RUTGERS
Education and Employment
Research Center

ISSUE BRIEF
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Adjusting Expectations: The Impact of Labor Market Information on How Undergraduates View Majors and Careers

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College students are growing increasingly concerned about their labor market prospects after graduation. College costs and rising debt levels among graduates, along with the heightened need for a college degree to access good jobs, have all contributed to an emphasis on college major and its link to employment. Students, parents, policymakers, and the public-at-large are all asking the question of whether graduates will see returns on their educational investments[1]. For low-income and/or first-generation college students, these questions can be particularly pressing given the importance of a college degree to social mobility[2]. In this context, information on earnings associated with college majors abounds. The popular media regularly point to the high earnings and strong employment potential of certain majors—often in STEM and business fields[3]. Numerous organizations are promoting websites with information on earnings and employment rates associated with various majors with the intention of helping students make better decisions[4]. With all the interest in the issue, there is a need to better understand how labor market data actually influence students, particularly low-income and first-generation college students.

Recent research provides some indication that earnings data influence students—at least particular types of college students. A survey of male Duke undergraduates shows that their knowledge of average earnings is not always accurate. The authors estimate that improved knowledge of earnings would lead a small portion of students (about 7.5%) to change their major[5]. Another survey of undergraduate students at New York University using an information experiment finds that students use earnings information to update their own expected earnings, and these revised earnings expectations have some modest influence on their choice of major[6].

While this research provides some evidence for how these data influence students in private universities, we know little about how they influence students in public universities—particularly schools with high numbers of low-income and first-generation college students. The effects of earnings data on low-income and first-generation college students are of particular concern given that these students tend to know less about majors and careers and have less accurate estimates of earnings for college-educated workers[7,8]. While the impact of labor market information on these students is not known, experimental research on college attendance and financial aid has demonstrated that information can have an important impact on this population[9].

Earnings and employment information can be presented in numerous ways—each conveying different information with potentially different impacts on students—but the differential impact of each presentation is not well understood. Most often earnings information is presented in averages across majors—and it is widely recognized that the average earnings across college majors vary. It is less common to present the range of possible earnings within a major. Yet the within-major range of earnings for graduates varies from major to major—some majors, such as education, have a narrow range of earnings, whereas as other fields, such as economics, have a fairly wide range of earnings.

While both across- and within-major earnings variation is likely due to a variety of factors, to some extent those variations reflect the risk associated with choosing different college majors. In addition to these variations, other information related to employment security, such as the unemployment rate and perceptions of job security, provide further information related to risk. This information may have particular salience to low-income and first-generation college students, who may be less likely to select majors associated with greater levels of risk.

To examine these issues, in this study we conduct an information experiment with undergraduates at Rutgers, The State University of New Jersey, to examine the impact of labor market information including data on earnings, unemployment, and perceived job security on the diverse student population at a large public state university with a sizable population of low-income and first-generation students. We address the following key questions:

- Does labor market information influence students' perceptions of earnings, perceptions of job security, and choice of major?

- Does the impact of labor market information vary by students' first-generation and low-income status?

Methods

To examine the effects of earnings information on students, we conducted an online survey of undergraduate students enrolled at Rutgers. The survey included an information experiment that varied the labor market information students received and then asked them to respond to a series of questions about their earnings expectations, perceptions of job security, and choice of major after viewing this information.

Sample. The population for the survey included all undergraduates at Rutgers' campuses located in New Brunswick, Camden, and Newark. We included all undergraduates regardless of their year of enrollment at Rutgers—from first-year students to graduating seniors—and regardless of their school of enrollment, including students in professional schools as well as those in schools of arts and science, to provide the broadest possible understanding of the impacts of earnings data. The Office of Institutional Research and Academic Planning (OIRAP) provided a list of Rutgers undergraduates and their background information including their year and school of enrollment, declared major, gender, ethnicity, first-generation status, and Pell-recipient status.

