be consistent with managerialist and human capital theories. In the managerial skill level category, total compensation for owners/plant managers adheres to managerialist theory, and total compensation for plant managers and assistant plant managers conforms to human capital theory. Total compensation for the specialized and general skill level categories tends to follow both managerialist and human capital theories. The coefficients for the variables representing managerialist and human capital theories indicate that decreasing returns to annual

sales volume, education after high school, and agribusiness work experience may exist for each skill level categories. Total compensation does not adhere to neoclassical theory.

In conclusion, salary, bonuses, and total compensation in the retail fertilizer industry tend to conform to managerialist and human capital theories. Benefits tend to increase with salary. Employees may experience decreasing returns to firm size, education, and work experience. Compensation tended to be unrelated to neoclassical theory.

#### 4.10 Conclusions

The previous sections present the results of the analysis. Compensation is estimated for six employee classifications of the retail fertilizer industry. The employee classifications are divided into three skill level categories, and four types of compensation are estimated. The most dominant findings are that salaries, bonuses, and total compensation in the retail fertilizer industry tend to conform to managerialist and human capital theories. Salary tends to help explain benefits. Since many of the compensation models rejected independence, the results of the models may be invalid.

## 5. CONCLUSIONS

### 5.1 Introduction

This research was undertaken to determine the factors that affect managerial and non-managerial compensation in agribusiness. Factors evaluated in this research include firm profit, firm sales, human capital investments, form of ownership, and salary's effect on bonuses and benefits. A further aim was to provide employees with strategies for improving their compensation packages and to provide firms with strategies for designing externally equitable compensation packages.

The data are drawn from a 1989 compensation survey of subscribers to the Fertilizer Institute's magazine, Dealer Progress. Compensation equations are estimated for three skill level categories - managerial, specialized, and general. The types of compensation examined are salary, bonuses, benefits, and total compensation.

The regression models used to examine compensation contain variables representing neoclassical, managerialist, and human capital theories. Neoclassical theory says that compensation is a function of marginal productivity, and is represented in this study by net return of the firm. Managerialist theory, which states that compensation is influenced by firm size and form of firm ownership, is represent-

ed by annual sales volume and the cooperative form of ownership. Human capital theory says that compensation should increase with investments in human capital. It is accounted for by the inclusion of variables representing education after high school and agribusiness work experience. The compensation models also account for salary's potential influence on bonuses and benefits.

This chapter presents the conclusions and implications of this research. The implications are presented in terms of labor market strategies for employees and firms. Also considered are limitations of this research and suggestions for further research.

## 5.2 Conclusions

Salary for each of the skill level categories tends to be higher for those employed in larger firms and/or for those with higher levels of either education or work experience. In addition to firm sales, salary tends to increase with education and work experience in the managerial skill level category, and with work experience in the specialized and general skill level categories. Firm profit does not have an impact on salaries.

Bonuses in the specialized and general skill level category tend to be lower in cooperatives. In the managerial skill level category, larger firms tend to provide higher

bonuses. Benefits for each of the skill level categories tend to increase with salary.

As with salary, total compensation for each skill level category tends to be higher for those employed in larger firms and/or for those with higher levels of either education or work experience. In the managerial skill level category, total compensation tends to increase with firm sales in the owners/plant managers position and with education and work experience in the plant managers and assistant plant managers positions. Total compensation increases with firm sales and work experience in the specialized skill level category. In the general skill level category, total compensation for general plant personnel tends to increase with firm sales and education, and total compensation for secretaries/bookkeepers tends to increase with firm sales and work experience. For employees of each skill level category, there are decreasing returns to firm sales, education, and work experience. Total compensation is not influenced by firm profit.

