On the Economic Returns to a College Degree in Agriculture: What do we know?

Genti Kostandini

Elton Mykerezi

Kristine West

Abstract

This study examines the returns to agricultural majors compared to other majors offered in four-year institutions. We find that, after accounting for the necessarily rural location of those with college degrees in agriculture, monetary returns to education are much closer to the median than naive rankings imply. As individuals acquire college degrees in pursuit of monetary and non-monetary goals, earnings are generally an imperfect measure of success for any degree, but they appear more so for those pursuing degrees in agriculture. Agriculture degree recipients report giving less importance to income when making a career choice than virtually any other major, with the exception of teachers.

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*PLEASE DO NOT CITE WITHOUT PERMISSION. THIS IS STILL WORK IN PROGRESS.

University of Georgia, 221 Stuckey Building, Grifin, GA 30223, gentik@uga.edu; University of Minnesota, St. Paul, MN; Macalester College, St. Paul, MN.

Introduction

The returns to different degree programs have been a major point of curiosity and debate among parents, students, academics and policy makers for many years. Ratings and rankings of different degree programs are common in the non academic media, and, there has been some work done to provide estimates of returns to college majors from economists (e.g. Arcidiacono, 2002; Hecker, 1998; Rumberger and Thomas, 1993 etc.). College major choice has also received attention in empirical studies (e.g. Stinebrickner and Stinebrickner, 2011; Zafar, 2009; Montmarquette et al., 2002). The policy interest is also justified, since, to a large extent higher education is publicly financed via funding to public institutions, federal and state assistance, etc. Information on returns to majors and major choice can facilitate efforts to better target public investments towards programs that produce higher benefits to society. Typically, the public subsidy to higher education does not explicitly influence degree choices (e.g. general funds to public institutions, federal grants and subsidized loans) but some public funds are being used to target specific degree programs. For instance, the National Science Foundation makes grants to higher education institutions to finance merit and need based assistance for students willing to enroll in Science, Technology, Engineering and Mathematics (STEM) majors.

Agriculture is inherently an area of study that requires land and space, therefore land grant universities are the primary provider of a higher education in agriculture (NRC, 1995). Recently the value of agricultural degrees has come into question by the published media and the general public (e.g. Yahoo, 2012; Daily Beast, 2011) and elicited a response from multiple public authorities, including the USDA and many agricultural colleges (NIFA, 2012; Redandblack, 2012; Huffington Post, 2012). However, a recent 2012 report from Georgetown University (Carnevale et al. 2012) found that recent graduates who hold a degree in agriculture are among those with the lowest unemployment rate and returns to agricultural majors are similar to humanities and liberal arts majors, communications and journalism majors but are lower compared to some others (e.g. business, engineering, social sciences

etc.). Needless to say, many reports are based on correlations rather than rigorous analysis of returns to college programs.

There has been research on returns to agricultural majors (e.g. Artz et al. 2011; Qenani-Petrela and McGarry Wolf, 2007; Barkley et al. 1999; Barkley et al. 2001; Preston et al. 1990; Zekeri, 1992). However most studies have focused on the determinant of earnings (e.g. Qenani-Petrela and McGarry Wolf, 2007; Barkley et al., 2001; Preston et al., 1990) finding that experience, advanced degrees and starting salary are important determinants of earnings. They have also documented differences in gender earnings with the gap narrowing over time (Barkley et al., 2001; Qenani-Petrela and McGarry Wolf, 2007). With respect to earnings of agricultural majors that work within the agricultural and non-agricultural sector research (e.g. Artz et al., 2011; Zekeri, 1992) shows higher earnings for agricultural business/economics majors who work in non-agricultural sectors. Location is also found to be important when it comes to earnings with those working in rural areas earning $18,000 less (for all majors) and agricultural firms in rural areas paying on average $30,000 less than their urban counterparts (Artz et al., 2011).