Survey design. The survey was designed to compare differences in students' earnings expectations, perceptions of job security, and major choices across three experimental conditions: 1) *no information*, 2) information on median earnings only (*median condition*), and 3) information on the variation in earnings and job security (*variation condition*). In the latter two information conditions, we presented national data for employment five years after college graduation[10] in both graphical and tabular format and provided guidance to students on how to read these data. To reduce the number of choices that respondents had to consider, we presented them with six broad fields of study rather than a list of individual majors: computer, engineering, and physical/ biosciences; healthcare; business; social sciences; education; and humanities. Appendix A shows the information presented to students in the "median" and "variation" conditions.

We began the survey by randomly assigning students to one of the three experimental conditions. In the two information conditions—*median* and *variation*—they were shown data and then proceeded to the survey

questions. In the “no information“ condition, they proceeded directly into the survey questions. For all conditions, the survey asked students three key questions about each field of study: 1) their personal salary expectations for full-time employment five years after graduation; 2) their perceived job security on a scale of 1 to 9; and 3) their likelihood or chances out of 100 of completing a degree in the field of study. The survey included questions about other sources of information at Rutgers students use to select a major and the degree to which they rely on their family for career information.

We created several variations of the survey to test the layout and user interface. In total, we collected 70 test responses spread over 9 different test surveys. These surveys tested different branching schemes and question types. Multiple undergraduates, graduate student assistants, and university administrators tested the survey for flow, visual appeal, and duration in August and September 2015. Based on these tests, we made numerous revisions to the survey to improve its design.

Data collection. Working closely with OIRAP, we crafted language for the email inviting students to participate in the survey. OIRAP sent the initial invitation to the survey on November 3, 2015 with an email addressed to all Rutgers undergraduates and then three follow-up emails to non-responders—one email each week until the survey was closed on November 30, 2015. To encourage participation, we offered incentives. All students who completed the survey were entered into a lottery for six $500 gift cards and ten $100 gift cards. We had three lottery drawings during the field period of the survey.

In addition to the multiple emails we sent to students, we conducted targeted outreach to promote participation in the survey. We worked with leaders in student affairs and in programs conducting outreach to low-income and first-generation students on each campus to leverage their influence with students; many sent out information about the survey to their student contact lists via email and other means to encourage participation. On the New Brunswick campus, the Office of Student Access and Educational Equity sent multiple emails to their list serve of students to promote their participation the survey. In addition, coordinators of undergraduate seminar programs promoted the survey directly with the broader undergraduate population. The TRIO Student Support Services in Camden conducted a range of outreach, posting reminders on electronic bulletin boards and hanging flyers on campus. At the Newark campus student services and academic affairs staff assisted with targeted outreach throughout the campus. We conducted outreach to students about the survey using social media, posting notices to the undergraduate Facebook pages; we posted flyers at student centers, in dormitories, and on bulletin boards within gyms and academic buildings on all campuses; and we promoted the survey in person at selected student centers, dining halls, and at a career fair.

Survey Respondents. The survey had an initial panel size of 48,139 students. Of those, 6,243 students responded to the survey. Of this total, 4,916 students fully completed the survey, giving it a final response rate of 10 percent. Respondents to the survey reflected the overall Rutgers population on most observable characteristics. Notably, they differed on gender, however, with the proportion of females responding to the survey exceeding the proportion of females in the overall population[11]. (See Table 1.) Respondent characteristics differed across the three Rutgers’ campuses, largely reflecting the existing differences in their student populations.

TABLE 1. POPULATION AND RESPONDENT DEMOGRAPHICS AND ENROLLMENT INFORMATION

	Rutgers Student Population (%)	Respondents (%)
Socioeconomic Background		
First-generation college student	20	21
Pell recipient	28	29
Race/Ethnicity		
Caucasian	40	41
African American	10	10
Asian	23	24
Latino	15	15
Other/Unknown/Mixed	11	6
Gender		
Male	48	34
Female	52	66
Year in College		
First Year	20	22
Sophomore	20	20
Junior	26	26
Senior	32	32
Major		
Business	19	18
Health	8	8
Humanities	6	7
Other	6	7
Social Science	11	13
STEM	17	17
Undeclared	32	31
Campuses		
New Brunswick	69	68
Newark	16	13
Camden	10	14
RBHS	5	5
All (N)	48,139	6,140

Analysis. To examine the effect of the earnings data on students, we divide the sample into three groups based on low-income and first-generation status: first generation and Pell recipient (10 percent), first generation or Pell recipient (29 percent), and neither first generation or Pell recipient (61 percent). We used ordinary least squares (OLS) regression to estimate the effect of each treatment and then to examine the effect of students' low-income and/or first-generation status and its interaction with the treatment. We also used OLS to examine the effect on choice of major. To examine the effect on job security we used an ordinal logit model.

