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Factors Affecting Minority Undergraduate Students' Enrollment In Agricultural Economics/Agribusiness

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FACTORS AFFECTING MINORITY UNDERGRADUATE STUDENTS' ENROLLMENT IN AGRICULTURAL ECONOMICS/AGRIBUSINESS

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Dedication

I dedicate this thesis to my family, my father, Salifou Labo, my mother Rakia Adamou, my brothers and sisters for their support, prayers and words of encouragement. I love you all.

Biographical Sketch

Sawde Salifou Labo was born in Niamey, Niger, West Africa, on June 22, 1980. She received her Bachelor Degree in Business Administration from the University of Greensboro at North Carolina in 2009. She is a member of Gamma Sigma Delta and Golden Key International. Sawde is completing her Master Degree in Agricultural Economics.

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Abstract

This study examines the factors that affect minority undergraduates' enrollment in agricultural economics/agribusiness at Land-grant institutions using a 2007 cross sectional demand model. Data for students enrolled in agribusiness, ethnicity, and sex were collected through Food and Agricultural Information Education Systems (FAIES). In-state tuition and financial aid were obtained via the Integrated Post Education Data System (IPEDS). The sample size is comprised of 53 land-grant institutions that offer undergraduate degree in agricultural economics/agribusiness. Additionally, multiple regression models were used to identify factors that influence enrollment of minority. Results indicate that there are more males enrolled in agricultural economics/agribusiness than females. Further, Caucasians enrollment is more than any other ethnicities at land-grant institutions as we anticipated. Finally findings show that financial aid/scholarship can increase enrollment in agricultural economics/agribusiness.

CHAPTER 1

Introduction

It is still a struggle for land-grant institutions to recruit and to retain minority undergraduate students in the field of agricultural economics/agribusiness. Ensuring that these institutions supply well-qualified minorities in the field of study is an important step in increasing and enhancing the quality of agricultural programs at land grant universities. According to Perry (2010), both the number of undergraduate students in agricultural economics and the number of departments offering the program have declined constantly over the years. The number of baccalaureate degrees awarded by the department of agricultural economics decreased from 1541 in 1991 to 545 in 2006. Although the overall number of degrees awarded in schools and colleges of agriculture in United States has increased by 37% between 1991 and 2006, the number of minority undergraduates' enrollment is still low. Further, the number of undergraduate degrees awarded in agricultural economics/agribusiness has increased only by 17% compared to other fields within the agricultural and natural resources sciences, which outgrew by 76% (Perry 2010).

Agriculture is one of the largest industries in United States. The agricultural industry employs more than 21 million people, which represents 15% of the total U.S. workforce (American Farm Bureau, 2002). Moreover, the United States Department of Agriculture (USDA) reported that the job market for college graduates in the agricultural and food systems, renewable energy and the environment is expected to increase through 2015. The annual number of job openings is projected to reach more than 54,000 per year, but on the average, only 29,300 or 55% graduates in the colleges of agriculture and life sciences, forestry and natural resources, and veterinary medicine will be available each year. Thus the remaining 24,200 or 45% will be filled

by qualified graduates from allied programs, which include biological sciences, engineering, communication, health sciences, and business (USDA, 2010). In 2012, Georgetown University also reported that agriculture and natural resources field has the lowest unemployment rates at 7% among other majors and even lower than engineering and business.

While the number of students' enrollment is increasing strongly in other majors such as Business, Engineering and Technology; schools and colleges of agriculture are experiencing challenges in attracting minorities in the field of agricultural economics/agribusiness program. Understanding students' decision making process in selecting a major can help administrators enhance their recruitment and retention strategies in order to increase minority students' enrollment in the field.

Statement of the Problem

Minority undergraduates' enrollment in agricultural economics/agribusiness at land grant institutions has always been a concern. Several recruitment and retention programs were established in attracting these students; however, it is still a struggle to increase the number. Why is it hard to attract minorities in the field? Is it because of the bad publicity or the lack of information about the profession? In 2012, Terrence Loose wrote an article, "College Majors that are Useless" and in this report, he cited an agriculture major to be the number one useless major to pursue. Contrary to this article, in fall 2010, Purdue University had 2,675 undergraduates enrolled in the agriculture program, Iowa State University 3,298 and Oklahoma State University 2,150 in their schools and colleges of agriculture (Farm World, 2011). Further, these universities reported to have a placement ratio between 90 to 98 percent within six months of graduation. Understanding the students' decision making process in selecting a major can help the school of agricultural sciences to design a program that will not only attract the talented ones but will also

keep them until they complete the degree. For the last decade, the number of undergraduates in the field of agriculture economics has reduced drastically whereas at the higher education level, the trend remains steady due to an increase in international students' enrollment (Black, 1998). Several studies have been conducted regarding factors that affect enrollment rate in Agricultural Economics. In 1998, Blank conducted a study examining agricultural economics enrollments and programs from period 1985 to 1996. After surveying 44 schools in North America, he found that the number of enrollment in agricultural economics is declining. Moreover, he added that the enrollment rate of undergraduate students in the agriculture program has decreased by 17% for academic year 1975-1984 to 1985-1996. During the same period, the author reported an overall decline of 14% in the average number of enrollment in both undergraduates and graduates in agricultural economics programs. His results also indicated a change in the characteristics of students in the program. He noticed a decline of students in agricultural economics with farm background and an increase in the females' enrollment in the program. He pointed out that several universities changed their curriculum and names of the department programs to reflect the changing characteristics of students. Over the years, agricultural economics programs have changed names from Applied Economics, Resources and Applied Economics, Applied Economics and Agribusiness to meet the needs and to make it more marketable to prospective students.