### 5.3 Implications for Employees

The results imply that options exist for employees to improve their compensation packages. This research shows that employees with larger firms tend to earn higher salaries and total compensation. In addition, human capital

investments in education and work experience tend to be rewarded with higher salaries and total compensation in the managerial and general skill level categories. While higher levels of work experience result in additional salary and total compensation for specialized skill level employees. Hence, to maximize salary and total compensation, employees should seek employment in larger firms. Managerial and general skill level employees should also concentrate on attending college and gaining work experience, and specialized skill level employees should focus on gaining work experience. Since there are decreasing returns to education and work experience, minimal investments in these forms of human capital may be critical for improving compensation. Managers desiring to increase the amount of their bonuses should seek employment in larger firms. Assuming that bonuses are the most variable form of compensation, specialized and general skill employees desiring to reduce the variability of their compensation packages should seek employment in a cooperative, where bonuses comprise a lower portion of the financial return. Employees should recognize that their benefits tend to increase with salary.

#### **5.4 Implications for Firms**

If agribusinesses desire to maintain external equity at minimal cost, there are several factors that these firms need to recognize. Larger firms tend to provide higher salaries and total compensation to each skill level category. Therefore, smaller firms may have to offer certain work schedule adaptations such as flexible hours or a compressed workweek to remain competitive in the labor market. Investments in human capital tend to be rewarded in the retail fertilizer industry. Therefore, to attain more educated and experienced employees, agribusinesses will have to provide higher compensation. In order to attract, retain, and motivate performance oriented employees, cooperatives may have to alter their compensation packages to be equivalent with the labor market. Firms also need to realize that labor market competitors are increasing benefits with salary and, as a result, their employees may expect such renumeration.

#### **5.5 Limitations of the Research**

The major limitation of this research is that the survey from which the data were drawn was limited. There was a reporting problem. That is, not all respondents provided the requested firm, employee, and compensation

information. The survey also did not account for all the variables necessary to successfully estimate compensation. Had the survey been able to account for the starting and previous year's salaries of the employees, the models in the research may have been well specified. In addition, the survey did not account for the conditions of the local labor market area from which the data were drawn, and net return was requested for only the year of the survey. The actual relationship may exist between compensation and net return of the previous year.

### 5.6 Suggestions for Future Research

Further research into the determinants of compensation for agribusiness should concentrate on obtaining more complete data. This process should focus on receiving complete information from the respondents and obtaining the necessary information for estimating compensation. The additional information needed to successfully estimate compensation includes information on starting or previous year's salary and local labor market conditions. In terms of neoclassical theory, future compensation research should focus on the relationship between compensation and a lag in net return. The effects of ownership of a controlling interest in the firm by a single individual or a group, hierarchical structure of the firm, and increased monitoring, search, and

training costs associated with larger firms are areas where future research is clearly needed. Managerialist theory has a lot to say about these effects, but our data do not permit this type of research. Further research into human capital theory's explanation of compensation should examine whether agribusinesses reward required education at a greater rate than surplus education.

## REFERENCES

1. Abraham, K. G. and H. S. Farber, "Job Duration, Seniority, and Earnings," The American Economic Review, 77, 278-297, 1987.
2. Addison, J. T. and Pedro Portugal, "Job Displacement, Relative Wage Changes, and Duration of Unemployment," Journal of Labor Economics, 7, 281-302, 1989.
3. Agarwal, N. C., "Determinants of Executive Compensation," Industrial Relations, 20, 36-46, 1981.
4. Akridge, J. T., L. D. Whipker, and S. P. Erickson, "Managerial Compensation in Midwestern Grain and Farm Supply Firms," Agribusiness, 5, 403-418, 1989.
5. Akridge, J. T., L. D. Whipker, and W. J. Taylor, Compensation Practices in the Retail Fertilizer Industry: 1986-87, Dept. Agricultural Economics, Agricultural Experiment Station, Purdue University, West Lafayette, Indiana, Station Bulletin No. 546, 1988.
6. Barron, J. M., D. A. Black, and M. A. Loewenstein, "Employer Size: The Implications for Search, Training, Capital Investment, Starting Wages, and Wage Growth," Journal of Labor Economics, 5, 76-89, 1987.
7. Barron, J. M., D. A. Black, and M. A. Loewenstein, "Job Matching and On-The-Job Training," Journal of Labor Economics, 7, 1-19, 1989.
8. Bassi, L. J., "The Effect of CETA on the Postprogram Earnings of Participants," The Journal of Human Resources, XVIII, 539-556, 1983.
9. Baumol, W. J., Business Behavior, Value, and Growth, Harcourt Brace and World, Inc., New York, 1959.
10. Becker, G. S., "Investment in Human Capital: A Theoretical Analysis," The Journal of Political Economy, LXX, 9-49, 1962.
11. Becker, G. S., Human Capital, National Bureau of Economic Research, New York, 1975.
12. Berger, M. C. and B. T. Hirsch, "The Civilian Earnings Experience of Vietnam-Era Veterans," The Journal of Human Resources, XVIII, 455-479, 1983.