To date, all empirical studies on returns to agricultural majors use surveys from a University's College of Agriculture alumni who hold an agricultural degree. Only Carnevale et al. (2011) use nationally representative surveys for their analysis, but the study is mainly descriptive and does not investigate determinant of earnings or control for ability and pre-college attributes. Artz et al. (2011) use survey data from Iowa State University alumni that include agricultural and non-agricultural majors. Another common theme across all these studies is that they do not focus on pre-college attributes of those that choose agricultural and non-agricultural majors. This study uses multiple nationally representative data sources to estimate the causal returns to an agricultural degree. Of course, college major is an individual choice, therefore analysis of the returns to any degree need to credibly disentangle the effect of the degree itself from that of observed and unobserved individual traits that lead to the major choice. This is not an easy task in general but it may even be more difficult for

agricultural majors. We propose that agriculture is unique in the following aspects: 1-People who self-select into agricultural majors may already have a relatively strong preference for agricultural jobs and/or non-metro living. 2-People prone to agricultural careers may see less reason to invest heavily in testable basic academic skills (SAT ACT) and perhaps invest in a broader set of skills (with disproportionate technical training). 3-Ag careers may contain a large "life choice" component. Using wages as a measure of success is noisy for all majors/professions (in that it disregards the fact that some actively sacrifice higher paying jobs for a better overall life experience), but it is likely more so for some occupations than others (e.g. college professors). Agriculture is likely to be one of these occupational choices where individuals consider non-wage factors more heavily. 4-Youth prone to agricultural careers may be more likely to already have their own family business or have friends or relatives who do. This has several implications for program evaluation. First, it is crucially important that the analysis controls for pre-college attributes, such as cognitive test scores, occupational aspirations, family resources, social capital etc. Second, it is equally important to have a strategy for accounting for the impact of unobservable factors. Models of career choice postulate that individuals maximize utility based on expected earnings, costs (monetary and psychological, thus ability plays a crucial role) and non-pecuniary preferences. The latter is likely to depend on factors that are rarely observed in data, and, we suspect these are disproportionally important for those choosing agricultural careers. Limited ability to control for ability, occupational aspiration and to account for unobservable factors will bias treatment effect estimates; in the current case likely downwards. We wish to make one more point. An unbiased estimate of the treatment effect of assigning individuals into one major as opposed to another, call it major treatment effect (MTT), is not sufficient for policy analysis. Policy is likely to invest or disinvest in infrastructure and/or support for particular areas of study rather than dictate what major people chose. It is thus important to estimate what would individuals do if their opportunities to study agriculture were reduced. The effect of changing investments in agricultural education opportunities is an

exposure treatment effect (ETT), and it reflects both, the causal effect of public investments on college choices and the MTT on labor outcomes. For instance, suppose that the true MTT of agricultural majors relative to engineering is negative. This information is useful to individuals when choosing majors, but does not fully address the question of whether policy should invest disproportionally in engineering schools, unless we are willing to assume that absent the opportunity to study agriculture, youth would chose engineering. This may not be the case; absent the opportunity to study agriculture, those interested in agricultural majors may disproportionally opt for two year technical degrees or the labor market (with no postsecondary training). So policy analysis requires an estimate of the treatment effect that public investments have on major choice and the treatment effects that majors have on labor market outcomes. Finally, we argue that non-pecuniary outcomes may be disproportionally important for agriculture and propose that a treatment effect on a subjective measure of job or life satisfaction be considered, in addition to the labor market outcomes.

Data

We use two large datasets that provide information on college major and employment. The American Community Survey (ACS) PUMS and the National Survey of College Graduates (NSCG). These are perhaps the two most recent. With these one can get an estimate of associations between college major and labor market outcomes such as wages and employment. These are partial associations that control for few background and demographic characteristics of respondents however as data on pre-college attributes is limited.

The ACS is a repeated cross section released annually, which collects data on 250,000 households each month. In addition to demographic information, such as gender, race and ethnicity, the survey also elicits information on the degree field of the respondents and work activities (e.g. labor force and employment status, annual earnings). Most importantly, the occupation of the respondents' Bachelor's degree is is elicited which makes it possible to

focus attention on the returns to different majors and how agricultural majors compare to them.

Starting with the 2005 wave, the ACS reported counties if they exceed a population of 65,000, and has created geographic areas called Public Use Micro Data Areas (PUMAs) that are available for all respondents. PUMAs are areas with a minimum population of 100,000 people and they do not cross state lines. Larger counties contain several PUMAs, while multiple smaller counties may be contained within PUMAs. This enables control for the 'rurality' of location which may cary widely in living costs. In this study we use the 2009 and 2010 waves of the ACS.

