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Show Me the Money! The Value of College Graduate Attributes as Expressed by Employers and Perceived by Students

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SHOW ME THE MONEY! THE VALUE OF COLLEGE GRADUATE ATTRIBUTES AS EXPRESSED BY EMPLOYERS AND PERCEIVED BY STUDENTS

F. BAILEY NORWOOD AND SHIDA RASTEGARI HENNEBERRY

Employers of agricultural undergraduates are presented with hypothetical job candidates with different attributes and salaries, and are asked which candidate, if any, they would hire. The employer choices are then used to estimate the additional salary they will pay for undergraduates with certain attributes. Students are administered similar surveys where they indicate which hypothetical candidate they think will be hired, which can be used to estimate students' perceived salary increase associated with each attribute. Employers' stated values are then compared to students' perceived values to identify any misperceptions regarding the monetary return of select attributes.

Key words: choice experiment, conjoint analysis, labor market, nonmarket valuation, undergraduate.

A college graduate is anything but a homogeneous item. A college graduate is best described as a collection of attributes; such as their degree, grades, academic awards, internship experience, and less tangible attributes like their character, communication skills, and work ethic. Students face a wide array of choices throughout their college career. They can signal intellectual ability by obtaining a difficult major and/or achieving a high grade point average (GPA). Others may choose to market themselves by obtaining work experience through internships, and others may seek to demonstrate their leadership ability by accepting officer positions in university organizations. Students can also signal a high degree of character by participating in service organizations. The number of ways a student can differentiate herself is large, and few students will pursue them all. Instead, most students focus on a few activities which they believe will yield them the highest return.

These returns are not known for certain, and perceptions are formed partly on the advice of undergraduate advisors. What are the returns in terms of higher salary from attaining these attributes? Undergraduate advisors have their own perceptions about the impact of these

attributes on starting salaries, and these perceptions are likely influenced by empirical studies on attribute values. Of particular interest is the Barkley (1991) and the Barkley, Stock, and Sylvius (1999) studies which utilize survey data of Kansas State University agricultural graduates. The survey collected data on starting salaries, as well as whether the respondent possessed certain attributes like a high GPA upon graduation. The survey results are then used to regress starting salaries against independent variables such as GPA, number of officer positions in university organizations, and number of extracurricular activities.

This study seeks to build upon the two aforementioned studies by employing an alternative valuation method to measure the impact of various college graduate attributes on starting salaries. A choice experiment is administered to agricultural college graduate employers, and is designed to estimate the impact of quantitative and qualitative job candidate attributes on starting salaries. Mail surveys containing the choice experiment are administered to employers of agricultural students. Employers are asked to imagine the typical job opening requiring an undergraduate degree at their organization. They are then presented with two hypothetical job candidates, each with different qualifications and salaries, and are asked whether they would hire either one of the candidates, and if so, which one. The survey responses are then used to estimate the returns to various attributes in terms of starting salary.

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This method has both advantages and disadvantages over the salary regression approach. The disadvantage is that the salaries and candidates are hypothetical, whereas salary regressions refer to real employees and real salaries. However, the fact that the candidates are hypothetical makes it easier to measure the value of qualitative attributes such as communication skills. For example, in the salary regression approach one would have to actually measure the communication skills of each graduate, whereas in our approach we can simply assume a given level of communication skills for each hypothetical candidate.

Another advantage is that the surveys allow us to evaluate whether students' perceived value of college graduate attributes match employer's stated value. Surveys similar to those given to employers are administered to students in the College of Agricultural Sciences and Natural Resources (CASNR) at Oklahoma State University, where students are asked whether they think either candidate will be hired, and if so, which one. The student responses are then used to estimate the perceived return to each attribute.

The remainder of this paper is organized as follows. First, the survey instrument and the attributes considered are described. The third section describes the statistical methodology used to estimate the value of each attribute as stated by employers and perceived by students. The fourth section describes the results, and is followed by concluding comments.

Survey Instrument

The purpose of this study is to measure the value employers place on certain job qualifications for recent college graduates. Of particular interest is the employer's stated value of qualitative attributes, such as perception of character and passion toward career goals. To achieve these goals, choice experiments are administered to employers and students. The experiment places employers in a hypothetical situation where they must choose between two job candidates with different salary levels. The option of hiring neither is also available. By observing how the higher salary candidate is chosen when particular attributes arise, employers' willingness-to-pay (WTP) for these attributes can be imputed. Students are then asked to put themselves in the employers' place and indicate who they think would be hired. Using the same process, the perceived

WTP for certain attributes can also be imputed. The stated WTP by employers and the perceived WTP for each attribute by students can then be compared to determine whether students understand the importance employers place on various qualifications. The choice experiment given to employers and students is basically the same, and is described below.

Employer Surveys

Choice experiments are administered to employers of agricultural college graduates through mail surveys. This employer database is compiled from two separate sources. The first source is a database of employers who hired graduates from the CASNR at Oklahoma State University, maintained by the college. This database contains 655 employers, along with a human resource manager contact information. Organizations include businesses such as Tyson Foods, Pfizer, and government organizations like the USDA and Agricultural Statistics Service. The second source is a directory of 2,109 agricultural input suppliers made available by the weekly newspaper *Feedstuffs*. After eliminating redundant entries between data sources and overseas addresses, a total of 2,568 addresses remain.

Mail surveys were administered to all 2,568 employers in May, 2004, providing 339 useful responses. Employers in the *Feedstuffs* input directory provided 217 responses, while the remaining employers were from the CASNR database. The survey comprises a booklet of four pages printed on both sides. The first page contains a cover letter explaining that the survey is an Oklahoma State University research project designed to elicit employer's preferences for college graduates. The letter requests that someone responsible for hiring within the organization complete the survey, and that all responses will be held strictly confidential.

On the next page, employers are given a description of the choice experiment that ensues on subsequent pages. The first paragraph states,

The purpose of this survey is to determine what type of college graduate employers prefer to hire. We could directly ask you to describe your idea of the "perfect" job candidate. However, this direct approach has many disadvantages. Instead, we use an indirect approach by describing two hypothetical job candidates, each with different qualifications.