REFERENCES (cont.)

13. Bils, M. J., "Real Wages over the Business Cycle: Evidence from Panel Data," The Journal of Political Economy, 93, 666-689, 1985.
14. Blakemore, A. E., J. C. Hunt, and B. F. Kiker, "Collective Bargaining and Union Membership Effects on the Wages of Male Youths," Journal of Labor Economics, 4, 193-211, 1986.
15. Blau, D. M. and P. K. Robins, "Training Programs and Wages: A General Equilibrium Analysis of the Effects of Program Size," The Journal of Human Resources, XXII, 113-125, 1987.
16. Borjas, G. J. and S. G. Bronars, "Consumer Discrimination and Self-Employment," The Journal of Political Economy, 97, 581-605, 1989.
17. Broder, J. M. and R. P. Deprey, "Monetary Returns to Bachelors and Masters Degrees in Agricultural Economics," American Journal of Agricultural Economics, 67, 666-673, 1985.
18. Brown, J. N., "Why Do Wages Increase With Tenure? On-The-Job Training and Life-Cycle Wage Growth Observed Within Firms," The American Economic Review, 79, 971-991, 1989.
19. Brown, Charles and James Medoff, "The Employer Size-Wage Effect," Journal of Political Economy, 97, 1027-1059, 1989.
20. Cannings, Kathy, "The Earnings of Female and Male Middle Managers: A Canadian Case Study," The Journal of Human Resources, XXIII, 34-57, 1988.
21. Carliner, Geoffery, "Wage Differences by Language Group and the Market for Language Skills in Canada," The Journal of Human Resources, XVI, 384-399, 1981.
22. Carliner, Geoffery, "The Wages of Older Men," The Journal of Human Resources, XVII, 25-38, 1982.
23. Chiswick, B. R., "The Earnings and Human Capital of American Jews," The Journal of Human Resources, XVIII, 313-336, 1983.

REFERENCES (cont.)

24. Ciscel, D. H., "Determinants of Executive Compensation," Southern Economic Journal, 40, 613-617, 1974.
25. Ciscel, D. H. and T. M. Carroll, "The Determinants of Executive Salaries: An Econometric Survey," The Review of Economics and Statistics, LXII, 7-13, 1980.
26. Cooley, P. L., "Managerial Pay and Financial Performance of Small Business," Journal of Business Research, 7, 267-275, 1979.
27. Cooley, P. L. and C. E. Edwards, "Ownership Effects on Managerial Salaries in Small Business," Financial Management, 11, 5-9, 1982.
28. Corcoran, Mary, Greg, Duncan, and Michael Ponza, "A Longitudinal Analysis of White Women's Wages," The Journal of Human Resources, XVIII, 497-520, 1983.
29. Cotton, Jeremiah, "On the Decomposition of Wage Differentials," The Review of Economics and Statistics, LXX, 236-243, 1988.
30. Datcher-Loury, Linda, "Racial Differences in the Stability of High Earnings Among Young Men," Journal of Labor Economics, 4, 301-316, 1986.
31. Daymont, T. N. and P. J. Andrisani, "Job Preferences, College Major, and the Gender Gap in Earnings," The Journal of Human Resources, XIX, 408-429, 1984.
32. Dickinson, K. P., T. R. Johnson, and R. W. West, "An Analysis of the Impact of CETA Programs on Participants' Earnings," The Journal of Human Resources, XXI, 64-91, 1986.
33. Dolton, P. J. and G. H. Makepeace, "Marital Status, Child Rearing and Earnings Differentials in the Graduate Labour Market," The Economic Journal, 97, 897-922, 1987.
34. Dooley, M. D. and Peter Gottschalk, "Earnings Inequality Among Males in the United States: Trends and the Effect of Labor Force Growth," The Journal of Political Economy, 92, 59-89, 1984.
35. Downey, W. D. and S. P. Erickson, Agribusiness Management, McGraw-Hill, New York, 1981.