A survey conducted by Food and Agricultural Education Information Systems (FAEIS) showed an increase in the number of bachelor's degree enrollment in agriculture academic areas. The overall enrollment was 13,191 in 2005, 13,304 in 2006, and 14,712 in 2007. For the same years, the higher education (Master and Doctorate degree) in the same areas were 890, 880, and 802, showing a slight decrease in the enrollment (FAEIS, 2008). On the other hand, minorities'

enrollment both Bachelor and Associate degrees programs at American Association of State Colleges of Agriculture and Renewable Resources institutions (AASCARR) accounted 13.5% in 2004, 11.3% in 2005, 12.2% in 2006, and 11.5% in 2007; still there is not a significant change in these numbers. These statistics do not include non-US citizens and unknown race; however, the analysis includes Family Consumer Sciences/Human Sciences and Forestry/Natural Resources disciplines. In addition, National Association of State Universities and Land Grant Colleges (NASULGC) recorded 15.4%, 16.3%, 17.0%, and 18.8% for the respective year, 2004, 2005, 2006, and 2007, indicating an increase in diversity. Furthermore, schools of agriculture have experienced an increase in the enrollment of students nationwide. In particular, land-grant institutions also reported a positive trend over the years (FAEIS, 2008). Figure 1 shows the enrollment trend of undergraduate students in agricultural economics/agribusiness in U.S. from year 2006 to 2010. Based on the graph, year 2009 has the highest enrollment of undergraduate students in the program contrary to year 2006, which has the lowest.

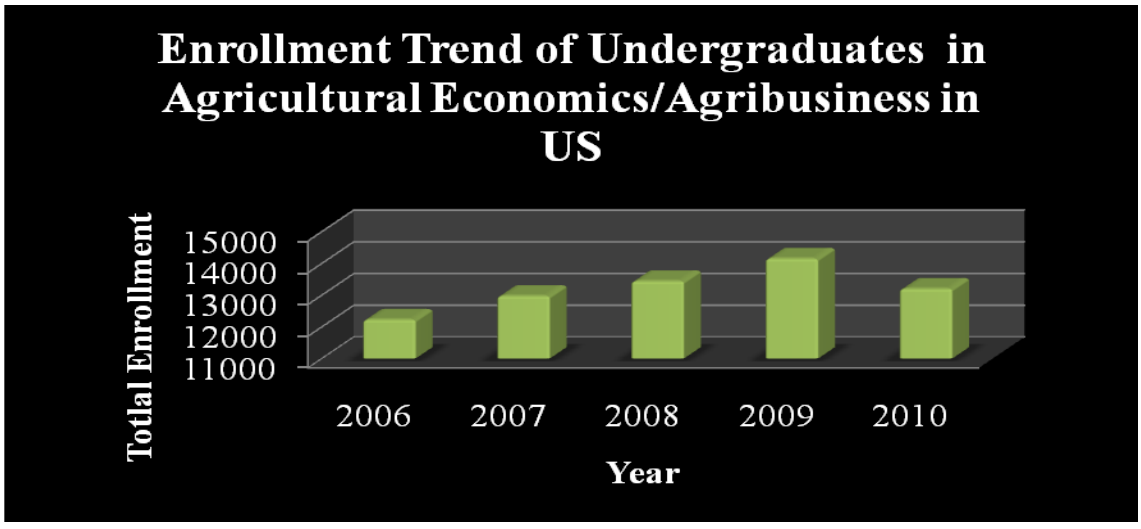

Figure 1. Enrollment Trend in agricultural economics/agribusiness

Purpose of the Study

Several studies have focused on the strategies of retaining and recruiting minority students in agriculture schools as a whole. Other literatures identified the perception of students and factors that influence undergraduate students' enrollment, but there is a lack of studies done on determinants that affect minority undergraduates' enrollment in agricultural economics/agribusiness.

The purpose of this study is to identify factors that influence enrollment in agricultural economics/agribusiness as a major and to discuss the implications for 1890 and 1862 land-grant institutions. Understanding the challenges in recruiting and retaining minorities in agricultural economics/agribusiness can be partially done by first finding out factors that influence an individual to select agribusiness as a major. The low participation of minority undergraduates in agribusiness academic programs may imply the elimination of several agricultural economics/agribusiness academic programs at land-grant institutions.

Objectives

This can be achieved through the following objectives:

(1) to identify the factors that influence enrollment in agricultural economics/agribusiness as a major and (2) to discuss the future implications for 1890 and 1862 land-grant institutions.

A Priori Expectations

We expect the demand for agricultural economics/agribusiness to respond negatively with tuition and positively with number of farms and financial aid. We also anticipate the number of Caucasians and males enrolled in the program to be more than any other ethnicity and of females. Results from this study will derive important implications for the demand for

agricultural economics/agribusiness programs that policymakers may consider in making decisions.

This study is organized as follow: Chapter 1, the introduction, Chapter 2, literature reviews of other studies, Chapter 3, the methodology, Chapter 4, the results and discussion, and Chapter 5 conclusion, recommendations, implications and summary.

CHAPTER 2

Literature Review

This chapter summarizes studies relevant to the enrollment of minority undergraduate students in schools and colleges of agriculture in the U.S. Further, the recruitment and retention strategies utilized by land-grant institutions in attracting minorities in schools and colleges of agricultural sciences are examined. Finally, curriculums in agribusiness and factors influencing the selection of a major in the college of agriculture are assessed in this study.

Demographic Characteristics

With the growing participation of minorities in the labor force and low unemployment rate in agricultural field, administrators can increase the enrollment of undergraduate minorities in agricultural economics/agribusiness program. In 2010, Black accounted for 62.2 percent of labor force compared to Hispanics 67.5%; Whites are 65.1%, followed by Asians 64.7%. The US Bureau of Labor Statistics reported that there was a decrease in the labor force participation since 2007. On the other hand, women were 58.6% in the workforce, showing a decrease compared to 2009. The participation of Asian women is about 46%, Whites, 42%, Black 34%, and Hispanics 24%. In addition, studies reported women to earn less than their male counterparts in agricultural economics/agribusiness. Barkley (2001) demonstrated that females earn less than men both in agribusiness and agricultural economics majors. The author indicated that women remuneration in agricultural economics is 15% less than of males. He also highlighted that earnings in both agricultural economics and agribusiness majors on the average are the same at entry level position; however, graduates with agricultural economics major reported earning 14% more than graduates in agribusiness. Further, graduates taking jobs in urban areas earn more than the ones in rural locations. Qenani-Petrela and McGarry Wolf (2007) conducted a study assessing

differences in gender earnings of graduates in agribusiness. In using a regression analysis, they found that men earn more than women in agribusiness firms, with a 19% wage gap. Graduates in agricultural fields' wages are 12.4% less than non- agricultural related fields (Qenani-Petrela and McGarry Wolf, 2007). Their findings showed that men have 17.5 years of work experience compared to women who have 10 years, which may explain the wage gap. Traditionally, prospective students interested in agricultural programs at one time were from rural areas and grew up on the farm. However, in an article written by Mihaljevich, Purdue University and Ohio University pointed out the change in backgrounds of prospective students enrolled in colleges of agriculture (Farm World, 2010). The decline in minority students with farm background is explained by a decrease in farm population due to the historical land loss of African Americans, which confirmed the decline of the number of students with farm background and coming from rural areas. On the contrary, administrators have recognized more students coming from urban areas and without farm experience.