You will then be asked which candidate you would hire, if these were the only two interviewees.

Respondents are given suggestions on how to answer the conjoint question. The first suggestion is to read each candidate's qualifications carefully, including their salary, and think about the qualifications they desire most if they are interviewing candidates for a real job in their organization. Employers are then asked to imagine the typical job requiring a Bachelor's Degree. Assuming the hypothetical candidates presented are the only two interviewing for the job, if neither would be hired they are asked to choose "Neither Candidate." If they would hire one or both at the listed salary, they are asked to choose the one they desire the most. Several times employers are reminded to answer as if they had to pay each candidate her listed salary.

Two additional comments are included to help the employer bridge the gap between the hypothetical employee choice and a real choice. First, we acknowledge that not all qualifications that are important to the employer will be presented, and urge them to assume both candidates possess "satisfactory" levels of omitted qualifications. Next, we include a cheap-talk script where hypothetical bias is described. Hypothetical bias is a well-documented tendency for people to say they value something more than they are actually willing to pay. Studies show that describing hypothetical bias and asking respondents to avoid it can help in attaining more realistic value estimates (Cummings and Taylor, 1999; Lusk, 2003). This is referred to as a "cheap-talk" script, and it should be noted that the cheap-talk script used here is shorter than that in the aforementioned studies.

The next four pages of the survey contain four conjoint questions (conjoint analysis is another term for choice experiment), examples of which are shown in Appendix A. In each question, two job candidates are presented with various job qualifications. The first two questions contain qualifications that would be revealed on resumes (attribute set A); including whether the major is relevant to the job, GPA, awards, leadership positions, internships or experience, and whether the student transferred to Oklahoma State University from a community college. See table 1 containing the different levels each attribute can take. The third and fourth questions deal with more qualitative characteristics (attribute set B). One of

these is interviewing skills, which is described as dress, resume, quick and intelligent response to questions, asks good questions, etc. Perception of interviewee character is also listed, where character is described as honesty, citizenship, fairness, caring, etc. Perception of the candidates' passion and dedication toward career goals, as well as perceived communication skills are also listed. Foreign language skills and willingness to relocate are the last two attributes. The salary the employee must be paid is an attribute on all questions.

The attributes and their wording were identified through discussions with undergraduate advisors, career counseling within the CASNR, and several local employers. Some portions of the survey met with contention by some parties. For example, some argued that a candidate could not have poor interviewing skills but excellent communication skills, and this argument has some merit. However, we feel there are some distinctions. An example is a student who is poorly dressed and has not conducted background research on the company, yet is a writer for the college newspaper. Since estimates (shown later in the paper) reveal that the employers' value on the two attributes are different, this indicates most employees deem them to be unique. Also, some reviewers thought the attribute "passion and dedication toward career goals" should be replaced with "strong work ethic." Again, this argument has merit, but we feel our attribute description encompasses work ethic and other properties, such as someone who wants to move up the company ladder. Despite the fact that some parties believed the survey could be improved, all felt the survey was acceptable.

Employer demographics for those who returned surveys are shown in table 2. Most list themselves as an input provider, which is expected since 65% of the employer respondents were from the agricultural input supplier database, and because all businesses except retailers could essentially be considered input suppliers. Also, this is the first category listed in the survey. The next largest organization types are durable goods manufacturers, service providers, and wholesalers. Most employed less than one hundred people and hire fewer than nine college graduates per year. The most prevalent college degree hired by the employers is a business, finance, or related degree, while agricultural economics/agribusiness and animal science come in second and third, respectively. Over 95% of the respondents indicate that they have influence over hiring. Those

Table 1. Candidate Attributes

	Level 1	Level 2	Level 3
Discrete variables			
Attribute set A			
Major	Major is not relevant to job	Major is relevant to job	
Number and quality of service and academic awards	None	One high quality award	
Number of leadership positions held in university organizations	None	One high leadership position	
Internship/experience	None	Internship or work experience in area not related to job	Internship or work experience in area related to job
Transfer student?	Transferred to Oklahoma State University from a community college	Began college career at Oklahoma State University	
Attribute set B			
Interviewing skills	Interviewing skills need improvement	Excellent interviewing skills	
Willingness to relocate	Willing to relocate one time only	Willing to relocate frequently	
Perception of interviewee character	Character is difficult to detect	Exhibits a high degree of character	
Perception of passion and dedication to career goals	Passion and dedication are difficult to detect	Exhibits a high degree of passion and dedication	
Perception of Interviewee communication skills	Communication skills need improvement	Excellent communication skills	
Multiple language skills	None	Can speak and write in multiple languages, including Spanish	
Continuous variables			
GPA (attribute set A)	2.5–4.0	Salary (both attribute sets)	\$20,000–\$50,000

who do not have hiring influence were not removed from the sample, and a sensitivity analysis reveals the results do not differ substantially if they are removed.

Student Surveys

Similar surveys are also administered to undergraduate students in the CASNR at Oklahoma State University. Only students with an agricultural major are included in the sample. The only difference between this survey and the employer survey is that instead of asking the subject who they would hire, we ask the subject who they think will be hired. The suggestions for completing the survey are almost identical to the employer survey. The candidate attributes and levels are identical to the employer survey.

Student demographics, shown in table 3, illustrate that agricultural economics/agribusiness students are the most prevalent major in the student sample, followed closely by animal science. This is consistent with enrollment, as these two majors comprise 54% of undergraduates in the CASNR. Overall, the major demographics are consistent with enrollment, with some oversampling of the agricultural economics/agribusiness students.