REFERENCES (cont.)

36. Duncan, G. J. and F. P. Stafford, "Do Union Members Receive Compensating Wage Differentials?", The American Economic Review, 70, 355-371, 1980.
37. Edmondson, William and Gerald Schluter, "The Farm: Source of Many Jobs," National Food Review, United States Department of Agriculture, Economic Research Service, NFR-27, 18-19, 1984.
38. Fairris, David, "Compensating Wage Differentials in the Union and Nonunion Sectors," Industrial Relations, 28, 356-372, 1989.
39. Falaris, E. M., "Migration and Wages of Young Men," The Journal of Human Resources, XXIII, 514-533, 1988.
40. Filer, R. K., "Sexual Differences in Earnings: The Role of Individual Personalities and Tastes," The Journal of Human Resources, XVIII, 82-99, 1983.
41. Fiske, J. R. and D. E. Hahn, "Agribusiness Compensation Practices in Ohio," Agribusiness, I, 73-87, 1985.
42. Galbraith, J. K., The New Industrial State, Houghton Mifflin Company, Boston, 1967.
43. Garen, J. E., "Worker Heterogeneity, Job Screening, and Firm Size," Journal of Political Economy, 93, 715-739, 1985.
44. Goddeeris, J. H., "Compensating Differentials and Self-Selection: An Application to Lawyers," Journal of Political Economy, 96, 411-428, 1988.
45. Gomez-Mejia, L. R., Henry Tosi, and Timothy Hinkin, "Managerial Control, Performance, and Executive Compensation," Academy of Management Journal, 30, 51-70, 1987.
46. Greenhalgh, Christine, "Male-Female Wage Differentials in Great Britain: Is Marriage an Equal Opportunity," The Economic Journal, 90, 751-775, 1980.
47. Grenier, Gilles, "The Effects of Language Characteristics on the Wages of Hispanic-American Males," The Journal of Human Resources, XIX, 35-52, 1984.

REFERENCES (cont.)

48. Gronau, Rueben, "Sex-Related Wage Differentials and Women's Interrupted Labor Careers -- the Chicken or the Egg," Journal of Labor Economics, 6, 277-301, 1988.
49. Gujarati, D. N., Basic Econometrics, McGraw-Hill, New York, 1988.
50. Gyourko, Joseph and Joseph Tracy, "An Analysis of Public- and Private-Sector Wages Allowing for Endogenous Choices of Both Government and Union Status," Journal of Labor Economics, 6, 229-253, 1988.
51. Hashimoto, Masanori and John Raisian, "Employment Tenure and Earnings Profiles in Japan and the United States," The American Economic Review, 75, 721-735, 1985.
52. Hirsch, B. T. and J. L. Neufeld, "Nominal and Real Union Wage Differentials and the Effects of Industry and SMSA Density: 1973-83," The Journal of Human Resources, XXII, 138-147, 1987.
53. Hodson, Randy and Paula England, "Industrial Structure and Sex Differences in Earnings," Industrial Relations, 25, 16-32, 1986.
54. James, Estelle, Nabeel Alsalam, Joesph Conaty, and Duc-Le To, "College Quality and Future Earnings: Where Should You Send Your Child to College," The American Economic Review, 79, 247-252, 1989.
55. Jensen, M. C. and K. J. Murphy, "Performance Pay and Top-Management Incentives," Journal of Political Economy, 98, 225-264, 1990.
56. Johnson, W. G. and James Lambrinos, "Wage Discrimination Against Handicapped Men and Women," The Journal of Human Resources, XX, 264-277, 1985.
57. Jud, G. D. and J. L. Walker, "Racial Differences in the Returns to Schooling and Experience Among Prime-Age Males: 1967-1975," The Journal of Human Resources, XVII, 622-631, 1982.
58. Kaufman, B. E. and P. E. Stephen, "Determinants of Interindustry Wage Growth in the Seventies," Industrial Relations, 26, 186-194, 1987.

