Which Fields Pay, Which Fields Don't? An Examination of the Returns to University Education in Canada by Detailed Field of Study

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February 2007

[1] The views expressed in this paper are my own and should not be attributed to the Department of Finance.

Abstract

The decision to attend university has a significant impact on an individual's lifetime earnings, as does his choice of field of study and whether or not to pursue graduate studies. This paper uses data from the 1996 Canadian Census to compute estimates of the private rate of return associated with these choices. Use of data from the full (20 per cent) sample allows for estimates to be computed by detailed field of study.

We find that the heterogeneity in rates of return across major fields of study documented in previous research is found to persist within more narrowly defined fields of study. We find rates of return to bachelor's degrees to be positive for all detailed fields of study; thus, they represent a sound investment. The same holds true for the vast majority of individuals pursuing graduate degrees. Additionally, use of 2002-03 tuition fee data indicates that recent increases in tuition fees has a noticeable, but not overwhelming, impact on rates of return; no field that was profitable under the 1995-96 cost structure is rendered unprofitable despite substantial increases in costs.

1. Introduction

The decision to attend university has a significant impact on an individual's lifetime earnings, as does his choice of field of study and whether or not to pursue graduate studies. These choices are the focus of this paper. It should be noted that it is not the intent of this paper to model the educational choices of individuals per se, but rather to examine the returns associated with these choices.[2] Specifically, we use data from the 1996 Census to compute estimates of the private rate of return accruing to university graduates in Canada with different levels of university education. In doing so we consider both the direct costs (tuition fees and non-fee costs) and indirect costs (foregone earnings) of pursuing university, as well as the impacts of income taxes. Use of data from the 20 per cent sample of the Canadian Census allows for estimates to be computed by detailed field of study.[3]

We wish to make it clear from the outset that we fully recognize that pecuniary rewards are not the only factors influencing a person's educational choice; they may not even be the primary factor. Nevertheless, it is reasonable to believe that individuals are concerned with the financial returns to education. Perhaps not so much that they choose the education path that will yield them the highest return, but at least to verify that a given choice will satisfy some idiosyncratic threshold. This is expected to be particularly true of persons deciding whether or not to pursue graduate work.

The rest of this paper will proceed as follows. Section 2 presents a brief discussion of the literature. Section 3 describes the methodology employed in the analysis and Section 4 describes the data. Construction of earnings profiles is discussed in Section 5. Section 6 presents results and Section 7 examines the sensitivity of these returns to increases in tuition fees. Conclusions and future work are presented in Section 8.

2. Literature Review

When discussing returns to education, one must be careful regarding terminology. What exactly is meant by 'returns to education'? An individual considering investing in

[2] Boudarbat and Lemieux (2003) provides an example of a study that models field of study as an endogenous choice.

[3] Each time the Canadian census is conducted, 80 per cent of respondents complete the short-form which asks only for demographic information. However, 20 per cent of respondents complete the long-form, which collects additional data including information pertaining to earnings and educational attainment. The Census public use file, representing approximately 3 per cent of respondents, presents educational attainment only by *major* field of study, whereas the 20 per cent sample presents field of study by the more narrowly defined *detailed* field of study.

education is primarily concerned with how they themselves will be directly affected by the investment. Thus, the measure of greatest interest to them is likely to be the *private* rate of return, which considers only the benefits and costs that accrue solely to the individual.

Alternatively, returns to education may be examined within a broader context, namely, from the viewpoint of society as a whole. In this case, it is more appropriate to examine the *total* rate of return (sometimes referred as the public return), which considers all the direct costs and benefits accruing to society, both private and public.

A related concept is the *social* rate of return to education, which like the total return, considers all the direct benefits and costs associated with investments in education, but also considers any externalities resulting from the production of education such as reduced crime, improved health and longevity, and human capital-driven endogenous growth. If schooling is a productive investment rather than a signalling or screening device, then in the absence of externalities the total rate of return coincides with the social rate of return. However, if higher investment in human capital produces positive externalities, then the social rate of return will exceed the total rate of return.