Freshmen constitute only 5% of the sample, while the remainder was evenly split between sophomores, juniors, and seniors. The ratio of males to females is also even. Attitudinal questions suggest that most students are willing to relocate away from their hometown, plan to participate in an internship, and close to half are very sure what career they desire. Transfer students (those who transfer to Oklahoma

Table 2. Employer Demographics (Sample Size = 339)

	Percent of Respondents
Organization type ^a	
Input provider	59
Food processor	8
Retailer	2
Financial institution	2
Wholesaler	13
Farm	3
Government agency	7
Durable goods manufacturer	15
Service provider	15
Number of employees	
<10	29
10–49	30
50–99	23
100–499	13
>500	4
College graduates hired per year	
<3	70
3–9	19
10–49	6
>49	5
Percent of employees with undergraduate degree	
0	3
<20	31
20–39	18
40–59	15
60–79	15
80–100	18
Undergraduate degree most prevalent among employees ^a	
Agribusiness/agricultural economics	24
Animal science	20
Agronomy or similar	7
Biochemistry or similar	6
Food/packaging science	4
Engineering (including Ag)	16
Business management, finance or related	29
Ag education, Ag communications or related	4
Other	10

^aSome respondents chose multiple selections, so percentages do not sum to one.

State University from a community college) are one third of the sample, and the median student participates in one student organization.

The same experimental design procedure (the procedure used to determine what attribute levels and salaries should be placed on each survey) is used for the employer and student surveys. A MATLAB® program was written to randomly select the attribute level to

be inserted into each survey. Then, the program iteratively removes individual attribute levels and replaces them with a new randomly generated attribute level. This iteration procedure continues until the D-efficiency score can no longer be improved, which results in a balanced and orthogonal selection of attributes across and within surveys (see Kuhfeld, Tobias, and Garratt, 1994).

Through survey responses, employers reveal their WTP for various attributes. Employers willing to pay \$5,000 more for a candidate with a high degree of character (assuming all other attributes are identical between candidates) implies that they value character (as character is described in the survey) by \$5,000 per year or more. Of course, employers may differ in their WTP. An international firm may display a higher WTP for multiple language skills than firms with only domestic customers. The estimation methodology used only estimates the average WTP across employers. Other methods could be exploited to estimate the variability in WTP, but since most students enter college with great uncertainty over where their first job will be, it is this average that is of most importance. The next section develops a random utility model that can synthesize the survey responses into a succinct preference profile.

Stated and Perceived Values

This section takes the survey results described previously and calculates the value employers place on each college graduate attribute and compares it to students’ perceived value. Parametric simulations are then performed to determine whether students’ perceptions match employers’ preferences. To map the survey responses into monetary values, a random utility model is used to describe preferences. The utility the employers receive from hiring a candidate is assumed to follow the model

(1)

$$U_{e,i} = V_{e,i} + \epsilon_{e,i}$$
$$= \beta_0 + \sum_{j=1}^A \beta_j D_{e,i,j} + \beta_\lambda S_{e,i} + \epsilon_{e,i}$$

where the $U_{e,i}$ is utility from hiring the i th job candidate for employer e . The subscript i can equal A for candidate A, B for candidate B, or 0 for neither candidate. The term $V_{e,i}$ is the observable portion of utility where $V_{e,0} = 0$. The subscript j refers to attributes, and the

Table 3. Student Demographics (Sample Size = 534)

	Percent of Survey Respondents	Percent of Enrolled Undergraduates		Percent of Survey Respondents
Major			University Status	
Agricultural economics/agribusiness	37	20	Freshman	5
Agricultural education and communications	13	14	Sophomore	22
Animal science	36	34	Junior	33
Biochemistry	3	10	Senior	39
Biosystems and agricultural engineering	1	5	Other	
Entomology and plant pathology	2	2	Percent who will readily accept job outside of hometown	74
Horticulture and landscape architecture	6	11	Percent who hold leadership positions	24
Plant and soil sciences	2	4	Percent who participate or plan to participate in internship	82
			Percent who are very sure job they desire	41
			Percent of transfer students	32
			Number of student organizations	Median = 1
			Percent male	48

variable $D_{j,i}$ is a dummy variable indicating a high level for the j th attribute. For example, the first attribute listed in attribute set A is the relevance of the major (see table 1). If the major is relevant to the job, then $D_{e,i,1} = 1$, otherwise $D_{e,i,1} = 0$. For internship/experience, there are two dummy variables where one equals 1 only if the candidate has experience not related to the job and the other equals 1 only if the candidate has experience related to the job. The variable $S_{e,i}$ is the i th candidate's salary. The value of GPA and salary is divided by 10 and 100,000, respectively, to facilitate convergence in nonlinear estimation. If no candidate is hired, utility is set to equal $U_{e,0} = \epsilon_{e,0}$. The terms $\epsilon_{e,A}$, $\epsilon_{e,B}$, and $\epsilon_{e,0}$ are independently and identically distributed across candidates and employers according to the extreme-value distribution.¹ The employer hires (and the student thinks the employer will hire) Candidate A over Candidate B if $U_{e,A} > U_{e,B} > 0$.

¹ The extreme-value cumulative distribution goes by the formula $1 - \exp[-\exp(\epsilon_{i,e})]$. This is a special case of the Gumbel distribution (Train, 2003).

This leads to the conditional logit that can be found in most econometric textbooks (Greene, 1997, pp. 914–17), where the parameters are estimated by maximizing the following log-likelihood function

(2)
$$\max_e \sum_{i=A,B,0} Y_{e,i} \ln \left(\frac{e^{V_{e,i}}}{\sum_{k=A,B,0} e^{V_{e,k}}} \right)$$

The term $Y_{e,i}$ is the dependent variable which equals 1 if candidate i is selected and 0 otherwise. Separate logit models are estimated for attribute sets A and B and for employers and students, since they were separate questions dealing with different types of attributes. The utility coefficients cannot be compared across attribute sets or students and employers. Only the sign and significance of the coefficients are meaningful. However, one can normalize utility by dividing each models' coefficient by the salary coefficient for each model, allowing a comparison of utility coefficients across models.