Findings

Based on these data, we examine each of the research questions. We first examine the effect of earnings data on all students and then on students by low-income and first generation status. We supplement our understanding of the effects of earnings data by examining students' other sources of earnings information.

Earnings Expectations

Earnings data lowered students' earnings expectations, particularly in business and STEM fields. Students who did not receive any earnings information have the highest earnings expectations. Those students who received information on earnings—whether the median or variation treatments—had lower earnings expectations, though those who received median earnings only had somewhat lower earnings expectations than those who saw variation in earnings. The observed differences among these three experimental groups were sizable and significant. They were particularly large in business and STEM—fields that commonly receive attention as offering high potential wages. Students may have formed perceptions of potential earnings in these fields that were driven by this attention and then were adjusted by the earnings data they observed. Students' earnings expectations in business and STEM were significantly lower among those who viewed only median information ($10,101 less and $9,767 less, respectively) as well as among those who viewed the variation information ($4,920 less and $6,720 less, respectively). Students' perceptions of potential earnings were also similarly impacted by the earnings information in education, health, humanities, and social science, but the differences were not as large. Table 2 summarizes these findings.

TABLE 2: IMPACTS OF INFORMATION ON AVERAGE EARNINGS EXPECTATIONS

	Business	Education	Health	Humanities	Social Science	STEM
No information	75,556	46,524	72,513	42,560	46,793	86,720
Median	65,455	42,500	65,898	38,624	42,222	76,953
Variation	70,636	44,525	68,889	40,724	44,455	80,000
Difference between no information and median	**-10,101**	**-4,024**	**-6,615**	**-3,936**	**-4,571**	**-9,767**
Difference between no information and variation	**-4,920**	**-1,999**	**-3,624**	**-1,836**	**-2,338**	**-6,720**

Note: Numbers in bold represent a statistically significant difference from the no information condition.

The effect of earnings data on expectations varied by low-income and first-generation status. Table 3 shows the difference in students' earnings expectations between those who saw earnings data—median or variation—and those who saw no information. Students who viewed median earnings had lower earnings expectations relative to no information regardless of students' low-income or first-generation status. The decreases in earnings expectations were particularly large for business and STEM fields among students who were neither low-income nor first-generation ($10,293 and $11,862, respectively), although decreases were substantial for students who were either low-income or first-generation ($8,951 and $8,903, respectively) or both low-income and first-generation ($8,955 and $6,155, respectively). Students who were either low-income and first-generation or both low-income and first-generation also had large decreases in their earnings expectations for health fields ($8,322 and $9,031, respectively). In contrast, information on variation in earnings lowered earnings expectations among students who were neither low- income nor first-generation relative to no information, but not as substantially with other students.