The NSCG is a longitudinal survey conducted since the 1970s, designed to provide data on the characteristics of the nation's college graduates in all academic disciplines providing data useful in understanding the relationship between college education and career opportunities (NSF, 2013).

The information collected on the NSCG provides a unique source for examining various characteristics of college-educated individuals such as major, occupation, salary and demographic information (NSF, 2013). More importantly, it provides information on job satisfaction as well as several other important measure other than salary.

We use the 2010 wave of the NSCG which provides coverage of the nation's college-educated population. Overall, the NSCG can provide an estimate of returns with a large recent sample.

Methodology

This study uses simple linear regression to examine the returns to agricultural majors relative to other majors. Although we cannot control for selection as, to our knowledge, data with a considerable number of agricultural majors that also have information on ability, and other variables that may help control for selection is not readily available. However, we control

for other important factors (demographics, locations, cost of leaving, etc.) and use naive regressions to shed some light on the returns to agricultural majors as well as some other measures such as salary importance and job satisfaction.

We focus on several issues. First, using data from the ACS, we examine the returns to agricultural majors (in general) and then for individual agricultural majors compared to other majors as we control for demographic information, location, cost of living and other economic conditions. Second, we examine employment status. Third, using data from the NCSG, we examine the relative importance of salary and job satisfaction across areas of study, including agriculture. Finally, using ACS, we examine how returns to agricultural and other business income varies across different majors.

Table 1: Relative Returns to Agricultural Majors

Major	1	2	3	4
Major	Demographics	Location	Price Level	Economic Con
No College Degree	-28.6	-30.20	-29.30	-29.20
Theology and Religious Vocations	-34.3	-35.20	-34.20	-33.80
Cosmetology Services and Culinary Arts	-7.8	-10.20	-12.60	-11.50
Philosophy and Religious Studies	-5.6	-9.60	-12.10	-11.80
Library Science	-4.7	-7.50	-8.40	-7.60
Education Administration and Teaching	-4.5	-5.70	-5.20	-5.10
Fine Arts	-3.7	-9.00	-12.80	-12.30
Public Affairs, Policy, and Social Work	-0.4	-3.00	-3.00	-2.80
Physical Fitness, Parks, Recreation, an	0.6	-2.00	-2.90	-3.10
Family and Consumer Sciences	2.1	-1.00	-2.10	-2.10
Liberal Arts and Humanities	5.7	0.50	-1.10	-1.20
Communication Technologies	5.7	1.10	-1.40	-1.20
Psychology	6.1	1.50	-0.05	-0.20
Linguistics and Foreign Languages	7.3	2.10	-1.30	-1.20
English Language, Literature, and Compo	7.9	2.70	-0.60	-0.50
History	10	5.20	2.00	1.70
Area, Ethnic, and Civilization Studies	14.8	8.60	3.60	3.70
Architecture	15.4	10.30	6.30	6.20
Criminal Justice and Fire Protection	8.2	4.80	4.70	4.30
Law	9.5	5.10	3.90	3.60
Communications	13.9	9.20	6.00	5.70
Electrical and Mechanic Repairs and Tec	0.05	-0.50	-0.60	0.30
Precision Production and Industrial Art	1.8	-0.50	2.00	2.60
Interdisciplinary and Multi-Disciplinar	15.1	11.30	9.80	9.70
Nuclear, Industrial Radiology, and Biol	15.7	14.40	14.80	14.50
Engineering Technologies	17.1	14.80	14.30	13.80
Military Technologies	17.6	13.60	12.60	12.60
Transportation Sciences and Technologie	18	14.70	13.70	13.30
Biology and Life Sciences	21.5	17.70	16.20	16.10
Social Sciences	21.7	16.30	12.50	12.00
Physical Sciences	22.5	18.70	16.80	16.20
Business	24.8	20.70	18.80	18.20
Medical and Health Sciences and Service	29.3	26.40	26.10	26.10
Construction Services	29.7	26.20	24.70	24.50
Mathematics and Statistics	29.7	25.10	22.40	21.30
Computer and Information Sciences	32.6	28.00	25.50	24.10
Engineering	37.3	32.90	30.50	29.30
Controls Demographics	x	x	x	x
Controls Location		x	x	x
Controls Cost of Living			x	x
Controls Economic Conditions				x
Observations	2,668,779	2,668,779	2,660,955	2,660,955
R Squared	0.46	0.468	0.471	0.473