The parameter estimates for all estimates (shown in table 4) are significant and of the

Table 4. Utility Function Estimates for Students and Employers

Attribute Set A			Attribute Set B		
Variable	Parameter Estimate (Asymptotic <i>t</i> -Stat)		Variable	Parameter Estimate (Asymptotic <i>t</i> -Stat)	
	Students	Employers		Students	Employers
Intercept	−1.1855 (−2.34)	0.4083 (0.65)	Intercept	−0.6192 (−1.39)	−1.2236 (−2.80)
Major: Is not to is relevant to job	1.1599 (10.87)	1.7056 (11.62)	Interviewing skills: Needs improvement to excellent	0.5924 (5.41)	0.5762 (4.36)
GPA/10	6.7424 (5.81)	4.7491 (3.17)	Willingness to relocate: Only once to frequently	0.6583 (6.22)	0.3141 (2.42)
Awards: No awards to one high quality award	0.3284 (3.17)	0.2428 (1.86)	Perception of character: Difficult to detect character to high degree of character	1.2427 (11.17)	1.6612 (12.12)
Leadership: No leadership positions to one high leadership position	0.8446 (8.03)	0.7949 (5.98)	Perception of passion: Difficult to detect to high degree of passion	1.3268 (11.69)	1.5622 (11.83)
Internship or work experience: No to yes and related to job	1.7601 (12.85)	1.8595 (10.54)	Communication skills: Needs improvement to excellent	0.9469 (8.51)	1.4999 (10.99)
Internship or work experience: No to yes but not related to job	0.3171 (2.52)	0.4305 (2.63)	Multiple language skills: None to a minimum of Spanish	1.3181 (11.56)	0.6399 (4.79)
Transfer student: Yes to no	0.3555 (3.45)	−0.3694 (−2.83)			
Salary/100,000	−5.00 (−4.42)	−8.4345 (−6.27)	Salary/100,000	−3.1129 (−2.55)	−4.2130 (−3.41)
<i>Log-likelihood function</i>	−861.89	−547.46	<i>Log-likelihood function</i>	−791.84	−544.22
<i>Number of choices</i>	1,068	678	<i>Number of choices</i>	1,062	676

Notes: The coefficients between employers and students cannot be directly compared without normalizing first. A coefficient can be deemed significant at the 1%, 5%, and 10% level if its *t*-stat in absolute value is greater than 2.575, 1.96, and 1.645, respectively. The number of choices is higher than the survey size because each respondent is asked to make more than one choice.

expected sign: except for one. The employer surveys indicate that hiring a student who transferred to Oklahoma State University from a community college yields a higher utility than one who began their college career at Oklahoma State University, which was unexpected to the authors (and the students as well, given that the coefficient on transfer student is positive for students). Transfer students are typically associated with lower academic ability, but note that academic ability is being held constant in the survey through the GPA and awards attributes. Why, then, would employers prefer transfer students when ability is held constant?

Insights can be gleaned from the survey comments provided by employers, shown in Appendix B. Numerous employers stated that they want students who paid their way through

college; possibly a sign of responsibility. Many transfer students do begin their college career at junior and community colleges because they come from lower income households, and these schools are less expensive. Students with lower incomes are more likely to pay some portion of their college expenses, and could therefore be more attractive to employers. Others have suggested that students who study at more than one institution gives them a premium, as it indicates the student is willing to relocate and try new experiences. These are mere conjectures though, and further evidence is before any firm explanation is reached. In line with this, it should be noted that Donhardt (2004) found little evidence that transfer students are penalized with a lower starting salary.

As mentioned previously, one cannot compare the utility coefficients between employers

and students because the utilities are scaled differently. Only when the coefficients are normalized by dividing by the coefficient on salary within that same model can they be meaningfully compared across models (Train, 2003). This normalization is performed and used to rank the relative importance students and employers place on each attribute. See table 5 where attributes are ranked from lowest to highest, where a ranking of one indicates the highest ranked item.

Employers and students agreed on several fronts. Both state that a candidate's character, passion and dedication toward career goals, and internship/experience relevant to the job are very important; they also state that GPA and awards are the least important items in the attribute set. Students' major misperception involves multiple language skills, as they rank it the second most important attribute when employers rank it sixth.

While rankings are useful for discerning whether an attribute is more important than another, they cannot quantify how much more important it is. Rankings are ordinal, but when allocating their resources students may be more interested in the cardinal rankings of attributes; more specifically, the impact of each attribute on salary. To estimate the stated and perceived value of each attribute, the following thought experiment is performed. Imagine a hypothetical situation where there are only two candidates applying for a single position, and the employer does not have to fill the position if both candidates are unqualified or cost too much. Each attribute can be thought of as having three levels: low, medium, and high. In table 5, the first two columns show the low and high levels. The medium category is between the low and high levels. For instance, using the attribute *relevance of major*, a medium level is between "relevant" and "not relevant" and the dummy variable for *major is relevant* is set to 0.5.

One attribute is designated as the attribute of interest, and both candidates are initially assumed to possess low levels of this attribute (while maintaining a medium level for other attributes). Both candidates are assumed to possess base salaries of \$30,000 and have a GPA of 3.0. The employer's expected utility from the choice between the two candidates or neither candidate is calculated as $EU_0 = \ln[\exp(V_A) + \exp(V_B) + \exp(0)] + D$ where D is a constant and V_A is the observable portion of utility for candidate A as shown in equation (1) (Champ, Boyle, and Brown, 2003). Then, the attribute

of interest to candidate A is assumed to jump from its low level to a high level. For example, candidate A goes from having a major not relevant to the job to a major that is relevant to the job. Observable utility V_A now increases to \hat{V}_A and expected utility from the hire is $EU_1 = \ln[\exp(\hat{V}_A) + \exp(V_B) + \exp(0)] + D$. The increase in expected utility from the choice is now $EU_1 - EU_0$, and so the maximum increase in salary for candidate A that makes employers indifferent between the two candidates is the salary increase that sets $EU_1 = EU_0$. This amount is given by (Champ, Boyle, and Brown, 2003)

$$(3) \quad WTP = \frac{EU_1 - EU_0}{-\beta_\lambda}$$

where β_λ is the marginal effect of salary on utility.²

This method estimates employers' WTP for an attribute in the context on real hiring decisions, where candidates compete against other graduates, and employers have the right to refuse employment to all. As shown in the third column of table 5, the rankings of WTP using equation (3) for each attribute is identical to the rankings in the last two columns, but more information is provided by showing how much more employers will pay for an attribute.