TABLE 3: IMPACTS OF INFORMATION ON AVERAGE EARNINGS EXPECTATIONS, BY LOW-INCOME AND FIRST-GENERATION STATUS

	Business	Education	Health	Humanities	Social Science	STEM
Neither low-income nor first-generation						
No Information	76,960	46,524	71,489	42,963	47,200	87,852
Median	66,667	42,222	66,634	38,486	42,222	75,990
Variation	70,317	44,444	67,542	40,212	44,444	79,819
Difference Between No Information and Median	-10,293	-4,302	-4,855	-4,477	-4,978	-11,862
Difference Between No Information and Variation	-6,643	-2,080	-3,947	-2,751	-2,756	-8,033
Either low-income or first-generation						
No Information	73,404	46,524	72,766	42,222	46,845	85,668
Median	64,453	42,543	64,444	39,124	42,222	76,765
Variation	71,020	45,034	70,708	40,952	44,449	80,182
Difference Between No Information and Median	-8,951	-3,981	-8,322	-3,098	-4,623	-8,903
Difference Between No Information and Variation	-2,384	-1,490	-2,058	-1,270	-2,396	-5,486
Both low-income and first-generation						
No Information	71,177	46,117	75,698	42,391	45,886	85,373
Median	62,222	44,597	66,667	38,529	41,471	79,218
Variation	75,000	46,425	71,131	42,465	45,882	82,909
Difference Between No Information and Median	-8,955	-1,520	-9,031	-3,862	-4,415	-6,155
Difference Between No Information and Variation	3,823	308	-4,567	74	-4	-2,464

Note: Numbers in bold represent a statistically significant difference from the no information condition.

Perceptions of Job Security

Information did not influence students' perceptions of job security, irrespective of the field of study. Further, the earnings data did not have a differential impact for low-income and/or first-generation students. Figures in Appendix B illustrate students' perceptions of job security by type of information received across field of study. Students' perceptions of job security across the fields of study may be more strongly established and have less potential for variation and correction than their perceptions of expected earnings.

Choice of Major

Earnings data did not influence students' choice of major. Table 4 summarizes the probability of choosing a major across each type of earnings information received. These probabilities are relatively unchanged regardless of the type of earnings information, across all fields of study. Students' choice of major is a highly complex process influenced by many factors, and this information on earnings alone is likely to be insufficient to substantially sway students' decisions.

TABLE 4: PROBABILITY OF CHOOSING A MAJOR, BY TYPE OF EARNINGS INFORMATION RECEIVED

	No Information	Median Earnings	Earnings Variation
Business	.17	.15	.15
Education	.10	.11	.10
Health	.18	.18	.18
Humanities	.13	.12	.12
Social Science	.20	.20	.20
STEM	.28	.29	.30

Note: Numbers in bold represent a statistically significant difference from the no information condition.

Other Sources of Information

To put the earnings information in context, we examined other sources of information that students may use when selecting a major. These sources of information include both family support and college resources. Students' reliance on these sources varied. Respondents who were both low-income and first-generation students were much less likely to rely on their family regularly for help in selecting a major: Only 28 percent of low-income, first-generation students reported they relied on their family all the time or often for help selecting a college major versus 39 percent among low-income or first generation students and 56 percent of neither low-income or first generation students. In contrast, while students from low-income, first-generation backgrounds were less likely to rely on their families for help selecting a major, they were more likely to rely on institutional sources of information. (See Table 5.) In particular, they were more likely to report Rutgers career services as a source of information for selecting a major—either through interaction with a counselor or special program advisor or by accessing online career resources.

TABLE 5. SOURCES OF INFORMATION AT RUTGERS IN SELECTING A MAJOR

	All students	Neither low-income nor first-generation	Low-income or first-generation	Low-income and first-generation
Friends from college/Rutgers	93	93	93	92
Professors	92	91	93	93
Career Counselors at Career Services	73	70	75	83
Online Career Resources at Career Services	73	71	74	78
Clubs or Student Groups at Rutgers	78	78	77	80
Program Adviser from your Department	79	77	81	82
Academic Adviser for your School	84	83	87	86
Special Program Adviser (e.g. EOF)	56	53	58	65

Conclusion

In general, we found that labor market information has an impact on students by lowering their earnings expectations, particularly in the typically high paying fields of business, health, and STEM. Many students hold higher-than-realistic views of their potential future earnings in these fields, and viewing national data on earnings and employment served to lower these expectations. Students' optimistic expectations about earnings in these fields may be cause for concern to the extent that these perceptions lead students away from other fields that they

may prefer and may be more lucrative than they think. Earnings information may help students more carefully consider potential earnings when making decisions about majors or at least when developing expectations for their job search. More information on the types of skills and experiences that would help students move to the higher end of the earnings distribution across a range of majors may better inform students in their preparation for a career., These resources could be particularly helpful to low-income and first-generation students who may have fewer family resources to guide their decision making and more commonly turn to institutional resources such as career services for assistance.