Table 2: Relative Returns to (Dissagregated) Agricultural Majors

Major	1	2	3	4
Theology and Religious Vocations	-5.5	-4.9	-4.8	-4.5
Studio Arts	14.4	11.4	8.2	8.8
Drama and Theater Arts	18.0	13.6	8.0	9.2
Music	16.9	14.2	11.3	11.7
Counseling Psychology	11.0	11.8	11.5	11.8
Visual and Performing Arts	21.1	16.6	12.0	12.5
Fine Arts	22.6	19.1	14.8	15.1
Botany	20.0	18.5	16.5	16.3
Philosophy and Religious Studies	23.3	20.9	17.6	17.7
Cosmetology Services and Culinary Arts	20.9	20.1	16.9	17.8
Art and Music Education	18.3	18.6	18.0	17.9
Film, Video and Photographic Arts	30.3	24.9	17.1	18.7
Human Services and Community Organizati	21.2	19.3	18.7	19.4
Early Childhood Education	21.7	21.4	21.4	21.2
Social Science or History Teacher Educa	21.9	22.0	21.3	21.2
General Agriculture	18.2	21.9	21.7	21.6
Library Science	23.9	22.8	21.0	21.7
Plant Science and Agronomy	21.3	23.2	22.6	22.3
Composition and Speech	29.0	26.2	22.4	22.5
General Education	24.2	23.7	22.9	23.0
Social Work	23.8	23.5	23.0	23.1
Educational Psychology	27.6	25.6	23.5	23.2
Humanities	30.3	26.4	23.4	23.5
Elementary Education	22.9	24.0	24.0	23.7
Physical and Health Education Teaching	24.5	24.4	23.9	23.7
School Student Counseling	25.1	23.7	23.6	23.7
Teacher Education: Multiple Levels	21.7	24.0	24.0	23.9
Linguistics and Comparative Language an	32.6	28.5	23.9	23.9
Other Foreign Languages	33.1	29.4	24.6	24.6
Science and Computer Teacher Education	25.2	26.1	25.7	25.4
Commercial Art and Graphic Design	33.6	30.2	25.9	25.7
Anthropology and Archeology	32.0	28.9	25.6	25.8
Physical Fitness, Parks, Recreation, an	29.3	28.3	26.5	26.2
Secondary Teacher Education	24.6	26.3	26.4	26.3
Clinical Psychology	33.0	28.9	26.0	26.4
Language and Drama Education	28.3	28.0	26.9	27.0
Ecology	30.7	28.7	26.5	27.0
Mass Media	33.8	31.2	26.8	27.0
Family and Consumer Sciences	30.7	29.2	27.2	27.1
Art History and Criticism	41.2	36.3	27.5	27.3
Animal Sciences	25.0	28.0	27.8	27.7
Communication Technologies	34.4	31.4	28.1	28.1
United States History	37.6	33.3	28.9	28.1
Interdisciplinary Social Sciences	32.2	30.3	28.9	28.4
Liberal Arts	34.7	31.2	28.7	28.5
Miscellaneous Health Medical Profession	30.2	29.5	28.8	28.8
Miscellaneous Education	27.1	29.2	29.1	29.0
Mathematics Teacher Education	27.7	29.3	29.2	29.0
English Language and Literature	37.0	33.4	29.3	29.2
Agriculture Production and Management	27.3	30.7	29.9	29.3
Physical Sciences	32.4	31.3	29.4	29.4
Sociology	35.2	32.1	29.5	29.4
Miscellaneous Agriculture	25.2	29.7	29.9	29.5
Psychology	35.2	32.2	29.7	29.5
Electrical and Mechanic Repairs and Tec	28.8	29.8	28.9	29.6
Natural Resources Management	30.5	31.1	29.7	29.7