Recruitment and Retention

Recruitment and retention of undergraduate minorities has been a challenge in schools and colleges of Agriculture. Talbert and Larke (1995) conducted a study to determine the factors that influence minority and non-minority students to enroll in an introductory course in Texas. The authors found that the majority of students and instructors are Whites; however, the number of minorities enrolled in the courses is low especially females. They highlighted that minorities coming from rural and farm backgrounds have more negative perceptions of agricultural education. Those students view agriscience as working on the farm, which is considered hard labor. In 1995, Frick et al. conducted a study in the Midwest where they investigated the perception and knowledge of high school students in both urban and rural areas toward food,

agriculture, and natural resources. Findings showed that students coming from both rural and urban locations are knowledgeable about natural resources and had a positive perception of agriculture. On the other hand, they scored low in Plants and Agricultural policy. In addition, higher numbers of students living in rural areas were found to know more about all the areas assessed compared to urban city students. Talbert and Larke (1995) conducted a study investigating the minorities' enrollment in introductory agriscience courses. In their study, they examined the attitude of minorities toward agriculture and their knowledge of the career opportunity within the field. Findings showed that minorities have negative perceptions about careers in agriculture. They reported that the majority of Black and Hispanic students in the study are from non-rural and non-farm backgrounds. The authors also discovered that students that are involved in 4-H programs in high school are more likely to enroll in agriscience courses in college. In addition, they agreed that exposing high school students to agriscience courses and 4-H program could be one of the steps in recruiting and retaining minorities.

In a study conducted by Wiley et al. (1997), the authors examined the attitude of minority high school students toward food and agricultural sciences after being exposed to a week workshop. The selected group is comprised of African-American, Hispanic and Asian-American students. They concluded that minority students gain a better understanding of food and agricultural sciences after completing the workshop. They also suggested that the school of agricultural sciences to develop summer programs where only minorities are targeted. After surveying 69 agricultural economics department heads, Dooley and Fulton (1999) found that enrollment of undergraduate students in agribusiness has increased over the years, implying future growth in the field. The researchers reported that 69% of all undergraduates in 39 programs selected agribusiness as a major. Dyer et al. (1999) studied the predictors of student

retention in colleges of agriculture. They surveyed freshmen from Illinois and Iowa land grant institutions in introductory courses. The authors discussed the changing characteristics of students enrolled in the school of agriculture and the factors influencing a student to complete a degree in agricultural program. They found that the majority of students from the University of Illinois at Urbana-Champaign were female and Caucasian with urban backgrounds compared to those from Iowa State University who were predominantly male and Caucasian with rural background. They also discovered that students coming from urban areas usually do not have agricultural experience, which of course implied a higher dropout rate among this group even though they may have higher class ranks. On the other hand, Iowa students are mostly from rural setting and have had exposure to agriculture either in or outside of the classroom. Further, the researchers advised that administrators should take into account if the student has previous agricultural courses and background before admitting him or her in colleges of agriculture.

Additionally, Franklin (2001) surveyed students enrolled in agricultural education courses in 22 high schools in Arizona. In this research, American Indians represented 61.1% were from rural area lived on the farm compared to African American, 57.9% coming from urban setting. Findings were similar to those of Talbert and Larke (1995). Minorities are less likely to enroll in agricultural courses and have less knowledge about career within agriculture. In 2004, Mark et al. conducted a study surveying graduates from 41 U.S institutions in the field agricultural, resource, or environmental economics. The focus of the researchers was to identify the factors that contribute to recruit graduate students in the program. Office space, computers, and geographic location (close to where they live), higher stipends, and program ranking were found to be important determinants for students considering agricultural economics as a major. Westbrook and Alston (2007) investigated the strategies 1890 land grant institutions employ in

retaining and recruiting minorities in agricultural science. The authors found that the most frequently utilized recruitment strategies of African-American students include: (1) secondary agricultural education and other teachers, (2) African-American professionals in the agricultural science field, (3) encouragement from faculty through workshops and recruitment events, (4) educating students about earnings and career opportunities, (5) attracting students with strong background in biological and physical sciences. They also indicated that faculty and parents' involvement, summer enrichment programs, having a prior agricultural experience, support from the department, monetary incentives are some of the factors that can increase enrollment in the college of agriculture. Overbay and Broyles (2008) conducted a study examining the values and perceptions of gifted high school students who participated in a summer program in Virginia Tech University in 2006. The results indicated that there was an increase in the enrollment of females in the College of Agriculture and Life Sciences at Virginia Tech. In addition, the authors concluded that there was not a significant difference between females and males in term of career values. However, the researchers found that there is still a lack of knowledge about agriculture and careers in the related field. The participants viewed agriculture as hard labor and low paying job. Epperson (2009) examined the challenges in recruiting American Ph.D. students in Agricultural and Applied Economics. The author concluded that the decision to pursue a Ph.D. in Agricultural Economics has less to do with demographic characteristics and geographic location. He reported that 52% to 71% of Americans are less likely to be interested in going for the PhD because of low starting pay and the opportunity cost (sacrifice) involved with it. Espey and Boys (2012) examined the challenges and opportunities of students' recruitment in Applied Economics Departments. In their study, the authors used survey and formal in-depth interviews to determine the most effective ways to increase enrollment of undergraduate students in

agricultural economics and agribusiness programs across US and Canada. They indicated that the institutions surveyed use different recruitment strategies, but the most common techniques utilized are high school visits, college fairs, FFA and 4H events, community colleges, workshop for both prospective and current students, direct inquiries and using Ag Ambassadors for recruitment purposes. Espey and Boys (2012) found personal interest and future career opportunities within the field to be the most significant determinants in attracting students in the programs. Furthermore, the researchers reported that increasing awareness of the industry and career opportunities are the factors that contribute to increase enrollment in agricultural economics/agribusiness.