REFERENCES (cont.)

59. Keller, K. R. and D. E. Hahn, "Ohio Agribusiness Compensation Study: 1986," Agrisbusiness, 4, 559-577, 1988.
60. Kiker, B. F. and C. M. Condon, "The Influence of Socioeconomic Background on the Earnings of Young Men," The Journal of Human Resources, XVI, 94-105, 1981.
61. Kiker, B. F. and S. L. W. Rhine, "Fringe Benefits and the Earnings Equation: A Test of the Consistency Hypothesis," The Journal of Human Resources, XXII, 126-137, 1987.
62. Langwell, K. M., "Factors Affecting the Incomes of Men and Women Physicians: Further Explorations," The Journal of Human Resources, XVII, 261-275, 1982.
63. Larner, R. J., Management Control and the Large Corporation, Dunellen Publishing Company, Inc., New York, 1970.
64. Leigh, J. P., "Analysis of Workers' Compensation Using Data on Individuals," Industrial Relations, 24, 247-256, 1985.
65. Lewellen, W. G., "Management and Ownership in the Large Firm," The Journal of Finance, XXIV, 299-322, 1969.
66. Lewellen, W. G. and B. Huntsman, "Managerial Pay and Corporate Performance," American Economic Review, 60, 710-720, 1970.
67. Mahoney, T. A., "Organizational Hierarchy and Position Worth," Academy of Management Journal, 22, 726-737, 1979.
68. Martens, B. P. and W. J. Taylor, Analysis of Compensation in Agribusiness: The Case of the Retail Fertilizer Industry, Dept. of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Va., Paper No. SP-90-7, 1990.
69. McGuire, J. W., J. S. Y. Chiu, and A. O. Elbing, "Executive Incomes, Sales, and Profits," The American Economic Review, LII, 753-761, 1962.
70. Medoff, J. L. and K. G. Abraham, "Experience, Performance, and Earnings," The Quarterly Journal of Economics, XCV, 703-736, 1980.

REFERENCES (cont.)

71. Mellow, Wesley, "Employer Size and Wages," The Review of Economics and Statistics, LXIV, 495-501, 1982.
72. Miller, P. W., "The Wage Effect of the Occupational Segregation of Women in Britain," The Economic Journal, 97, 885-896, 1987.
73. Moore, W. J., D. K. Pearce, and R. M. Wilson, "The Regulation of Occupations and the Earnings of Women," The Journal of Human Resources, XVI, 366-383, 1981.
74. Murphy, K. J., "Corporate Performance and Managerial Renumeration: An Empirical Analysis," Journal of Accounting and Economics, VII, 11-42, 1985.
75. Nakosteen, R. A. and M. A. Zimmer, "Marital Status and Earnings of Young Men: A Model of Endogenous Selection," The Journal of Human Resources, XXII, 248-268, 1987.
76. Olson, J. E., I. H. Frieze, and D. C. Good, "The Effect of Job Type and Industry on the Income of Male and Female MBAs," The Journal of Human Resources, XXII, 532-541, 1987.
77. O'Neill, June, "The Trend in the Male-Female Wage Gap in the United States," Journal of Labor Economics, 3, Supplement, S91-S116, 1985.
78. Pfeffer, Jeffrey and Alison Davis-Blake, "Understanding Organizational Wage Structures: A Resource Dependence Approach," Academy of Management Journal, 30, 437-455, 1987.
79. Preston, W. P., J. M. Broder, and M. C. P. Almero, "Temporal Analysis of Income Earned by Former Agricultural Students," American Journal of Agricultural Economics, 72, 13-23, 1990.
80. Pugel, T. A., "Profitability, Concentration and the Interindustry Variation in Wages," The Review of Economics and Statistics, LXII, 248-253, 1980.
81. Ragan, Jr., J. F. and S. P. Smith, "The Impact of Differences in Turnover Rates on Male/Female Pay Differentials," The Journal of Human Resources, XVI, 343-365, 1981.