Special Needs Education	30.2	29.9	29.7	29.9
Miscellaneous Psychology	37.3	33.4	30.3	30.0
Criminology	33.2	31.9	30.7	30.3
French, German, Latin and Other Common	37.7	34.4	30.4	30.3
General Social Sciences	35.1	32.0	30.8	30.4
Court Reporting	34.7	32.1	30.9	30.7
History	38.9	35.7	31.8	31.2
Hospitality Management	37.5	34.2	31.2	31.3
Environmental Science	37.1	34.2	31.9	31.7
Geography	37.9	35.2	32.2	31.8
Precision Production and Industrial Art	30.6	29.9	31.5	31.9
Interdisciplinary and Multi-Disciplinar	32.2	32.7	31.9	31.9
Social Psychology	37.6	34.6	32.6	32.7
Educational Administration and Supervis	30.9	32.9	33.0	32.8
Computer Networking and Telecommunicati	40.1	36.9	33.9	33.0
Miscellaneous Biology	35.5	34.7	33.2	33.1
Intercultural and International Studies	41.6	38.1	33.1	33.1
Area, Ethnic, and Civilization Studies	43.6	39.1	33.3	33.2
Pre-Law and Legal Studies	38.7	36.0	33.7	33.3
Criminal Justice and Fire Protection	36.8	35.1	34.1	33.6
Biological Engineering	36.2	36.0	34.5	34.2
Forestry	32.5	34.7	34.6	34.9
Communications	43.9	40.2	36.1	35.5
Architecture	44.2	40.8	35.9	35.7
Journalism	42.4	40.2	36.3	35.8
Astronomy and Astrophysics	48.6	43.0	37.2	35.8
Computer Programming and Data Processin	40.7	39.2	37.3	36.2
Physiology	43.0	40.4	37.8	37.4
Nutrition Sciences	43.8	40.9	37.9	37.4
Communication Disorders Sciences and Se	40.3	38.9	37.9	37.6
Engineering Technologies	40.7	39.5	37.9	37.7
Community and Public Health	42.1	40.8	38.5	38.3
Atmospheric Sciences and Meteorology	43.0	41.7	39.0	38.6
Neuroscience	44.6	41.9	39.3	38.8
Soil Science	38.2	39.6	38.1	38.9
Agricultural Economics	36.3	39.9	39.0	39.0
Miscellaneous Business and Medical Admi	44.9	42.8	39.4	39.0
Geology and Earth Science	43.9	42.5	39.9	39.5
Molecular Biology	48.2	44.0	40.0	39.8
Advertising and Public Relations	45.5	44.0	40.4	40.1
Electrical Engineering Technology	45.4	43.8	42.3	40.9
Industrial Production Technologies	43.3	43.8	42.2	41.8
Multi-disciplinary or General Science	45.8	44.0	41.9	41.8
Oceanography	48.1	44.6	41.7	41.9
Military Technologies	46.4	43.9	42.1	42.0
General Medical and Health Services	45.7	43.4	42.2	42.1
Transportation Sciences and Technologie	46.7	45.1	43.2	42.6
Miscellaneous Engineering Technologies	45.7	45.1	43.6	43.1
Political Science and Government	52.2	48.5	43.8	43.1
Mechanical Engineering Related Technolo	44.1	43.2	43.7	43.2
Food Science	47.6	46.1	44.2	43.5
Business Management and Administration	47.9	46.0	44.1	43.5
Public Administration	48.3	45.5	43.9	43.7
Physics	52.5	49.3	44.7	43.7
Nuclear, Industrial Radiology, and Biol	44.4	44.7	44.3	43.9
Industrial and Organizational Psycholog	52.3	49.1	44.9	43.9
Medical Assisting Services	46.8	45.9	44.5	44.2
Human Resources and Personnel Managemen	48.0	46.9	44.9	44.2
Miscellaneous Social Sciences	52.9	48.9	44.4	44.2
Computer Information Management and Sec	48.5	47.8	45.1	44.4
General Business	50.8	48.1	45.1	44.4