Several studies have identified predictors of the performance and retention in the college of agriculture. Garton et al. (2001) identified the predictors of academic performance and retention in schools and colleges of agriculture. Learning style, ACT score, class rank and GPA were utilized in the analysis. The Group Embedded Figures Test was employed to assess student learning style, which could be either field-dependent or field-independent. They defined field-dependent learners as individuals who think globally, have difficulty in solving problems and are extrinsically motivated. On the other hand, field-independent individuals are analytical in solving problems, intrinsically motivated and prefer to work on their own. They also found GPA score to be an important factor in predicting how well a student will perform during his first year in college. Also, learning style was insignificant in predicting college performance. A Delphi Study was utilized by Dyer et al. (2003) to investigate the challenges high school agricultural teachers were facing in retaining students for secondary agricultural education programs. The results showed that lack of support from administrators, the perception of agriculture, difficulties in scheduling a course, and increased graduation requirements were some of the barriers affecting

retention of students in the school of agriculture. Barkley and Forst (2004) found that ACT scores and high school grades are significant factors in explaining the first year academic performance in the College of Agriculture at Kansas. The authors added that first semester college grades are strong predictors of future grades after the first semester. Rocca and Washburn (2005) examined the factors that influence college choice of high school and transfer students into the College of Agriculture and Life Sciences at the University of Florida. The study involved all undergraduate students enrollment in the agricultural and life sciences programs for the fall semester 2003 and transfer and high school students. The authors noted that differences exist between the groups on ACT and SAT test, ethnicity, and major. They also reported that Caucasians represent 71% of high school population. The researchers indicated that the most useful sources of information were web-based information and conversations with professors, while printed university publications and websites were the most commonly used. Nolan and Ahmadi-Esfahani (2007) surveyed students enrolled in agricultural economics program at the University of Sydney from 1993 to 2001 to predict their performance during the first year. The researchers used OLS regressions and multinomial logit models to explain and to predict students' entry characteristics and retention in the first year. The results showed that Universities Admission Index (UAI) is a strong indicator of performance in the first year; but it is not necessarily a significant factor in determining the likelihood of degree completion. According to Outley (2008), minorities' image and the lack of information about agriculture and natural resources are some of the issues in attracting minority students in the profession. The author reported that financial incentives, internship, workshop and recruitment programs of high school students are some of effective ways in getting minorities in the field. He found that mothers, professionals in the agricultural field, and personal interest in the environment to be some of the

important factors in selecting the agricultural career. Koon et al. (2009) used College Student Inventory (CSI) approach and demographic survey to determine the type of students enrolling in agricultural college. Further, he identified the factors related to the retention of first year freshmen. First year students' cumulative GPAs were significantly correlated with retention; whereas, family emotional support was insignificant and negatively correlated. The authors found that more females (60%) are enrolled in the college of agriculture than males (40%). About 50% of the students had some agricultural experience prior to entering college. Findings indicated there may be a positive relationship between students' enrollment in the college of agriculture and financial incentives (scholarships). Gardner (2011) tested the hypothesis that courses with low success rates decrease the likelihood of retention. He reported that there is no relationship between retention rates and courses with low success rates. He argued that researchers put more emphasis on retention than on learning. The author added that students who do not do well in college may have had issues with learning before entering college. He indicated that a student who takes more classes is more likely to be retained. Thus emphasis should be put more on learning than on retention of students. Barkley (2010) used the demand for college model and specific college courses to explain how academic coaching could enhance learning and retain students in the 21st century. He demonstrated that students will stay away from a course or an instructor that is known to be difficult because they can easily substitute for other courses or section. The author suggested changing teaching styles to incorporate collaborative or team-based learning styles.

Selecting a Major

Understanding the factors that influence an individual to choose a career in agribusiness will help schools and colleges of agriculture to target students interested in the program.

According to Overbay and Broyles (2008), "what a person values and the perceptions they have about an industry or institution" are the two factors an individual uses in choosing a career and college. Wildman and Torres (2001) analyzed the factors influencing an individual to select a major in agriculture at New Mexico State University. The results showed that several variables are considered when choosing a major in agriculture; however, having prior agricultural experience is one of the most significant predictors in selecting a major in agriculture. To examine the factors that influence an individual to choose a career in agriculture and non-agricultural related field, Jones and Larke (2001) surveyed African-American and Hispanic students who completed their undergraduate degree in agricultural-related field. Contrary to previous literature, the authors indicated that prior college experience and early enrollment in the college of agriculture did not have an impact in determining the likelihood of an individual to select agricultural related field as a career. The authors also found that respondents who have parents working in agricultural related field are more likely to choose the same path. However, individuals who consider job opportunities limited in agricultural related field tend not to choose it as a career. In addition, salary was found not significant in this study. Jones and Larke (2003) examined the factors that influence minorities to choose career in agriculture. The study focused on how graduates minorities both African Americans and Hispanics choose a career in agriculture. The authors found encouragement from other minorities and individuals to have a greater influence on students in selecting a career in agriculture. Thus, the involvement of instructors, administrators in assisting students in selecting a major proved to be effective. Lidner et al. (2004) studied rural middle school student's beliefs about science and the causes that influence science career choices. The authors agreed that students' beliefs about science were positive. Parents or guardians, teachers, and other family members were the most influential

factors affecting a student science career choice. Tarpley and Miller (2004) used stepwise regression to examine the factors associated with choosing a major. The study consisted of students from Utah who have taken 2002 ACT assessment and whether they planned or not to major in agriculture. Findings showed that Utah students who plan to major in agriculture are more likely to be interested in natural science; and community size was also found to be an important variable in choosing a major. Barkley and Parrish (2005) identified the predictors of selecting Agriculture as a major. They surveyed undergraduate students enrolled in the college of agriculture at Kansas State University. Their study indicated that social support such as parents or guardian, being in a friendly atmosphere, involvement in on campus activities and early agriculture courses in high school to be the most influential in choosing a college major in agriculture. Contrary to other literature, the authors found that students who listened to the radio and who do not have prior agricultural experience were more likely to choose agribusiness as a major. They also cited that respondents who choose agribusiness as a major expressed interest in working with people.