The WTP estimates are consistent with Barkley (1991) and Barkley, Stock, and Sylvius (1999) study in that GPA significantly impacts starting salary. Moreover, the value of a higher GPA calculated here is surprisingly close to these two studies. Table 5 shows that increasing one's GPA from a 3.0 to a 4.0 increases salary by \$1,397. Barkley (1991) found that graduates with a 3.5–4.0 GPA have salaries \$1,245 higher than their counterparts, and in the Barkley, Stock, and Sylvius (1999) study this value was

² Specifically, WTP is calculated as follows. Assume one is interested in the returns to possessing a major relevant, as opposed to not relevant to the job. First, the models are estimated again using effects coding, where dummy variables are coded as (−1,1) instead of (0,1). Effects coding is more complicated for internship where there are three levels, but a useful description is found in Champ, Boyle, and Brown (2003). The observed utility from hiring candidate A before the change is then specified as $V_A = \beta_0 + \beta_{\text{Major}}(-1) + \beta_{\text{GPA}}(0.3) + \beta_\lambda(0.3)$, where the observed utility for candidate B is the same. Now, candidate A's major is assumed to be relevant to the job, and the new observed utility is $\hat{V}_A = \beta_0 + \beta_{\text{Major}}(1) + \beta_{\text{GPA}}(0.3) + \beta_\lambda(0.3)$. The two utilities can then be inserted into equation (3) to calculate WTP. This is the same as using dummy variables as opposed to effects coding, where the dummy variables for all attributes except the one being valued is set to 0.5. Effects coding provides identical value estimates, as parameter estimates using effects codes are two times larger than those using dummy variables, but we found the computer code easier to write and check for errors.

Table 5. Monetary Value of Job Candidate Attributes

		Estimated Increase in Starting Salary ^a		Ranking of Importance to Employers ^b	
Change from	Change to	Stated by Employers	Expected by Students	Stated by Employers	Expected by Students
		Point Estimate (Numbers with Same Letter Are Not Significantly Different)		1 = Highest Ranked Item 12 = Lowest Ranked Item	
Attribute set 1					
Major not relevant to job	Major is relevant to job	\$5,860 <i>a</i>	≈ ^c \$6,388 <i>g</i>	5	6
3.0 GPA	4.0 GPA	\$1,397 <i>b</i>	\$3,561 <i>h</i>	10	10
No awards	One high quality award	\$663 <i>c</i>	\$1,565 <i>i</i>	12	11
No leadership position	One high leadership position	\$2,406 <i>d</i>	\$4,426 <i>h</i>	8	9
No internship experience	Internship experience related to job	\$6,658 <i>a,e</i>	\$10,735 <i>j</i>	4	4
No internship experience	Internship experience not related to job	\$1,109 <i>b,c</i>	≈ \$1,389 <i>i</i>	11	12
Attribute set 2					
Interviewing skills need improvement	Excellent interviewing skills	\$3,005 <i>d</i>	≈ \$4,831 <i>g,h</i>	7	8
Willing to relocate only once	Willing to relocate frequently	\$1,566 <i>d,b,c</i>	\$5,435 <i>g,h</i>	9	7
Character is difficult to detect	Exhibits high degree of character	\$10,031 <i>f</i>	≈ \$11,282 <i>j</i>	1	3
Passion and dedication are difficult to detect	Exhibits high degree of passion and dedication	\$9,334 <i>e,f</i>	≈ \$12,188 <i>j</i>	2	1
Communication skills need improvement	Excellent communication skills	\$8,900 <i>e,f</i>	≈ \$8,216 <i>g,j</i>	3	5
No multiple language skills	Can speak and write in multiple languages, including Spanish	\$3,372 <i>d</i>	\$12,093 <i>j</i>	6	2

^aEstimates must be interpreted with care. Assumes two candidates are applying for job with equal qualifications, except that the candidate of interest has the additional qualification listed in each row. Statistical significance is determined using parametric bootstraps.
^bRanking are determined by dividing the coefficients in table 4 by the price coefficient for each model and ranking from highest to lowest value.
^cSignifies numbers in left and right columns are not significantly different.

\$1,029. These results imply that the hypothetical values calculated here do match salaries earned by real college graduates. Within a group (employers or students), values with the same letter underneath are not statistically different. Statistical significance is ascertained using parametric simulations as follows. After obtaining the estimated parameter distributions, which are assumed normally distributed, 10,000 random parameters are drawn from the estimated distribution. At each simulated draw, equation (3) is used to calculate the value of each attribute and *p*-

values are calculated for the null hypothesis of no difference between attribute values. Consider testing whether the value of an award is different from the value of a leadership position. If the award value is greater than or less than the value of a leadership position in 90% of simulations, the values are said to be statistically different (at the 10% confidence level). Similar bootstraps are used to determine whether attribute values differ across students and employers. For several categories, students' perceptions are remarkably close to employers' stated

values. All values with the “ \approx ” between students and employers are not significantly different. Values are not statistically different for half of the attributes, indicating students have an accurate depiction of what employers will pay for communication skills, passion and dedication, character, interviewing skills, internships that are relevant to the job, and the relevance of the major to the job.

Students’ greatly overestimate the returns to multiple language skills. Conversations with students indicate this is because Career Services frequently stress the importance of learning multiple languages. Willingness to relocate does not increase the qualifications of a candidate as much as students perceive, and neither does obtaining leadership positions or awards. Finally, students overestimate the returns to obtaining a higher GPA. Overall, the results suggest that students possess reasonably accurate perceptions over the value employers place on various attributes, except for multiple language skills.

The qualitative and more vague attributes are also the most important according to employers. The ability to detect a high degree of character is the most important attribute among those evaluated. Passion and dedication toward career goals and communication skills are the next two leading attributes. A question unanswered is how students should signal these personality traits. Some may argue that employers use GPA as a signal of work ethic, or academic awards as a signal of character. If this is true, then attributes like grades and work ethic cannot be considered separately. Future research should concentrate on how these qualitative attributes are signaled and revealed in the interviewing process.