REFERENCES (cont.)

82. Roberts, D. R., Executive Compensation, The Free Press, Glencoe, Illinois, 1959.
83. Romanoff, Kent, Ken Boehm, and Edward Benson, "Pay Equity: Internal and External Considerations," Compensation and Benefits Review, May-June, 17-25, 1986.
84. Rosen, Sherwin, "Authority, Control, and the Distribution of Earnings," The Bell Journal of Economics, 13, 311-323, 1982.
85. Rumberger, R. W., "The Impact of Surplus Schooling on Productivity and Wages," The Journal of Human Resources, XXII, 24-50, 1987.
86. SAS Institute Inc., SAS User's Guide: Statistics Version 5th Edition, Cary, N. C.: SAS Institute, 1985.
87. Schwager, J. D., A Complete Guide to the Futures Markets: Fundamental Analysis, Technical Analysis, Trading, Spreads, and Options, John Wiley and Sons, New York, 1984.
88. Schwartz, Saul, "Earnings Capacity and the Trend in Inequality Among Black Men," The Journal of Human Resources, XXI, 44-63, 1986.
89. Shackett, J. R. and J. M. Trapani, "Earnings Differential and Market Structure," The Journal of Human Resources, XXII, 518-531, 1987.
90. Shapiro, D. M. and Morton Stelcner, "Earnings Differential Among Linguistic Groups in Quebec," Industrial Relations, 21, 365-375, 1982.
91. Shapiro, D. M. and Morton Stelcner, "Canadian Public-Private Sector Earnings Differentials, 1970-1980," Industrial Relations, 28, 72-81, 1989.
92. Sonka, S. T. and M. A. Hudson, "Why Agribusiness Anyway?," Agribusiness, 5, 305-314, 1989.
93. Spanos, Aris, Statistical Foundations of Econometric Modeling, Cambridge University Press, Cambridge, 1986.
94. Spanos, Aris, "Error - Autocorrelation Revisited: the AR(1) Case," Econometrics Review, 285-94, 1988.

REFERENCES (cont.)

95. Taylor, W. J. and J. T. Akridge, "That Competitive Edge What Does It Cost?," Dealer Progress, 20, 6, 1989.
96. Taylor, W. J. and J. T. Akridge, "A Mixed Bunch of Dangling Carrots: Dealer Progress Retail Salary Survey," Dealer Progress, 19, 6, 1988.
97. Taylor, W. J. and J. T. Akridge, "Progress Retail Salary Survey," Progress, 18, 6, 1987.
98. Taylor, W. J. and J. T. Akridge, "Progress Retail Salary Survey 1986," Fertilizer Progress, 17, 6, 1986.
99. Tomes, Nigel, "Earnings and the Returns to Human Capital," The Journal of Human Resources, XIX, 472-488, 1984.
100. Verdugo, R. R. and N. B. Verdugo, "The Impact of Surplus Schooling on Earnings: Some Corroboration of Rumberger's Findings," The Journal of Human Resources, XXIV, 629-643, 1989.
101. Wallace, Jr., M. J. and C. W. Fay, Compensation Theory and Practice, Kent Publishing, Boston, 1983.