Several determinants are taken in consideration in choosing a college major; however, future income expectation is one of the important variables in selecting a major for number of students. An individual is expecting to earn higher income after completing number of years of education. There is much emphasis put on the number of students' graduation rate instead of the quality of education they receive (Redd and Djunaidi, 2006). The author claimed that there are two types of students: one that knows exactly why he or she wants to go to college and others who attend college because their parents want them to. He cited that this basic understanding of students needs can help administrators and instructors determine highly motivator individual drive to success in college compared to the other category of students. Robinson et al. (2007)

identified factors that influence an individual choice to enroll in agriculture program. In their study, they surveyed two academic years of freshman students who have enrolled in the school of agriculture. The authors concluded that visit to campus, printed university publications, and letter and/or information sent out by admissions are the three most significant source of information utilized by students when selecting a college. Additionally, they found that university academic reputation, preparation for employment and career opportunities after graduation are the important factors students consider in choosing a college. After surveying freshmen students enrolled in an introductory business course, Walstrom et al. (2008) discovered the factors that influence students not to major in information systems. The results indicated that students are unaware of career opportunity and are less knowledgeable about the field. Higher earnings, interest, and job security are found to be significant for business students in choosing a major. Georgeanne et al. (2011) conducted a study examining the earnings by major in agricultural and non-agricultural field. They pointed out that the consequence of having a low number of qualified graduates in agriculture resulted in filling non- agricultural students in agricultural related field. The study suggested that there is a significant difference in the earnings to working in agriculture across degree programs. The agriculture students earn more in non-agricultural fields especially if the jobs are located in urban areas. The authors also found that only 21% of alumni in the college of agriculture and life sciences work in agricultural industries in 2007, whereas the majority reported working in non-agricultural related field and 60% of those graduates live in urban areas. Herrin et al. (2011) surveyed undergraduate students enrolled in the College of Agricultural Sciences and Natural Resources at Oklahoma State University in spring of 2005. In their study, the authors examined the factors that affect the decision making process to enroll in the school of Agriculture. Further, they found that the participants in the

research started the process of selecting a college major before the ninth grade and finalized their decision in their senior year in high school (twelfth grade). Results showed that Campus visits were the most useful source of information. In addition, career opportunities after graduation, the reputation of the institution, quality of education provided, parents were the most influential factors in choosing a college major.

Change in Curricula

Several academic programs of agricultural economics and agribusiness diversified their curriculum over the years to attract and also meet the changing demographics of students in agribusiness programs. Capstone courses insight students to be challenged, to think critically, to analyze and to improve their learning ability (Nilsson & Fulton, 2002). The authors suggested instructors to use class reports and presentation methods in teaching capstone courses, which can enhance the learning style. Parcell and Sykuta (2003) believed that students in agricultural economics/agribusiness may have interest in agricultural entrepreneurship program; however, numbers of those students are not knowledgeable about the concept of entrepreneurship. After taking a survey of students between age 25 and 44 years old, the authors confirmed that the probability of starting a business after graduation is higher among this group.

Previous literature assessed the skills and qualities agribusiness industries sought in new agribusiness graduates. The major characteristics listed as the most important qualities agribusiness firms seek in potential employees are: interpersonal characteristics, communication skills, business and economics, technical skills, computer, quantitative, and management information, and previous work experience respectively (Litzenberg and Schneider, 1987; Wachenheim and Lesch, 2002). Having a partnership between students, agribusiness industries, and faculty can have a positive impact (Litzenberg & Dunne, 1996). They agreed this type of

collaboration promotes ongoing research with faculty and agribusiness companies, and it is a great way to expose students to various careers within agribusiness. A study conducted by Thor (1994) suggested that instead of focusing on reforming curriculum in agricultural economics/agribusiness academic programs should first understand the needs of students. He also added that the school should hire instructors who really understand the objectives of the department and keep those teachers motivated by providing financial incentives or some type of rewards that will insight them to work harder. He discovered that students are more interested on how to get a job after they graduate; therefore, the school could think about implementing a course focusing on problem solving skills that will prepare them for future employment (Thor, 1994).

Theoretical Framework

Studies have identified factors that affect the demand for college education. Individual may decide whether or not to attend college based on several variables. A motivation to attend college may be related to the expected higher income after completing a number of years of education (Bezmen & Depken, 1998). Based on their analysis, the authors concluded that tuition and the number of students' enrollment in college are positively related. This holds true for an individual responsible for the it-own expenses. Campbell and Siegel (1967) estimated the demand for higher education in United States between 1919 and 1964. In their analysis, they used undergraduate enrollment in 4 years college as their dependent variable, real disposable income per household, average real tuition, and the number of 18-24 year old were used as independent variables. The researchers found that income and tuition explained some 87% of the variation of the demand for higher education. Moreover, as income changes so does the demand for college, meaning they are positively related. On the contrary, as tuition increases, the demand

for higher education decreases indicating a negative relationship. He also found income and tuition elasticities of demand of 1.20 and -0.44 using enrollment ratios. Kim (1984) conducted a study estimating the demand for education. The author used translog-Linear Expenditure System specifications of the indirect utility function in his analysis. He reported income elasticity of demand for education to be 1.33995 and the own price elasticity is -1.31019. Yang (1998) conducted a study examining the demand for higher education from both public and private schools. In his model, he also used the similar explanatory variables similar to those of Campbell and Siegel (1967), but he added wage rate in the retail sector and unemployment rate to seize the opportunity cost of attending college and the effect of labor condition on the college enrollment. Results showed that tuition and income are significant in decision making process of attending public institutions, but not the wage rate. Additionally, tuition elasticity at public schools is -0.797, which is higher compared to private colleges -0.154. Leslie and Brinkman conducted a study in 1988 in which they reviewed twenty five previous studies done on the effect of price change on college enrollment at the higher education. Their result indicated that there is a negative relationship between enrollment and tuition. In addition, the researchers noted that students are sensitive to a change in tuition. An increase of $100 in tuition decreases students 'enrollment between age 18 and 24 years by 3% on the average. Hossler et al. (1998) investigated the factors that affect student sensitivity to college tuition and financial aid in the college choice process. The study consisted of twenty one high schools in the state of Indiana. The authors claimed that female students are more likely to think that low tuition is important than males students. In 1999, Dynarski conducted a study on the effect of student aid on college attendance and educational attainment. The author found that a $1000 increase in the financial aid increases the completion of college by approximately 0.16 years and attendance by 4%. Beggs, et al.