Appendix A

TABLE A-1: MEDIAN CONDITION: GRAPH OF MEDIAN ANNUAL SALARIES OF GRADUATES BY MAJOR FIELD OF STUDY FIVE YEARS AFTER GRADUATION

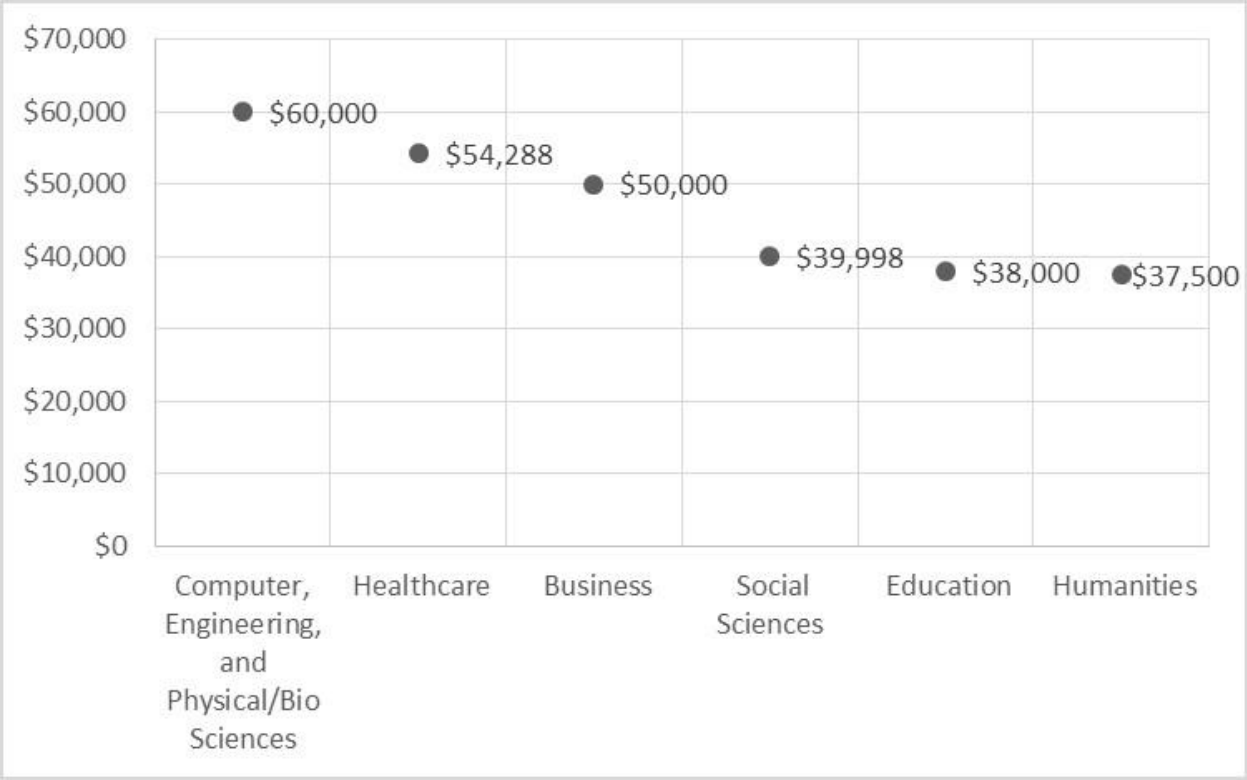


TABLE A-2: MEDIAN CONDITION: TABLE OF MEDIAN ANNUAL SALARIES OF GRADUATES BY MAJOR FIELD OF STUDY FIVE YEARS AFTER GRADUATION

Field of Study	Median
Computer, Engineering, and Physical/Bio Sciences	$60,000
Healthcare	$54,288
Business	$50,000
Social Sciences	$39,998
Education	$38,000
Humanities	$37,500

TABLE A-3: VARIATION CONDITION: GRAPH OF VARIATION IN ANNUAL SALARIES OF GRADUATES BY MAJOR FIELD OF STUDY FIVE YEARS AFTER GRADUATION