There are a number of studies that estimate private and total rates of return to post-secondary education in Canada.[4] There are fewer studies that estimate social returns to education [see Moretti (2004) and Davis (2003) for examples].[5]

This paper most closely resembles four other studies: Vaillancourt (VA) (1995), Stager (ST) (1996), Rathje and Emery (RE) (2002) and Vaillancourt and Bourdeau-Primeau (VBP) (2002). Each of these studies uses census data to estimate private and total rates of return to university education in Canada.[6] They also examine similar time frames: together VA and VBP examine data from the 1986, 1991 and 1996 censuses, as does RE. ST confines his attention to the 1991 census. Accordingly, these papers shall be our primary points of reference. However, there are important differences between these studies and our own which shall be discussed in more detail later.

This being said, the results from these studies indicate that rates of return can vary substantially across the broadly defined major field of study, for example, between a bachelor's degree in one of the social sciences and a bachelor's degree in an engineering field. But does this heterogeneity *across* major fields of study also exist *within* fields? How does the return to a degree in economics compare to the return to a degree in sociology? A primary goal of this paper is to examine private rates of return by the more

[4] Vaillancourt (1995) and Vaillancourt and Bourdeau-Primeau (2002) provide detailed summaries of the studies in this area. More recent studies include, but are not restricted to Appleby et. al. (2002). In related studies, Finnie (2002a, 2002b) examines early labour market outcomes of university graduates.
[5] Readers of studies on returns to education must be careful when faced with the term 'social return' as this term is sometimes used interchangeably with the term 'total return'.
[6] Vaillancourt (1995) also estimates the return to a college diploma.

narrowly defined detailed field of study and determine if such heterogeneity persists at that level. A secondary goal is to document recent increases in university tuition fees and determine their impact on estimates of rates of return.

3. Methodology

3.1 Computation of Rates of Return

There are three main methods of estimating rates of return to investments in education. The first, developed by Mincer (1974), involves econometrically estimating an earnings function where log earnings is regressed on years of study and age/experience in the labour market. Under this specification, the estimated coefficient on the years of study variable represents the rate of return to an additional year of education. More general specifications include dummy variables that distinguish between years of education or the last level of education obtained.

A second approach involves computing the ratio of discounted net benefits to total costs. This method does not measure the internal rate of return to education as it depends on an assumed value of the discount rate used in the calculations.

A third method, one that will be employed in this study, involves the calculation of the internal rate of return associated with an investment in education in much the same way as one would compute the profitability of a financial asset. Specifically, this method computes the rate of return as the internal rate of return that equates the net lifetime discounted benefit from pursuing the educational investment with zero. This is represented in equation (1) where A and B represent the earnings streams with and without the investment, respectively.

$$0 = \sum_{i=1}^{N} \frac{(A_i - B_i - C_i)}{(1+r)^i} \qquad (1)$$

C represents the private costs associated with the investment (tuition fees and non-fee costs).[7] N represents the number of years between when the educational investment begins and a person retires.[8] Thus, the rate of return, r, represents the ex-ante rate of

[7] Living and accommodation costs are not considered in the analysis since these are incurred by students and non-students alike. Such costs should be included only to the extent that they differ from comparable costs incurred in an alternative activity. It is assumed that these costs are identical for both students and non-students.

[8] All persons are assumed to retire after age 64.

return associated with the investment evaluated immediately before the educational investment is undertaken. [9]

Within this framework, it is assumed that all benefits derived from employment can be measured solely by earnings; all fringe benefits are excluded.

3.2 Computation of After-tax Earnings

Calculation of private rates of return necessitate that we compute after-tax earnings. This is done using a simplified version of the tax system. Specifically, I compute taxes for a representative individual without children who resides in Ontario. We consider the federal income tax schedule, EI and CPP contributions, the federal surtax and the GST credit. From the Ontario tax system we consider basic tax, the high-income surtax and the low income tax reduction. Note that unlike VBP, we do not include any deductions for RRSP contributions. Thus, after-tax earnings may be underestimated relative to their estimates.

3.3 Additional Assumptions

Carrying out this exercise requires that a number of additional assumptions be made concerning the timing of education programs, alternative earnings and foregone earnings. These are discussed in turn.