(2006) used both qualitative and a means-send (quantitative) methods to analyze the factors that influence a student to choose a college major. They assessed information search, match with interests, job characteristics, financial considerations, social benefits and major attributes. According to the authors, parents or guardians are found to be influential in the process of choosing a college major. Their findings showed that match with interests and job characteristics are the most significant in selecting a major. On the other hand, the quantitative analysis, the authors indicated that match with interests is statistically significant compared to information search, which in this case is the least significant. The results for this study concluded that students choose a college major first because of their match with interests. Beggs et al. (2006) asserted that this information about factors that influence students to select an academic major can help administrators to recruit and guide students in the decision making process of selecting a major. They suggest institutions to allow enough times to students to make a fully conscious decision about choosing a major. In addition, specific recruitment and communication strategies should be used in attracting the new generation of students called "generation Y" (Beggs et al., 2006). Shin and Milton (2008) surveyed 470 public 4-year colleges and universities in the US examining student response to tuition increase by academic majors. The six majors in this study were Education, Engineering, Biology, Math, Physics and Business. Results showed that response to tuition change differ across the majors. The authors pointed out that when future expecting income is greater than the price of college education, then individual may be less sensitive to a tuition increase. Additionally, even though tuition went up between year 2002 and 2004, full time enrollment at public colleges also increased during the same period, which was explained by changes in other variables such as financial aids.

CHAPTER 3

Methodology

This chapter discusses the methods and procedures used in the study. We also discuss the collection of the data and the variables in this research.

The purpose of this study is to identify factors that influence enrollment in agricultural economics/agribusiness as a major and to discuss the implications for 1890 and 1862 land grant institutions. Understanding the challenges in recruiting and retention minorities in agribusiness can be partially done by first finding out factors that influence an individual to select agribusiness as a major. The low participation of minority undergraduates in the program may imply the elimination of several agricultural economics/agribusiness academic programs at land-grant institutions. This can be achieved through the following objectives: (1) to identify factors that influence enrollment in agribusiness as a major and (2) to discuss the future implications for 1890 and 1862 land-grant institutions.

Methods and Procedures

The focus of this study is to identify factors that affect enrollment in agribusiness. We estimate the demand for enrollment in agribusiness using previous studies on demand for higher education model. Our model is based on Barkley (2005), a study which identifies determinants of the selection of a major field of study. The model is as in equation 1.

$Major_i$ = f (Sociodemographic Variables, High School Experience, Prior Experience, Mentors, Academic Characteristics, Career Characteristics)

Sociodemorgraphic variables represent student's gender (Female) and Age. High School Experience describes GPA, high school activities and class size. The Mentors include parents, teachers and personal role model. Academic Characteristics are friendly environment,

scholarship, alumni, school reputation, agricultural clubs, radio broadcasts about the College of Agriculture, and difficulty of curriculum. Career Characteristics are working outdoors, field work, working with animals, location of career, future job market of career, potential income, working with people and plants, and desire to help others. Prior Experience describes agriculture course in high school and prior experience in agriculture.

According to Bezmen and Depken (1996), the author conducted a research study investigating the demand for college in US using a cross section data of 113 colleges between years 1994-1995. In their study, they utilized the log-linear model to estimate the demand for college using multiple regressions as in the following equation 2 of the model.

$Qd = \beta o + \beta 1x + \beta 2x + Є$

Where Qd is the number of applicant to given school

βo is the intercept of the regression equation

$\beta 1$ is the vector of the coefficient

X is the independent variable

$Є$ is the error term

Data

Cross sectional demand model for 2007 is used in this research to analyze the variables. Data in this study are collected via various sources. The dependent variable, 2007 fall enrollment in agricultural economics/agribusiness data was obtained via the Food and Agricultural Information Education System database (FAIES). Only 1890 and 1862 land-grant at 4 years universities and colleges that offer the agricultural economics/agribusiness program are considered in this research. Additionally, we dropped out a few colleges because of missing data for the specific year. The independent variables, sex and ethnicity are also extracted via the

FAEIS database using time period of 2007. Tuition costs and grant for financial aid are gained through the Integrated Postsecondary Education Data Systems (IPEDS) for year 2007. Number of farms within the respective university states was collected via Census of Agriculture. Data were analyzed using SPSS 20 with an alpha level of 0.05 and 0 .10 to determine the statistical significance.

Empirical Model

To identify factors that affect enrollment at 1890 and 1862 four years land-grant institutions offering agricultural economics/agribusiness program as in the subsequent equation 3 of the model.

Enrollment in agribusiness = f (Ethnicity, Sex, Tuition, Number of Farms, Financial Aid)

The dependent variable, enrollment in agricultural economics/agribusiness represents students enrolled in the agricultural economics/agribusiness at 1890 and 1862 land grant institutions. Tuition (independent variable) is in-state tuition paid at the university, adjusted for inflation in year 2007; sex (independent variable) consists of dummy variables, 0-females and 1-males to differentiate gender of students enrolled; ethnicity (independent variable) is comprised of dummy variable, 0-other ethnicities and 1-Caucasians; number of farms is the number of farms within the respective university's state. Financial aid is the number of grant aid dollars received by undergraduate students at each institution during year 2007. Ordinary Least Squares is used in the study to compute the analysis with a sample size of 53 land-grant institutions and colleges offering agricultural economics/agribusiness as a major at the undergraduate level.

CHAPTER 4

Results and Discussion

In this chapter, results from data analysis are discussed. Descriptive statistics and regression model are used to capture the determinants that are significant in this study.