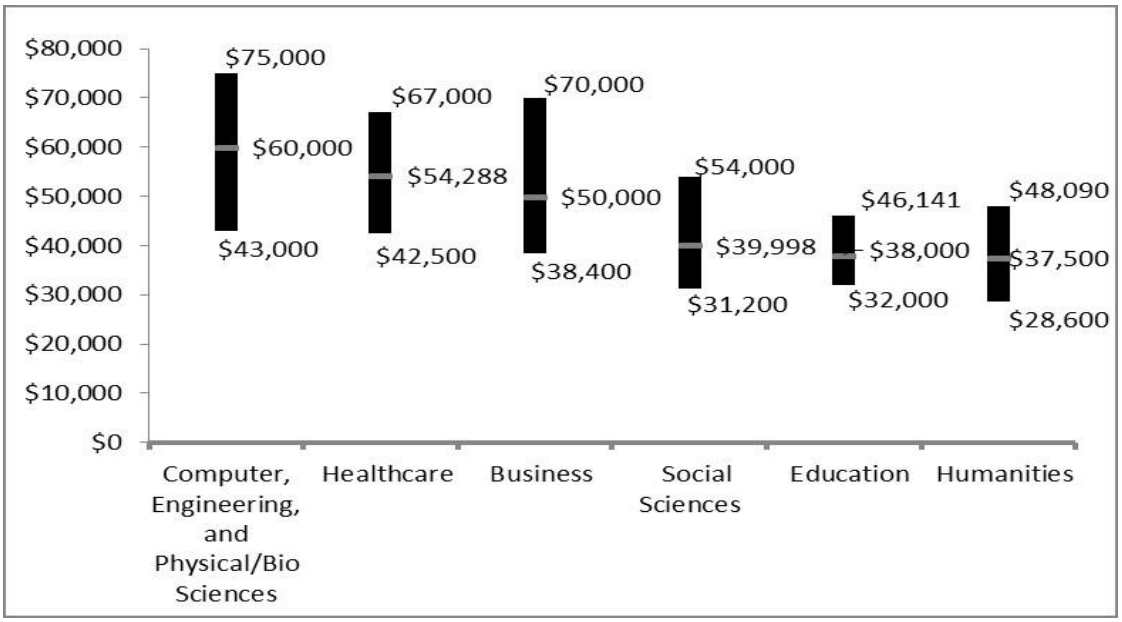


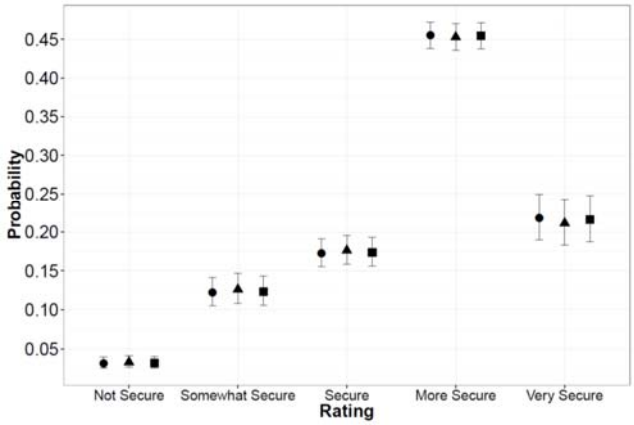
TABLE A-4: VARIATION TREATMENT: TABLE OF VARIATION IN ANNUAL SALARIES OF GRADUATES BY MAJOR FIELD OF STUDY FIVE YEARS AFTER GRADUATION

Field of Study	25th %	50th % (Median)	75th %
Computer, Engineering, and Physical/Bio Sciences	$43,000	$60,000	$75,000
Healthcare	$42,500	$54,288	$67,000
Business	$38,400	$50,000	$70,000
Social Sciences	$31,200	$39,998	$54,000
Education	$32,000	$38,000	$46,141
Humanities	$28,600	$37,500	$48,090