## APPENDIX I -- Matrix of Previous Compensation Models<sup>a</sup>

### Bibliography

Number	1	2	3	4	5	6	7	8	12	13	14	15	16	17
<b>DEPENDENT VARIABLE</b>														
Total Compensation		*	*	*										
Salary	*	*			*	*	*	*	*	*	*	*	*	*
<b>INDEPENDENT VARI.</b>														
<b>MANAGERIALIST VARI.</b>														
Firm Sales					+	*								
Firm Size		*	+	-	+									
Hierarchical Levels			+											
Firm Growth														
Form of Ownership					+	+								
<b>NEOCLASSICAL VARI.</b>														
Firm Profit				+	+									
Firm Productivity														
Value of Firms' Stk.														
<b>HUMAN CAPITAL VARI.</b>														
Experience	*		+	+			+			-	+	*		+
Experience Squared	*							-						
Tenure	*	+									+			
Tenure Squared		+												
Education	*		*	*	*		+	*	*	*	+	*	+	+
Education Squared														
<b>PERSONAL TRAITS</b>														
Age		+			*		+	*	*					+
Age Squared						-	*	*						-
Marital Status	*							*			+			+
Race	*	+						*		+	*			
Sex						-								+
<b>CONTROL FACTORS</b>														
Region	*	-	*	*	+				*	-	-		+	+
Industry	*					+		*						
Occupation	*						+					+		
Union Density						+	+							
Product Mix														

<sup>a</sup> - +/- indicates a significant positive/negative relationship with the dependent variable. \* indicates an unreported or insignificant relationship with the dependent variable.

**APPENDIX I (cont.) -- Matrix of Previous Compensation Models**

**Bibliography**

Number	18	19	20	21	22	23	25	26	27	28	29	30	31	32
--------	----	----	----	----	----	----	----	----	----	----	----	----	----	----

**DEPENDENT VARIABLE**

Total Compensation	*	*	*										
Salary	*	*	*	*	*	*	*	*	*	*	*	*	*

**INDEPENDENT VARI.**

**MANAGERIALIST VARI.**

Firm Sales				+	+	+
Firm Size	*					
Hierarchical Levels		*				
Firm Growth						
Form of Ownership					+	

**NEOCLASSICAL VARI.**

Firm Profit				+	+	+
Firm Productivity						
Value of Firms' Stk.						

**HUMAN CAPITAL VARI.**

Experience	*	+			+	+	+	+
Experience Squared	*		-				-	
Tenure	+	*	*					
Tenure Squared	-	*	-					
Education	*	+	+	+	+		+	+
Education Squared							+	*

**PERSONAL TRAITS**

Age	+	-						*
Age Squared	*							
Marital Status			-			+	+	*
Race							*	*
Sex	*							

**CONTROL FACTORS**

Region	*	-	-	-	+	*
Industry	*	*			+	
Occupation	*					+
Union Density						
Product Mix						

**APPENDIX I (cont.) -- Matrix of Previous Compensation Models**

**Bibliography**

Number	33	34	36	38	39	40	43	44	45	46	47	48	50	51
--------	----	----	----	----	----	----	----	----	----	----	----	----	----	----

**DEPENDENT VARIABLE**

Total Compensation	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Salary	*	*	*	*	*	*	*	*	*	*	*	*	*	*

**INDEPENDENT VARI.**

**MANAGERIALIST VARI.**

Firm Sales														
Firm Size														+
Hierarchical Levels														
Firm Growth														
Form of Ownership														

**NEOCLASSICAL VARI.**

Firm Profit														+
Firm Productivity														
Value of Firms' Stk.														

**HUMAN CAPITAL VARI.**

Experience	*	*	+	*	*	+	+	+	+	+	+	+	+	+
Experience Squared	*	*	*	*	*		-		-	-	-	-	-	-
Tenure							+							*
Tenure Squared														-
Education	*	*	+	+	+	*	+	+	+	+	+	+	+	+
Education Squared														

**PERSONAL TRAITS**

Age	*			*	*									
Age Squared						*								
Marital Status			+		*									+
Race	*	*	*	*	*									+
Sex	-													+

**CONTROL FACTORS**

Region	+	+												-
Industry	+			*										+
Occupation	*			*										+
Union Density								+						*
Product Mix														