The purpose of this study was to identify factors that influenced enrollment in agricultural economics/agribusiness as a major and to discuss the implications for 1890 and 1862 land-grant institutions. Understanding the challenges in recruiting and retaining minorities in agricultural economics/agribusiness can be partially done by first finding out factors that influence an individual to select agribusiness as a major. The low participation of minority undergraduates in agribusiness academic programs may imply the elimination of several agricultural economics/agribusiness academic programs at land-grant institutions. The purpose of this study was achieved through the following objectives: (1) to identify factors that influence enrollment in agribusiness as a major and (2) to discuss the implications for 1890 and 1862 land-grant institutions.

Descriptive Statistics

The descriptive statistics for this study are presented in Table 1. Each variable's mean, standard deviation, minimum and maximum are calculated for the analysis. Explanatory variables are ethnicity, sex, tuition, number of farms and financial aid. The sample size of this study is 53 and is comprised of 1890 and 1862 four year land-grant institutions that offer agricultural economics/agribusiness academic programs. To understand the variability between variables, the standard deviation of the variables is also reported. Enrollment in agribusiness has a mean of 152 pupils enrolled with a minimum of three enrolled, a maximum of 717 and a

standard deviation of 146, which exhibits high variation. Tuition was on average $5,681 per academic year 2007, a maximum of $34,600, a minimum of $1,723, and a standard deviation of $4,591. The number of farms has a mean of 54,363, a maximum of 247,500, a minimum of 2,520, and a standard deviation of 47,272, which also displays a high variation. Finally, financial aid is another variable of importance and has a mean of $60,209,318, a maximum of $162,436,101, a minimum of $470,918, and a standard deviation of $46,621,316.

Table 1

Descriptive Statistics of Variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Enrollment in Agribusiness	53	3.00	717.00	152.3962	146.06721
Ethnicity	53	.00	1.00	.8491	.36142
Sex	53	.00	1.00	.8679	.34181
Tuition	53	1723.00	34600.00	5681.0000	4591.20315
Numberof Farms	53	2550.00	247500.00	54363.2075	47272.61684
Financial Aid	53	470918.00	162436101.00	60209318.7170	46621316.44828

The frequency is generated for the independent variables sex and ethnicity. Table 2 shows the representation of males and females enrolled in agribusiness in 2007. The results indicate that there are more males (86.8%) enrolled in agricultural economics/agribusiness program at land-grant institutions than females (13.2%) in 2007. On the other hand, Shrestha et al. (2011); Overbay and Broyles (2008); Koon et al. (2009) highlighted that an increasing number of females are enrolling in schools and colleges of agriculture. After examining the undergraduate enrollment in agricultural economics and agribusiness at 1862 and 1890 land-grant institutions from year 2006 to 2010, FAEIS (2012) reported that male enrollment in the

program has increased by 14.8% in 1862 land-grant universities and by 13.7% at 1890 institutions. On the other hand, female enrollment has grown rapidly especially at 1890 land-grant institutions (24.8%) between 2006 and 2010. For the same years, 1862 institutions have also experienced an increase of 11.6% of female enrollment in the program. Overall, both male and female enrollment has increased; however, the number of male enrollment in agricultural economics and agribusiness still outweighs those of females.

Table 2

Enrollment of Undergraduates by Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	7	13.2	13.2	13.2
Male	46	86.8	86.8	100
Total	53	100	100	

Table 3 represents Caucasians and other ethnicities in this study. In addition, Caucasians represent 84.9% compared to other ethnicities (15.1%). These findings are similar to those in previous studies (Dyer et al., 1999; Beggs et al., 2006).

Table 3

Enrollment of Undergraduates by Ethnicity

	Frequency	Percent	Valid Percent	Cumulative Percent
Others	8	15.1	15.1	15.1
Caucasian	45	84.9	84.9	100
Total	53	100	100	

The number of females (50%) enrolled in agricultural economics/agribusiness at 1890 land-grant institutions is equal to the number of males (50%) (Table 4). This may be due to the changing

demographics of students enrolling in the program. According to FAEIS (2012), female enrollment (19.9) surpassed male enrollment (9.1%) from 2009 to 2011 in agricultural programs as a whole. In addition, female enrollment in agricultural economics/agribusiness was reported to increase by 27.8% from 2004 to 2011 compared to male enrollment, which grew by 27.0%.

Table 4

Enrollment of Undergraduates at 1890 by Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	6	50	50	50
Male	6	50	50	100
Total	12	100	100	

Table 5 shows the representation of Caucasian and minorities at 1890 land-grant institutions. African Americans represent 87%, Caucasians 11%, Hispanics 1%, and Native American 1%. The total enrollment of undergraduate students enrolled in agricultural economics/agribusiness at 1890 land-grant universities in 2007 is 189.

Table 5

Enrollment of Undergraduates at 1890 by Ethnicity

Year	Total	Caucasian	African American	Hispanics	Native American
2007	189	20	165	2	2

Female enrollment in agribusiness represent 2.4% compared to male enrollment, which is 97.6% at 1862 Land grant institutions in Table 6.

Table 6

Enrollment of Undergraduates at 1862 by Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	1	2.4	2.4	2.4
Male	41	97.6	97.6	100
Total	42	100	100	

The total enrollment of undergraduate students within agricultural economics/agribusiness at 1862 land-grant institutions in 2007 is 7,251. Caucasians make up 89%, African Americans 4%, Hispanics 3%, Asian 3%, and Native American 1% (Table 7).