Limitations of Study

Several factors limit the ability to extrapolate these results to real hiring situations. The results pertain only to hypothetical hiring situations where both the job and the job candidates are not well defined. For employers who find it difficult describe the employee they want, but rather “know it when they see it,” answering the questions may be difficult. The significance of each attribute suggests this did not have a big influence on the results though.

Employers and students may approach the questions in a different fashion. Employers know whether multiple language skills are

valuable to their organization and answer accordingly. When students see the multiple language skill attribute, they may assume that since the attribute is present on the survey the average employer must value it. This could explain the high perceived value of multiple language skills relative to employer’s value.

Some attributes are difficult to disentangle. Attribute set B contains interviewing skills and communication skills, but the two are in many ways similar. There are some differences between the two attributes though that induced us to separate them. For instance, a student who was a member of the debate team will likely be an effective communicator, but may not prepare for the interview well by failing to researching the company. The higher value on communication skills relative to interviewing skills suggests that the two are not identical to employers.

The sample of employers consisted mainly of input suppliers and most hire fewer than three college graduates per year. How this compares to the population of employers is unknown, but it is clear further research should be conducted using a more diverse sample of employers. In particular, only 11% of the employers hire ten or more new college graduates each year. It would be interesting to see how our results change under a sample of large employers, who might use more sophisticated, or at least different, hiring techniques.³

Real hiring decisions differ from the survey used here in that employers must infer qualitative characteristics like character from real candidates, whereas the survey here could simply state that the hypothetical candidate has high character. In situations where attributes must be inferred, perhaps attributes like number of awards and GPA and serve as signals of more intangible attributes like character, and therefore would become more valuable to the employer than the value estimates calculated here. This is one reason that attribute set A, which contains observable attributes, is separated from attribute set B, whose attributes are more difficult to observe.

The attribute descriptions are deliberately vague and can be interpreted differently across employers. Subjects may interpret attribute descriptions differently, but language must

³ We thank an anonymous reviewer for pointing this out. This reviewer provided an example that some larger employers use a GPA of 3.0 as an automatic screen; they do not consider candidates with grades lower than 3.0. If the sample entailed more larger firms, perhaps GPA would have a larger impact on salary.

stand for something universal. Otherwise, normal conversations would present great difficulties. The values represent average values, and it is unlikely any one employer contains values identical to those estimated. This is not a drawback, but a plus. Students entering college rely on college professors, staff, and administrators for guidance. This guidance must be given with little to no knowledge about where the students will seek and find employment. Thus, we often provide guidance based on what we feel the average employer wants, and that is the information provided in this study.

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Appendix A

Conjoint Question Examples

Table A.1. Attribute Set A

Qualifications	Candidate A	Candidate B	Neither Candidate
Major	Major is relevant to job	Major is relevant to job	
GPA	2.6	3.8	
Number and quality of service and academic awards	One high quality award	One high quality award	
Number of leadership positions held in university organizations	One high leadership position	None	I am certain I would not hire Candidate A or B
Internship/experience	None	Internship or work experience in area RELATED to job	
Transfer student?	Transferred to Oklahoma State University from a community college	Transferred to Oklahoma State University from a community college	
Salary	\$47,000	\$46,000	
Please check the ONE candidate you believe you would hire	<input type="checkbox"/> I would prefer to hire Candidate A	<input type="checkbox"/> I would prefer to hire Candidate B	<input type="checkbox"/> I would not hire Candidate A or B

Table A.2. Attribute Set B

Qualifications	Candidate 1	Candidate 2	Neither Candidate
Interviewing skills (dress, resume, quick and intelligent response to questions, asks good questions, etc.)	EXCELLENT interviewing skills	Interviewing skills need improvement	
Willingness to relocate	Willing to relocate FREQUENTLY	Willing to relocate FREQUENTLY	
Perception of interviewee character (degree of honesty, citizenship, fairness, caring, etc.)	Exhibits HIGH degree of character	Exhibits HIGH degree of character	I am certain I would not hire Candidate 1 or 2
Perception of passion and dedication to career goals	Exhibits a HIGH degree of passion and dedication	Passion and dedication are difficult to detect	
Perception of interviewee communication skills (written and oral)	Communication skills need improvement	EXCELLENT communication skills	
Multiple language skills	Can speak and write in multiple languages, including Spanish	None	
Salary	\$34,000	\$28,000	
Please check the ONE candidate you believe you would hire	<input type="checkbox"/> I would prefer to hire Candidate 1	<input type="checkbox"/> I would prefer to hire Candidate 2	<input type="checkbox"/> I would not hire Candidate 1 or 2

Appendix B

Employer Comments
<div><div>1 We can hire graduates who do not have traditional agricultural or home economics degrees. But then most possess skills/experience that would make up for limited education in these areas.</div><div>2 Good communication skills (oral and written). Able to communicate w/people both up and down the chain of command. Creative, respectful, ethical/fair.</div><div>3 Good work ethic, willingness to learn, spend time working up the corp. ladder.</div><div>4 Well rounded, worked while in college, campus leaders, outgoing, well read, ROTC student, good grades.</div><div>5 Increased emphasis in managing public use/recreation areas. A greater number of grads w/parks and rec [parks and recreation] backgrounds is likely. Also in public service issues of dependability, character, etc. Are even more vital in today's climate than before w/govt. Ability to relocate and move is important, especially in terms of upward mobility.</div><div>6 Please be aware in this age of multiple income couples ability to relocate for the good of the employee and the company has become critical.</div><div>7 For us, the number 1 thing we look for is proven leadership and communication skills. The first place I look on a candidates resume is <i>activities</i> and honors. Number 2 is work experience. The most important thing these students must do is put together a great resume. Otherwise they will not even get the chance to sell me in the interview. Then they have to be able to convince me they are the best candidate for the job—the communication and the ability to back up and justify their answers and resume. We will only take the top candidates off each campus.</div><div>8 Prefer candidates that have worked while attending college. 3.0>. Involved in activities. Must show passion and have strong ethics.</div><div>9 Good communication skills, willingness to relocate, and a self-motivator.</div><div>10 Flexible, good attitude, willing to learn new jobs when needed in a small company.</div><div>11 One that does not act like they know everything. One that is <i>honest</i>, trainable, and works hard.</div><div>12 One that is well-rounded—customer service experience as well as agriculture knowledge—one that is ethical and displays integrity. We can teach skills—we cannot teach behavior!</div><div>13 Re: The candidate option questions—only candidate 4, from the information presented, appears to have excellent interpersonal skills—which includes, but not limited to strictly communication ability. Most business decisions favor those that you trust and respect personally—those people that you enjoy doing things with and for. That set of skills generally directs a student to become actively involved in activities outside the curriculum and why outside activities are considered important by many employers.</div></div> <div>(Continued)</div>