Architectural Engineering	52.9	50.1	45.7	44.5
International Business	53.5	49.1	45.1	44.5
Treatment Therapy Professions	47.5	46.0	44.7	44.7
Biochemical Sciences	54.5	50.8	46.7	45.8
Geosciences	50.1	49.3	46.5	46.1
Microbiology	50.3	49.1	46.8	46.6
International Relations	60.5	56.1	47.8	46.7
Marketing and Marketing Research	54.1	51.4	47.8	47.0
Genetics	54.4	51.3	47.8	47.3
Health and Medical Administrative Servi	49.8	48.7	47.9	47.5
Biology	52.3	50.2	48.0	47.7
General Engineering	56.3	52.9	49.2	48.2
Cognitive Science and Biopsychology	58.6	52.8	48.2	48.2
Zoology	50.9	50.1	48.4	48.6
Medical Technologies Technicians	51.2	50.4	49.3	49.2
Miscellaneous Engineering	55.6	53.6	50.7	49.7
Computer and Information Systems	54.9	52.9	50.9	49.9
Chemistry	55.6	53.2	50.9	50.2
Mathematics	57.6	54.8	51.3	50.2
Operations, Logistics and E-Commerce	56.8	54.8	52.2	51.0
Public Policy	62.6	58.5	52.1	51.6
Information Sciences	59.0	56.3	53.7	52.3
Pharmacology	56.8	54.3	52.4	52.5
Accounting	59.5	57.0	54.4	53.7
Construction Services	58.4	56.5	54.1	53.8
Materials Engineering and Materials Sci	58.4	57.0	55.0	53.8
Engineering Mechanics, Physics, and Sci	59.2	56.8	54.8	53.8
Applied Mathematics	64.6	60.4	55.4	54.2
Economics	67.1	62.4	55.5	54.3
Environmental Engineering	60.1	57.2	54.8	54.5
Naval Architecture and Marine Engineeri	63.4	58.9	55.6	54.9
Engineering and Industrial Management	57.6	57.4	55.9	55.3
Business Economics	66.0	62.0	57.3	56.2
Management Information Systems and Stat	63.2	60.8	58.1	56.6
Computer Science	66.1	62.7	58.7	57.0
Metallurgical Engineering	61.1	60.2	58.5	57.4
Finance	66.2	63.1	58.7	57.5
Statistics and Decision Science	67.8	64.5	59.5	57.5
Civil Engineering	64.1	61.5	58.8	57.8
Biomedical Engineering	65.9	63.3	59.0	58.2
Industrial and Manufacturing Engineerin	64.1	62.2	60.0	59.0
Nursing	62.8	61.6	60.5	60.4
Mechanical Engineering	67.2	64.8	62.1	60.9
Aerospace Engineering	69.2	66.1	62.6	61.4
Electrical Engineering	70.8	67.5	63.7	61.9
Computer Engineering	72.3	68.9	64.4	62.2
Health and Medical Preparatory Programs	66.6	65.0	63.2	62.6
Chemical Engineering	73.3	71.0	68.3	66.9
Mining and Mineral Engineering	67.6	70.3	68.3	67.6
Actuarial Science	81.5	78.6	73.3	71.5
Nuclear Engineering	76.8	75.8	74.2	72.8
Pharmacy, Pharmaceutical Sciences, and	76.3	75.5	74.5	74.2
Mathematics and Computer Science	85.9	81.8	77.6	76.4
Petroleum Engineering	97.9	98.6	95.0	93.4
Controls Demographics	x	x	x	x
Controls Location		x	x	x
Controls Cost of Living			x	x
Controls Economic Conditions				x
Observations	2,668,779	2,668,779	2,660,955	2,660,955
R Squared	0.46	0.468	0.471	0.473