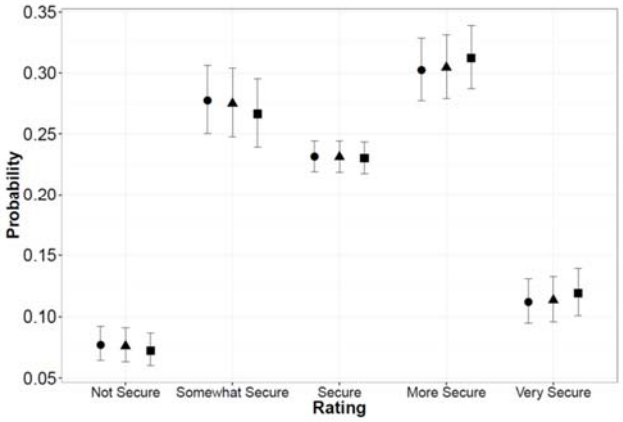
TABLE A-5: VARIATION TREATMENT: UNEMPLOYMENT RATE AND JOB SECURITY AMONG GRADUATES BY MAJOR FIELD OF STUDY FIVE YEARS AFTER GRADUATION

Subject Area	Unemployed %	Satisfied with Job Security %
Healthcare	3.0	77.4
Education	6.3	66.7
Computer, Engineering, and Physical/Bio Sciences	6.6	66.8
Business	9.3	70.5
Humanities	12.1	60.2
Social Sciences	12.9	62.2

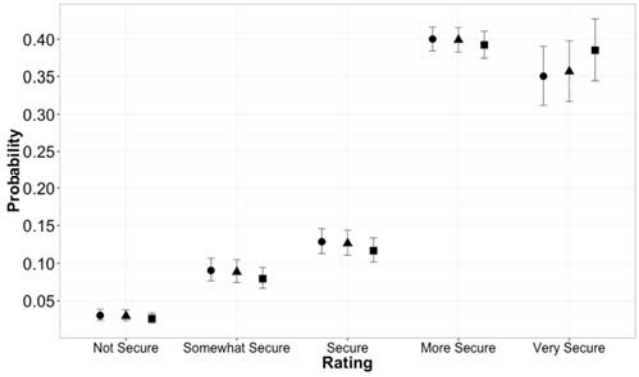
Appendix B: Student's Perceptions of Job Security in Each Field of Studies