Appendix B (Continued)

- 14 Willing to travel very important, Spanish language very important, honest very important.
- 15 A good work ethic is invaluable. A willingness to work hard for promotion. An openness to applying their education in the work environment while learning new things.
- 16 Communication skills are important but are not the only deciding factor. We look for students eager to relocate, campus involvement, above 2.8 GPA.
- 17 No passion, no relevance, no job. If you hire people who think alike, you end up with a very boring workplace.
- 18 Communication skills! Have an idea (passion) of what they want in a job and why that profession. Obtain an internship in the field of study, GPA at least a 3.0.
- 19 Individual who is a self-starter, not afraid to work, who has previous work experience.
- 20 When hiring college students, it is very difficult to determine whether they have a work ethic. We have been disappointed in the recent graduates we have hired because many cannot write a business letter and most have not learned to work. They seem to be most interested in their time off work and what the company can do for them. Hard, dedicated work seems to be a topic not taught in college any more. Salary, wages, time off, and benefits is their only concern. P.S. Do your students a big favor and teach them to work. We will teach them the business.
- 21 I prefer to hire a college graduate who has already had at least *some* experience in their major/our line of work. I cannot stress enough the importance of internships!
- 22 I prefer hiring graduates with a high degree of character that are flexible, and desire continuous learning and growth throughout their career.
- 23 Priorities: Character, work ethics, willingness and ability to learn, interpersonal skills, communication skills.
- 24 What really moves a resume to the top of the stack is being able to speak and write Spanish and internships in the food industry. We would be pleased to meet with you to discuss what we perceive OSU's strengths and weaknesses to be.
- 25 Must have major that meets minimum requirements, must be willing to start at entry level salary (plus or minus \$25K), must be willing to relocate to where the jobs are available and move for advancement in the organization.
- 26 Ideal candidate: High passion, excellent ethics, strong communication skills, very outgoing.
- 27 Character, enthusiasm, flexibility, communication skills
- 28 Someone who is willing/able to learn new things. Our operation changes with advancements in technology, we have to be flexible.
- 29 High achievers in activities (4-H, FFA, community), leadership in college activities, high productivity (has written for real publication), multiple communication skills in print, on line, radio, T.V.
- 30 They must be able to balance their own checkbook, i.e., know basic business skills.
- 31 I generally hire more individuals from a two-year program because it is industry driven, and the starting salary they expect is lower.
- 32 That can work with people, good communication skills, team player, and a passion for the resources.
- 33 We typically try to hire someone with a combination of education and experience.
- 34 We just recently started hiring college graduates.
- 35 When we are looking for a college graduate, it is nice to find someone with a degree in the area he/she is being hired for but not absolutely necessary. As farmers cooperative a candidate with agricultural background is helpful. We look for people who are able to communicate and get along well with others. We also look for people that continue to learn.
- 36 Loyal, timely, diligent
- 37 Most office employees have degree, most shop employees do not.
- 38 Note: candidate 1 is a poor example. Could not have excellent interviewing skills and need improvement on communication.
- 39 Someone with work experience in related field—energy, positive attitude—well rounded individual.
- 40 All new hires are recent graduates. Will not hire unless they are.
- 41 A well-rounded individual that has exhibited success through coursework, extracurricular activities, and internships, coupled with willingness to relocate, excellent communications skills, and dedication to achieve career success is the one we are looking to hire.
- 42 Type of degree is less important to me. If they have the brains to get one, I can teach them what I need them to know. I primarily look for a person who has personal character and strong work ethic. If they do not have that, I cannot waste my time on them.
- 43 We have placed new graduates for forty-five years. Colleges do a poor job of presenting realistic salary expectations to their graduates. Degrees alone do not get a new graduate a job or a higher paying position. Colleges should teach a class on interviewing. One key point—do not ask about salary or benefits unless the position is offered. New graduates should be more concerned about finding a position that will train them to further their career and not be so concerned about location, starting dollars, fringe benefits, and hours.

(Continued)

Appendix B (Continued)