Table 3: Relative Employment of Agricultural Majors

Major	Employed
Architecture	-7.40
Electrical and Mechanic Repairs and Tec	-6.50
No College	-4.80
Cosmetology Services and Culinary Arts	-4.40
Fine Arts	-4.30
Law	-4.20
Precision Production and Industrial Art	-3.90
Library Science	-3.80
Communication Technologies	-3.20
Liberal Arts and Humanities	-3.00
Linguistics and Foreign Languages	-2.90
Philosophy and Religious Studies	-2.80
Engineering Technologies	-2.60
English Language, Literature, and Compo	-2.60
Communications	-2.50
History	-2.50
Area, Ethnic, and Civilization Studies	-2.30
Social Sciences	-2.20
Psychology	-2.00
Construction Services	-1.90
Interdisciplinary and Multi-Disciplinar	-1.80
Business	-1.70
Computer and Information Sciences	-1.50
Mathematics and Statistics	-1.50
Public Affairs, Policy, and Social Work	-1.40
Engineering	-0.80
Physical Sciences	-0.30
Family and Consumer Sciences	-0.20
Transportation Sciences and Technologie	0.03
Biology and Life Sciences	0.30
Physical Fitness, Parks, Recreation, an	0.40
Criminal Justice and Fire Protection	0.60
Theology and Religious Vocations	0.60
Education Administration and Teaching	0.90
Military Technologies	1.80
Nuclear, Industrial Radiology, and Biol	2.70
Medical and Health Sciences and Service	2.90

Table 4: Relative Importance of Salary and Satisfaction of Agricultural Majors

Area of Study	Salary Importance	Satisfaction	Satisfaction with Controls for Salary
Science	-0.001	-0.003	-0.027
Liberal Arts	0.016	0.018	0.001
Education	0.025	-0.037	-0.075**
Engineering	0.052	-0.017	-0.018
Business	0.105	0.105**	0.108**
Health	0.125	0.098**	0.078**
Other	0.135	-0.036	-0.041

Table 5: Majors, Income and Farm Income

Variable	Log Farm Income	Log Business Income	Log Ag Wages
Business	0.0641*	-0.0449	0.0582
	(0.0352)	(0.0960)	(0.0366)
Science	-0.0713*	-0.165	-0.0537
	(0.0425)	(0.121)	(0.0450)
Engineering	0.0390	-0.314**	0.221***
	(0.0476)	(0.128)	(0.0506)
Education	-0.0643**	-0.513***	-0.125***
	(0.0318)	(0.0970)	(0.0331)
Liberal Arts	-0.179***	-0.328***	-0.162***
	(0.0319)	(0.0889)	(0.0335)
No Degree	-0.406***	-0.116*	-0.326***
	(0.0239)	(0.0594)	(0.0255)
Female	-0.630***	-0.614***	-0.513***
	(0.0116)	(0.0371)	(0.0126)
race==2	-0.332***	0.166	-0.274***
	(0.0430)	(0.264)	(0.0453)
race==3	-0.154**	-0.445*	-0.00565
	(0.0700)	(0.238)	(0.0737)
race==4	-0.0213	-0.148	-0.142
	(0.191)	(0.973)	(0.190)
race==5	0.0788	-0.0637	0.151
	(0.206)	(0.628)	(0.234)
race==6	0.00165	0.141	0.0275
	(0.0709)	(0.261)	(0.0715)
race==7	-0.265***	-0.0733	-0.178**
	(0.0818)	(0.315)	(0.0850)
race==8	-0.173***	-0.0157	-0.102
	(0.0591)	(0.191)	(0.0645)
race==9	0.0251	-3.133***	0.0813
	(0.250)	(1.171)	(0.249)
Age	0.0808***	0.0155	0.112***
	(0.00476)	(0.0151)	(0.00519)
Age Squared	-0.000819***	-0.000130	-0.00119***
	(5.03e-05)	(0.000157)	(5.61e-05)
educd==114	0.339***	-0.169**	0.343***
	(0.0261)	(0.0851)	(0.0268)
educd==115	0.668***	0.432***	0.704***
	(0.0466)	(0.119)	(0.0494)
educd==116	0.628***	-0.234	0.726***
	(0.0680)	(0.209)	(0.0689)
year==2010	-0.105***	-0.194**	-0.0815***
	(0.0264)	(0.0804)	(0.0283)
metro==1	0.0148	-0.0137	0.0149
	(0.0166)	(0.0463)	(0.0181)
metro==2	-0.0777	0.522**	0.0336
	(0.0679)	(0.265)	(0.0731)
metro==3	0.0142	-0.0982	0.0570**
	(0.0262)	(0.0780)	(0.0281)
metro==4	0.0276	0.0637	0.0461*
	(0.0218)	(0.0634)	(0.0236)
appald==11	-0.0522	-0.226**	-0.0210
	(0.0392)	(0.112)	(0.0425)
appald==12	0.0668	-0.383*	0.106