Table 7

Enrollment of Undergraduates at 1862 by Ethnicity

Year	Total	Caucasian	African American	Hispanics	Asian	Native American
2007	7251	6480	295	232	178	66

The regression model explained 56% of the variation for enrollment in agricultural economics/agribusiness. Ordinary Least Squares is used for this study to estimate the demand for enrollment in agribusiness academic programs. Enrollment in agricultural economics/agribusiness, tuition, number of farms and financial aid are transformed in natural logarithm. The summary of the regression analysis is presented in table 4. Significance and t-statistics are calculated. The coefficient of ethnicity is statistically significant at 10% (p = 0.068).This indicates that a 1% increase in Caucasian population will increase enrollment in

agricultural economics/agribusiness by .667. The coefficient of sex is statistically significant at 5 % ($p = 0$). The beta of 1.449 implies that a 1% increase in male enrollment will increase enrollment in agricultural economics/agribusiness program by 1.449. The elasticity of enrollment with respect to tuition is .239. This suggests that 1% increase in tuition will increase enrollment in agricultural economics/agribusiness by .239. The effect of tuition on enrollment is statistically not significant ($p = .299$). This result is contrary to what was expected. Traditionally, when tuition increases, enrollment decreases and vice versa. A possible explanation might be that as long as students have access to loan or financial aid, then a weak increase in tuition will not have a significant effect on enrollment (Shin and Milton, 2008). They pointed out that students might not be so sensitive to a change in tuition if the cost of education is still lower than of competing majors or if they can pay for their own tuition. The authors explained that an individual will be willing to pay higher price on education if the expected return is higher. For example, the researchers found that student are responsive to a price change in tuition in majors such as Physics, Biology, and Business; but not in Engineering, Math, and Education. Another explanation for the positive relationship between tuition and enrollment might be due to the affordability of tuition at public universities compared to private institutions. Number of farms is statistically significant ($p = 0.001$) at 5%. Thus a 1% increase in the number of farms will increase the number of enrollment in agribusiness by .438. The elasticity of enrollment with respect to financial aid suggests that 1% increase in the number of financial aid awarded will increase the number of enrollment in agricultural economics/ agribusiness by .189. The effect of financial aid on enrollment is statistically significant ($p = .069$) at 10%.

Table 8

Fit Statistic

MSE	SSE	df	R-Square
.606	28.487	52	.559

Table 9

Estimation Results

Variables	Estimate	Standard Error	t-value	P-value
Constant	-7.222	2.599	-2.778	.008
Ethnicity	.667	.357	1.870	.068
Sex	1.449	.364	3.985	.000
LnTuition	.239	.228	1.050	.299
LnNumberof Farms	.438	.117	3.740	.001
LnFinancial Aid	.189	.101	1.861	.069

CHAPTER 5

Conclusion, Recommendations, Implications and Summary

The purpose of this study was to identify factors that influenced enrollment in agricultural economics/agribusiness as a major and to discuss the implications for 1890 and 1862 land-grant institutions. Understanding the challenges in recruiting and retaining minorities in agricultural economics/agribusiness can be partially done by first finding out factors that influence an individual to select agribusiness as a major. The low participation of minority undergraduates in agribusiness academic programs may imply the elimination of several agricultural economics/agribusiness academic programs at land-grant institutions. The purpose of this study was achieved through the following objectives: (1) to identify factors that influence enrollment in agribusiness as a major and (2) to discuss the implications for 1890 and 1862 land-grant institutions.

The status of agricultural economics/agribusiness is a concern, especially at land-grant institutions. Several land-grant institutions have eliminated programs due to budget cut and the low productivity of the department. Based on the analysis, the researcher discovered that the struggle to attract minorities in the agricultural economics/agribusiness program will probably continue. Different measures can be taken in improving recruitment and retention of these students. However, several strategies such as changing curriculum, partnering with agribusiness firms, organizing various workshops to educate students about the agricultural economics/agribusiness field are already in place to increase enrollment. These initiatives have been effective in increasing enrollment, but not drastically. On the other hand, results showed that the independent variables considered in this study were not strong factors that contributed to increase enrollment in the programs significantly. This can possibly be explained by

understanding an individual's choice to enroll in the program, which might either be due to personal interest or having parents that are in the industry. Several factors are involved in choosing agribusiness as a major, but the most important determinants would be "match with interest" as Beggs et al. (2006) highlighted. Shrestha et al. (2011) conducted a study identifying and ranking the factors that influence students' decisions to enroll in the College of Agriculture and Natural Resources at Michigan State University. The authors found that curriculum was ranked the first most important and reputation, the second influential factor in selecting to major in their program. Additionally, scholarship/financial aid was ranked as one of the least important factors choosing to enroll in the agricultural program.

Several studies reported that monetary incentives could contribute to increase enrollment of students in schools and colleges of agriculture. Based on this study, the researcher concluded that in order to attract this group of students, administrators could change how these students view the agricultural field. If students also rank the reputation of a school as one of the factors that influence them to choose a particular program, then agricultural schools should focus on developing strong marketing strategies and a rich curriculum that can attract minorities. Additionally, the study's findings show that land-grant institutions can increase enrollment of minorities by providing financial aid/scholarship. Agricultural leaders should also design a curriculum that requires students to intern with at least two different companies during their four years in the program. Moreover, land-grant institutions should target both female and male, Hispanics, Asians, and Native Americans in their program. Several workshops should be in place to increase the interest and the knowledge of students about the field. Further, the results of this study suggested that land-grant universities can continue to improve and enhance their recruitment strategies to attract more minorities.

Overall results showed that at 1890s, the number of female enrollment is equal male enrollment in 2007. Traditionally, males are more enrolled in agricultural economics/agribusiness program. Due to the changing demographics of students and the increasing number of minorities, 1890s can still attract more students in agricultural economics/agribusiness program at these institutions by targeting both female and male. Since these schools are noticing more and more females enrolling in the program, they are encouraged to continue to recruit this group. In addition, the majority of students entering agribusiness programs at 1890s are African-Americans (87%); this imply that administrators can increase the number of minorities' enrollment by providing funding/financial aid. Further, the findings indicate that Caucasian enrollment is about 11% at 1890s. This suggests that 1890 land grant universities can continue to target this group and other minorities such as Hispanics and Asians.

Contrary to 1890, 1862 land grant colleges have more diversity in agricultural economics/agribusiness program. At the same time, they can also increase enrollment of minority by targeting Native Americans, Asians, Hispanics, and African American. The majority of students enrolled at 1862 are Caucasians (89%), which outweigh any other ethnicity.

In closing, agricultural leaders should continue to improve their recruitment and retention efforts to attract minority undergraduate students at land-grant universities in agricultural economics/agribusiness academic programs. It is a crucial for these institutions to promote the success of the agricultural programs.

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