3.1.1 Timing of Schooling

As a first step in this exercise, we must make assumptions concerning the duration of different university programs and the ages of individuals when they undertake these programs. These are presented in Table 1.[10] It is assumed that individuals graduate from high school at age 18. A bachelor's program takes four years of study to complete and commences in the year following completion of high school. A law degree requires three additional years of study after the completion of a bachelor's degree.[11] A degree in medicine, dentistry, veterinary or optometry requires four years of study and is pursued

[9] This methodology differs slightly from that used in VA and VBP which considers all costs to be up-front costs and discounts differences in earnings back to the point where schooling is completed.
[10] The durations of programs as listed in Table 1 are typical, but there are exceptions.
[11] Although law programs do not require the completion of an undergraduate degree as a prerequisite, it is common for individuals starting law school to possess a bachelor's degree.

after the completion of a bachelor's degree. A master's degree takes two additional years of study following the completion of a bachelor's degree and completion of a Ph.D. degree takes an additional four years after completion of a master's degree.[12]

Table 1: Ages of Students while Attending University

Program	Age while Attending	Duration
Bachelor's degree	19-22	4 years
Law degree	23-25	3 years
Degree in Medicine, Dentistry, Veterinary or Optometry	23-26	4 years
Master's degree	23-24	2 years
Ph.D. degree	25-28	4 years

3.1.2 Alternative Earnings

For each level of university education the alternative earnings stream (i.e. without the investment in additional education) is estimated as the earnings of a person who had the credentials necessary to pursue the investment, but did not do so. Thus, the alternative earnings stream for a person with a bachelor's degree is the earnings series for a high school graduate who did not pursue further schooling. Similarly, the alternative earnings series for someone with a master's degree is the earnings series of someone whose highest degree was a bachelor's degree and the alternative earnings for someone with a Ph.D. degree is the earnings series of someone whose highest degree was a master's degree.

This procedure allows for the determination of the incremental return to a given degree relative to the next lowest level of education. For example, the return to pursuing a master's degree relative to entering the workforce after attaining a bachelor's degree. The alternative earnings series for degrees in law and the medical fields are treated slightly differently. The decision of a person to pursue a degree in these fields is assumed to take place when he first enters university, rather than after completion of his bachelor's degree. Thus, the appropriate comparison is between someone who chose to attain a

[12] Four years is most likely an underestimate of the time required to complete a Ph.D. program. After our computational work was completed, we learned of Gluszynski and Peters (2005) which reports that among a sample of graduates from Canadian Ph.D. programs in 2003-2004 the average time to completion was 5 years and 10 months.

bachelor's degree followed by a law degree versus someone who entered the workforce immediately following high school. Accordingly, the alternative earnings stream is that of a person whose formal education ceased after completing high school and the rate of return is the return relative to someone who pursued no further schooling after graduating high school. [13]

Furthermore, when estimating the rate of return for a person with a master's or Ph.D. degree we must consider not only the field of study for the degree being pursued, but also the field of study associated with the alternative earnings stream. For the purposes of this study it is assumed that a person pursuing a graduate degree has a previous degree in the same field. Thus, when computing the return to a M.A. in economics, the alternative earnings stream is for a person with a B.A. in economics.

As stated, the alternative earnings path is proxied by the earnings path of those people who did not continue their education to the next level. However, it is possible that individuals who chose to pursue additional education are systematically different from individuals who did not. Therefore, there may be a sample selection issue. For example, one could argue that persons pursing additional education are of a higher ability and thus, could be expected to earn more than the less able group even without additional education. Some authors have adjusted estimated earnings streams to reflect differences in ability, but in this study we make no such adjustments.

3.1.3 Foregone Earnings

When considering alternative earnings, special attention must be paid to earnings foregone while in university. During these years, individuals generally are employed for part of the year and thus do not forgo an entire year's salary.

It is assumed that undergraduate students pursuing their first undergraduate degree attend university for eight months each year. Thus, each year while they are undergraduates, they are assumed to earn one-third of the earnings of a high school graduate at age 19.

Similarly, students pursuing medical degrees are assumed to attend school for eight months each year; thus, each year they are in medical school they are assume to earn one-third of the annual earnings of someone aged 23 years with a bachelor's degree in the agricultural-biological field.

[13] The sequential approach used for law and the medical fields could also be applied to graduate studies, which would allow for the direct comparison of returns to different fields at the graduate level. For example, one could compare the return associated with acquiring a bachelor's degree in economics followed by a master's degree in economics (relative to high school completion) with the return associated with acquiring a bachelor's degree and a master's degree in say, engineering (relative to high school completion). However, we have not done this as our focus is on the incremental return associated with each level of education and field of study.