	(0.0615)	(0.205)	(0.0654)
appald==20	0.0599	-0.0988	0.0579
	(0.0584)	(0.179)	(0.0630)
appald==31	-0.0338	-0.0863	-0.0635
	(0.0456)	(0.137)	(0.0494)
appald==32	0.0265	0.353**	0.102*
	(0.0523)	(0.173)	(0.0580)
region==12	0.0880*	0.299**	0.0785
	(0.0519)	(0.146)	(0.0566)
region==21	0.122***	0.136	0.0605
	(0.0459)	(0.128)	(0.0499)
region==22	0.153***	0.265**	0.0832*
	(0.0455)	(0.125)	(0.0497)
region==31	0.167***	0.0704	0.138***
	(0.0485)	(0.139)	(0.0527)
region==32	0.176***	0.0276	0.128**
	(0.0522)	(0.149)	(0.0567)
region==33	0.274***	0.190	0.250***
	(0.0495)	(0.137)	(0.0539)
region==41	-3.71e-05	0.114	-0.0365
	(0.0493)	(0.135)	(0.0538)
region==42	0.128**	0.329**	0.0895
	(0.0511)	(0.144)	(0.0556)
Value less than 50K	-0.00852	0.00367	-0.0152*
	(0.00748)	(0.0224)	(0.00805)
value 500k-999k	-0.00873	-0.0228	-0.0101
	(0.00641)	(0.0210)	(0.00684)
Valueb 300k-499k	-0.00518	-0.00344	-0.00845
	(0.00630)	(0.0193)	(0.00675)
Valueb 200k-299k	-0.00447	0.000898	-0.00970
	(0.00699)	(0.0211)	(0.00754)
Value 150k-199k	-0.00936	-0.00230	-0.0137*
	(0.00709)	(0.0213)	(0.00761)
Value 100k-149k	-0.00612	-0.00341	-0.00960
	(0.00723)	(0.0218)	(0.00777)
Value 50k-99k	-0.00651	0.00383	-0.0116
	(0.00746)	(0.0224)	(0.00803)
Median Value	7.55e-08	2.37e-06	-3.69e-07
	(5.58e-07)	(1.64e-06)	(6.06e-07)
Profession Agriculture	0.533	5.295***	-0.811**
	(0.347)	(0.955)	(0.381)
Construction	-0.911	-1.605	0.0693
	(0.710)	(2.110)	(0.767)
Manufacturing	-0.0770	-1.048	-0.0660
	(0.249)	(0.699)	(0.270)
Wholesale	1.795	4.724	0.930
	(1.253)	(3.554)	(1.358)
Preretail Trade	-0.0806	0.899	0.576
	(0.590)	(1.661)	(0.643)
Transport and Wholesale	0.139	-3.277	0.128
	(0.788)	(2.308)	(0.844)
Information Services	3.092*	0.664	1.923
	(1.731)	(4.887)	(1.870)
Finishing Sector	1.708**	4.944**	0.113
	(0.712)	(2.182)	(0.753)
Profession Balet	0.771	-2.245	0.133

	(0.640)	(1.901)	(0.682)
Education	0.659**	-0.299	0.398
	(0.336)	(0.959)	(0.363)
Certified Tech	-0.189	2.633*	-1.636***
	(0.521)	(1.560)	(0.557)
Other Occupation	0.694	4.407	-0.778
	(1.148)	(3.297)	(1.243)
Median Income	3.08e-06**	6.76e-06	2.84e-06**
	(1.33e-06)	(4.15e-06)	(1.41e-06)
Unemployment rate	0.00777**	-0.00638	0.00523
	(0.00308)	(0.00910)	(0.00332)
Constant	9.094***	8.468***	9.136***
	(0.766)	(2.308)	(0.824)
Observations	36,610	10,981	25,835
R-squared	0.131	0.058	0.133