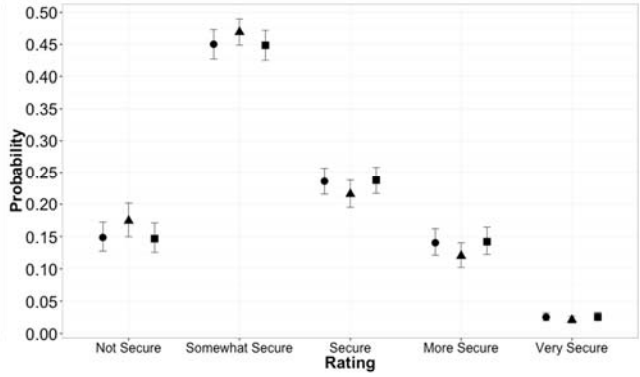
Business



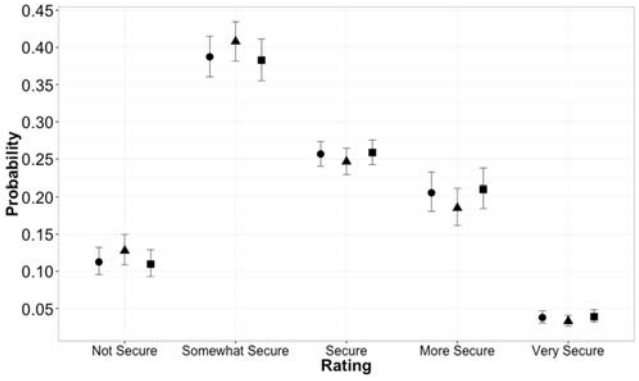
Education



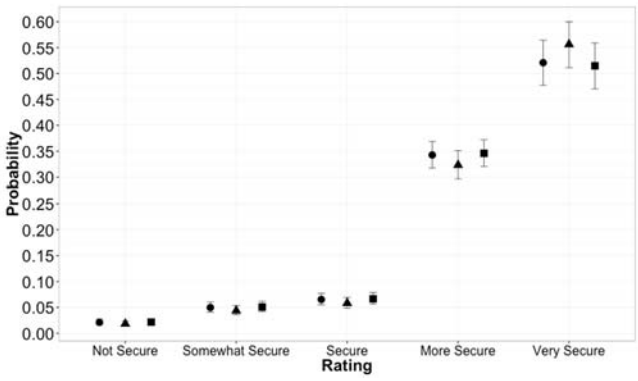
Health



Humanities



Social Sciences



STEM

Note: Circles indicate respondents are neither first-generation nor low-income; triangles indicate first-generation or low-income; squares indicate first-generation and low-income.

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[1] Carey, K. (2014, July 28). Building a better college ranking system. Wait, Babson beats Harvard? *New York Times*. Retrieved from https://www.nytimes.com/2014/07 /29/upshot/building-a-better-college-ranking-system-babson-beats-harvard.html; Chingos, M.M. (2014, April 16). How well does college pay? It depends on who you ask [Web log post]. Retrieved from https://www.brookings.edu/research/how-well- does- college-pay-it-depends-on-who-you-ask/.

[2] Haskins, R. (2016). *Education and economic mobility* (Economic Mobility Project No. 8). Retrieved from Brookings Institute website: https://www.brookings.edu/wp-content/uploads/2016/07/02_economic_mobility_sawhill_ch8.pdf

[3] Adamcyk, A. (2016, October 14). The highest-paying jobs for new college grads. *Time Magazine*. Retrieved from http://time.com/money/4523295/highest-paying-jobs-recent-bachelors-degree/

Powell, F. (2016, July 21). Top College majors for finding full-time work. *US News & World Report*. Retrieved from https://www.usnews.com/education /best-colleges/paying-for-college/articles/2016-07-21/top-college-majors-for-finding-full-time-work

[4] See CollegeMeasures.org and PayScale.com.

[5] Arcidiacono, P., Hotz, J., & Kang, S. (2012). Modeling college major choice using elicited measures of expectations and counterfactuals. *Journal of Econometrics*, *166(1)*, 3–16.

[6] Wiswall, M., and Zafar, B. (2015). Determinants of college major choice: Identification using an information experiment. *Review of Economic Studies*, 82(2),791-824.

[7] Betts, J. R. (1996). What do students know about wages? Evidence from a survey of undergraduates. *Journal of Human Resources, 31*(1), 27–56; Saks, R. E., and Shore, S. H. (2005). Risk and career choice. *The B.E. Journal of Economic Analysis & Policy, 5*(1),1–43.;
Caner, A., and Okten, C. (2010). Risk and career choice: Evidence from Turkey. *Economics of Education Review*, 29(6),1060–1075.

[8] Hodkinson, P., & Sparkes, A. C. (1997). Careership: A sociological theory of career decision making. *British Journal of Sociology of Education*, 18(1), 29–44.
Hodkinson, P., (2008). Understanding career decision-making and progression: Careership revisited. Woburn House, London. (pp. 1–17).

[9] Bettinger, E. P., Long, B. T., Oreopoulos, P., and Sanbonmatsu, L. (2012). The role of simplification and information in college decisions: Results from the H&R Block FAFSA experiment. *Quarterly Journal of Economics*, 127(3):1205-1242.
Hoxby, C., and Turner, S. (2013). *Expanding college opportunities for high-achieving, low-income students* (Technical Report 12-014). Stanford Institute for Economic Policy Research. Retrieved from http://siepr.stanford.edu/research/publications/expanding-college-opportunities-high-achieving-low-income-students

[10] Data is from the National Center on Education Statistics' Beginning Postsecondary Survey.

[11] This has been found to occur in other studies of student populations, e.g., Underwood, D., Kim, H., and Matier, M. (2000, May). *To mail or to web: Comparisons of survey response rates and respondent characteristics*. Paper presented at the Annual Forum of the Association for Institutional Research, Cincinnati, OH.