Students in masters programs are assumed to earn more because of teaching assistant/research assistant duties; hence, they are assumed to earn one-half of the earnings of a 23-year old graduate of a bachelor's program. Similarly, Ph.D. students are assumed to earn one-half of the earnings of a 25-year old graduate of a master's program.[14]

[14] This is the same procedure followed in Ratjje and Emery (2002) and Allen (1999).

4. Data

4.1 Earnings Data

The earnings data used in this analysis are from the 1996 Census of Canada. Accordingly, the estimated life-time earnings profiles will suffer from the same failing common to all earnings profiles estimated using data from a single cross section, namely, these estimates will not pick up any cohort effects present in the data.[15]

Unlike the studies discussed above which used data from the Census public use microdata files, this study uses data on the earnings of university graduates from the full 20 per cent sample from the Census.[16] Use of this data affords a more detailed breakdown of field of study than is available with the public use file. It should be noted that the form of this data differs as well. This data was made available in the form of a table that presents average earnings by level of education, detailed field of study, gender and year of age. This data did not contain information of earnings of high school graduates.[17] For this reason, average earnings of high school graduates by gender and year of age was computed from the 1996 public use microdata file.

The strategy followed in this analysis is to define the sample and measure of earnings such that all possible future outcomes faced by individuals will be considered as fully as possible. Accordingly, the sample includes all individuals who satisfied the educational criteria and reported non-zero earnings in the census year.[18] The measure of earnings includes wages and salaries plus income from self-employment. VA, VBP and ST also include self-employment income in their definition of earnings and thus, retain the self-employed in their sample. In contrast, RE includes only paid employees; self-employed individuals are excluded. Moreover, paid employees had to work at least 26 weeks in the census year to be included in their sample.

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[15] Use of a cross sectional data from a single year to derive earnings profiles implicitly assumes that the future earnings of younger individuals may be accurately represented by the present day earnings of older workers. If cohort effects are present in the data, this assumption will not hold. See Beaudry and Green (2000) for a detailed discussion of cohort effects in the earnings patterns of Canadian men.

[16] Stager (1996) uses a table produced from the 1991 census, which I believe is from the 20% sample.

[17] The table provided by Statistics Canada defined level of education using the 'DGREEP' variable, which refers to the highest degree, certificate or diploma obtained. Using this variable to identify persons with a high school diploma would include persons who attended schooling beyond high school but for which they did not obtain a degree. Use of the 'HLOSP' variable, which reports highest level of schooling attended, allows for the identification of high school graduates who had no additional schooling. As the more detailed field of study variable was not required for computing average earnings for high school graduates, the earnings data for these people were constructed using the public use file.

[18] The decision to retain only those individuals with non-zero earnings means that the analysis will not consider the experiences of workers who did not work during the census year. As such, this analysis does not fully account for the possibility of future unemployment. See OECD (2006) for an example of methodology that explicitly models the probability of unemployment.

4.2 Tuition Fees and Non-tuition Fees

Data on tuition fees is taken from Table 1 (University tuition fees for full-time Canadian students) in "Tuition Fees and Living Accommodation Costs at Canadian Universities Survey, 1995-96", (Statistics Canada). Data on non-tuition fees is taken from Table 3 (Additional fees for full-time students) of the same publication. For each of these data series we compute an unweighted average across major schools by field of study (additional fees do not vary by field of study). The sum of these two values yields our estimates of total tuition fees (hereafter, simply tuition fees) for each field of study.[19]

Non-fee costs (out of pocket expenses) are from Porter and Jasmin (1987).[20]

5. Earnings Regressions

Studies estimating returns to education typically use individual level microdata and employ ordinary least squares to estimate a relationship between log earnings and age, level of education and field of study. Predicted values from these regressions allow for the construction of the age-earnings profiles for each group defined by gender, education level and field of study used in the rate of return calculations.