- 44 We prefer graduates w/strong science or finance backgrounds, strong communication skills (verbal *and* written) and a passion for the environment/natural resources management.
- 45 People and communication skills are 1.
- 46 It was not till this year that we started hiring college graduates.
- 47 We are Ag Recruiters
- 48 We are primarily interested in hiring forestry, wildlife person, and agribusiness majors/backgrounds from the College of Ag. However, all majors are welcome for this volunteer opportunity.
- 49 A good attitude is number one. With a good attitude and a passion to learn, most can be successful with their college background. Make excellent employees!
- 50 We want people who can think outside the box and bring real value to the company in a short period of time.
- 51 Interest in working for medium to small company and work way up in all areas. Good language skills—proper noun/verb/pronoun and tense usage. Above average academics but not 4 pt. A/B in some subject matter. Some extracurricular activities.
- 52 Realistic salary expectations and willing to remain after training money is invested. (Tired of job hoppers)
- 53 I am self-employed. I did answer these questions if I were to begin looking to hire someone.
- 54 Very active in college organizations, display good people skills, speech, internships in industry area.
- 55 Real world work experience counts more than high grades. I rarely find recent graduates with experience beyond McDonald's or life guarding. Certainly these are valuable positions, but in our industry, they offer little practical experience. A CO-OP or summer job(s) in the career make me take notice.
- 56 I would prefer hiring someone with good communications skills. However, I believe those are secondary to an agricultural background, even through an internship program and good character plus a passion to learn.
- 57 I have retired from the feed and grain business, but I am in the Real Estate Business selling agribusiness facilities and could find jobs—manager—owner manager types of relationships.
- 58 Good GPA 3.0 is okay. Good communication skills essential—verbal and written. Strong computer skills as a user, willingness to relocate—more than one time. Work experience—not necessarily in field of study, just to point of establishing good work habits, evidence they can work with other people, especially in a management role.
- 59 Willing to learn new tasks, willing to work, good problem solving skills, good communicator.
- 60 On the whole, in our experience, the degree is just an extra; common sense and personality, combined with a friendly open honesty outweigh a degree. We have had degreed people never get out of the warehouse, while others excelled as salesmen.
- 61 Business card attached
- 62 We rarely hire new graduates. We usually hire people who have demonstrated good qualities while working elsewhere. Agriculture related training is good, but integrity, dedication, and communication are more important. Multiple languages are not crucial, but are becoming more beneficial. Thank you for asking what we look for.
- 63 If hired into operations, must be willing to work on ranches in a variety of capacities to learn the business.
- 64 Work ethic, character are critical.
- 65 We hire all areas—business, DVM, chemistry, An. Sci. Prefer genuine people who did well on “sandbox skills,” i.e., sharing, helping, problem solving, adapting.
- 66 Independent, entrepreneurial spirit, speaks at least one other language, willing to travel internationally.
- 67 1. Chose A: salary probably match IT or engineering position. Other positives would probably start at less \$. GPA low—would explore how performed in leadership and internship positions. 2. Chose C: Internship would be a plus. Salary would probably match a technical job. 3. Chose None: Would want to determine character. 4. Chose None: Would want to determine character.
- 68 No one is dominant. We hire all the Ag. Disciplines. Salaries listed in the \$40,000–\$50,000 would not be considered in our agency for recent graduates.
- 69 Goal oriented, self-disciplined, energetic.
- 70 Language skills have become increasingly important. Mainly Spanish and French. Flexibility to move needed at least to start in the company. (1) honesty and character, (2) work ethic, (3) skill set. I would hire a hard worker. I can teach over a highly skilled prospect with lower work ethics every time.
- 71 Willingness to begin at entry level. Willingness to be flexible to work more than 40 hours if needed. Strong morals and ethics.
- 72 I would hire both A and B or D depending on how well they did in interviews, but not at that salary. Our salary range 35–40.
- 73 In order I look for (course degree assumed). (1) *Any* work experience. (2) Passion, eager about our business. (3) Communication skills. (4) People skills—we are all salesmen regardless of position. (5) Realistic salary expectations.
- 74 We would not hire a new graduate except in the new leadership development program (12–18 months of training). Other than an entry-level production position.

(Continued)

Appendix B (Continued)

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- 75 Excellent communicators—self-starting and self-motivated with understanding of participative management, teaming and outstanding customer service skills. I would consistently hire based upon the individual's attitude—skills can be taught.
 - 76 I prefer a candidate that shows that they contributed personally to a portion of the cost of their college education. To me it indicates a stronger desire to obtain the education.
 - 77 Great to have agricultural background, especially raised on a farm. Outgoing personality, dedicated worker (does not complain about work hours). Just want a perfect person!!
 - 78 Did they work part time while in school?
 - 79 Have historically recruited AgEcon/Acct double majors for accounting positions. We are changing profile of entry-level accountants to have graduate degree or have sufficient hours to sit for CPA exams. This is due to two factors: (1) 150-hour rule for CPA eligibility and (2) increasing complexity of accounting practices, regulations, and global business issues.
 - 80 Well-rounded, driven, high degree of character, strong work ethic.
 - 81 I prefer young people who have integrity, are "family" oriented, who are contributors, who see life as a continuous education, who are passionate, and have a strong value system.
 - 82 Combination of Agribusiness, Business Management, and Finance
 - 83 We hire graduates at an entry level. Pay good candidates a starting wage of \$20,000–\$25,000.
 - 84 We like to see relevant internships and work experience on a resume.
 - 85 They must have core values with a spiritual underpinned. A strong work ethic must be demonstrated. GPA is secondary.
 - 86 Females just work better in association type setting. Honesty and integrity a must in small setting like ours.
 - 87 Good people skills are very important.
 - 88 Character is primary. Whether they work while in school is a modifier to lower grades. I have noticed that most of the graduates who went straight through school w/good grades but no job experience can be a bit prideful and less grateful about their new job.
 - 89 Maturity and honesty.
 - 90 Five-year experience in business world. Good college records. Good recommendation from job experience.
 - 91 How they fit with our company culture is key—we assess for teamwork, work ethic, communication skills, ethics (honesty, etc. . . .).
 - 92 Basic experience has more importance than higher education.
 - 93 College grads that pay their own way are preferred over trust-fund babies.
 - 94 Can speak a second language, i.e., Spanish. Passionate, dedicated to field of study/strong GPA, practical (relevant), internships/part-time jobs. Involved in school community: strong leadership skills, can communicate ideas/thoughts clearly, answers a question w/relevant info during an interview.
 - 95 Individual—self motivated, willing to be a team player.
 - 96 Good character is most important with a willingness to learn.
 - 97 Ag business, Engineering
 - 98 High degree of character is very/most important. Being a small farm means our people are the company. We do not lie to or mislead customers. We cannot afford to lose them but will walk away if we cannot do the job right. Our people have to understand this.
 - 99 Strong work ethic, one that shows up to work everyday.
 - 100 Communication skills are very important. Organizational, project or time management, and analytical skills are also important. Appearance and attitude are of secondary importance but they help for that lasting "first impression."
 - 101 Sales interns, campus leadership
 - 102 Good communication skills
 - 103 For this area of the country, the salaries—even at \$23,000 and a college degree, are too high. In this company, only job experience will get you a job making \$23,000 or more.
 - 104 A high percentage of our laboratory employees come from a temporary agency. After ninety days, we can add to staff if there is a position available. A need is apparent for potential employees to understand the need to improve on appearance and dress. Take a look at how middle management is dresses. First impressions count. Do not dress like a college student and maybe a typical professor.
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