**APPENDIX I (cont.) -- Matrix of Previous Compensation Models**

**Bibliography**

Number	52	53	54	55	56	57	58	60	61	62	63	64	66	68
<b>DEPENDENT VARIABLE</b>														
Total Compensation	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Salary	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<b>INDEPENDENT VARI.</b>														
<b>MANAGERIALIST VARI.</b>														
Firm Sales											*	*	*	+
Firm Size	*													
Hierarchical Levels														
Firm Growth	*										*			
Form of Ownership														+
<b>NEOCLASSICAL VARI.</b>														
Firm Profit	+										+	+	+	*
Firm Productivity	*													
Value of Firms' Stk.					+						*			
<b>HUMAN CAPITAL VARI.</b>														
Experience	*					+	+		+	+	+	*		+
Experience Squared	*					-			-	-				
Tenure														
Tenure Squared														
Education	*	+	*			+	+	*	+	+		*		+
Education Squared														
<b>PERSONAL TRAITS</b>														
Age		*												
Age Squared												*		
Marital Status	*					+				+			*	
Race	*	*			-	-	*			+			*	
Sex							-					*		
<b>CONTROL FACTORS</b>														
Region	*						-			+				
Industry	*													
Occupation	*								+	+				
Union Density	*	+						*						
Product Mix														

## APPENDIX I (cont.) -- Matrix of Previous Compensation Models

### Bibliography

Number	70	71	72	73	74	75	76	77	78	79	80	81	85	88
--------	----	----	----	----	----	----	----	----	----	----	----	----	----	----

### DEPENDENT VARIABLE

Total Compensation	*		*											
Salary	*	*	*	*	*	*	*	*	*	*	*	*	*	*

### INDEPENDENT VARI.

#### MANAGERIALIST VARI.

Firm Sales														+
Firm Size														+
Hierarchical Levels														+
Firm Growth														+
Form of Ownership														

#### NEOCLASSICAL VARI.

Firm Profit														
Firm Productivity														
Value of Firms' Stk.														+

#### HUMAN CAPITAL VARI.

Experience	+	+	+	+						*			+	+
Experience Squared	-	-	-	-									-	-
Tenure	+	+												+
Tenure Squared	-	-												
Education	+	+	+	+		*				*	+	+	+	+
Education Squared	+		-											+

#### PERSONAL TRAITS

Age														+
Age Squared														-
Marital Status	*			+				*		+			+	
Race	-								*		*		-	-
Sex	-							-		*	-			

#### CONTROL FACTORS

Region	*	*	*	+						-	*	*	-	+	*
Population															
Industry	*										*				
Occupation	*		*	+			*							+	
Union Density	+													*	
Product Mix															

**APPENDIX I (cont.) -- Matrix of Previous Compensation Models**

## Bibliography

**Number** 89 90 91 99 100

## **DEPENDENT VARIABLE**

## Total Compensation

## INDEPENDENT VARI.

## **MANAGERIALIST VARI.**

Firm Sales  
Firm Size  
Hierarchical Levels  
Firm Growth  
Form of Ownership

## **NEOCLASSICAL VARI.**

## **Firm Profit Firm Productivity Value of Firms' Stock**

HUMAN CAPITAL VARI.

Experience	+	+	+	+	+
Experience Squared	-	-	-	-	
Tenure					
Tenure Squared					
Education	+	+	+	+	+
Education Squared			*		

## **PERSONAL TRAITS**

Age \*  
Age Squared  
Marital Status + + + - -  
Race  
Sex

## **CONTROL FACTORS**

Region	-	*	-
Population			
Industry			
Occupation			+
Union Density			
Product Mix			

VITA

Bradley P. Martens was born in Madison, Wisconsin on May 30, 1963. He is the son of Dr. David C. Martens and Gwendolyn Helton Martens. He has spent most of his life in the Blacksburg, Virginia area, where he grew up and went to high school. He received an Applied Arts and Sciences degree in General Studies from New River Community College in 1986. In January of 1986, he enrolled in the B.S. program in Agricultural Economics at Virginia Polytechnic Institute and State University. He received his B.S. in June 1988 and decided to remain at the university to pursue a M.S. degree.

*Bradley P.  
Martens*