In the current analysis we begin with data in the form of average earnings by individual year of age for each group defined by gender, education level and field of study. Thus, we already have age-earnings profiles at hand, but inspection of the data reveals that these series display varying degrees of volatility. These profiles are smoothed using the same regression techniques used in studies utilizing microdata.[21] Specifically, using data for a given gender and education level, equation (2) is estimated by ordinary least squares. Inclusion of dummy variables for each field of study (indexed by i) allows the

$$\ln(earnings) = \beta_0 + \beta_1 Age + \beta_2 Age^2 + \sum \beta_{0i} Field + \sum \beta_{1i} Field \text{ x } Age \qquad (2)$$

intercept term to vary by field. Field dummies interacted with the *Age* variable are also included to allow the *Age* coefficient to vary by field as well. The coefficient on the Age^2

[19] This is the same procedure followed in VA and VBP with two differences: VBP do not include additional fees (Table 3 of publication) and VBP compute tuition levels for 1995-96 using the TLAC data for 1993/94, adjusted for inflation. The tuition fee data used by RE (for 1998-99, adjusted for inflation) was obtained directly from the websites of seven Canadian universities.

[20] I use the value reported in VBP.

[21] Methodologically, this results in an important difference between our study and those using microdata. The earnings profile from a log earnings regression using microdata is not identical to the earnings profile from a log earnings regression using average values from that same microdata.

variable is constrained to be constant across fields of study. Hence, this specification allows for the construction of earnings profiles specific to field of study.

Within each gender-education level group, three sets of regressions are estimated. At the highest level of aggregation neither the field dummies nor the interactions of *Field* and *Age* are included in the specification. The second specification includes these variables with fields defined by *major* field of study. The third specification is a variant of the second with fields defined by *detailed* field of study. Regression results are presented in the appendix. Construction of earnings profiles in this manner allows for the computation of rates of return to different levels of education at the aggregate level and by both major and detailed fields of study.[22] Finally, these earnings profiles are used to compute after-tax earnings profiles employing the simplified version of the income tax system described in Section 3.2.

There are some additional issues that must be addressed in estimating these regressions. In the aggregate earnings data, the number of individuals in the population belonging to a given cell defined by gender, age and field of study varies across cells. Accordingly, the regressions are estimated using as weights the number of persons represented by each cell.

Another issue is whether the data is sufficiently rich to allow for reasonable earnings profiles to be estimated for groups disaggregated by education level, gender and detailed field of study. Given the data is in aggregate form, the first question is whether or not there are sufficient aggregate data points for each group to identify the coefficients on field and the interaction of field and age. We deal with this issue by assuming that an earnings profile is sufficiently well identified if there are at least 15 aggregate data points for the group in question. If either the group associated with the investment or the group associated with the alternative fail to meet this criteria, we do not report the corresponding rate of return.

A second related question concerns the quality of the aggregate data points. Some groups are not well represented in the general population. Thus, even with a data set as large as the 20 per cent census sample, there will be some detailed fields for which it is not credible to say that the resulting earnings profile represents an accurate estimate of what a person could expect to earn if they chose to pursue that education path. This will be considered when discussing results.

[22] Rates of return are computed using the Gauss software program. To ensure robustness, numerous runs were computed using a wide range of starting values.

6. Results

In this section we present the estimated rates of return associated with the completion of four levels of university study:

- a bachelor's degree (non-medical) relative to a high school diploma;
- a master's degree relative to a bachelor's degree;
- a Ph.D. degree relative to a master's degree; and
- a medical degree relative to a high school diploma[23].

Results will be presented separately by gender. The aggregate results and results by major field of study will be presented first, followed by results by detailed field of study.

6.1 Results by Major Field of Study

Table 2 presents estimated rates of return to different levels of university education at the aggregate level and by major field of study.[24] As can be seen, there is considerable variation in returns across both fields and levels of education. [25]

[23] "Medical degrees" are limited to degrees in the fields of medicine, dentistry, veterinary and optometry i.e. degrees which entitle the holder to be addressed as "doctor". Bachelor's degrees in fields such as nursing and physiotherapy are included in the "Health Professions" category of non-medical bachelors' degrees.

[24] For some gender-education level-field of study combinations, the gauss program did not converge to a solution. Such occurrences are noted in the tables.

[25] When interpreting our results the reader should bear in mind that the earnings profiles used in this analysis represent only an expectation of future earnings. Accordingly, there will be a distribution of realized rates of return. Boothby and Rowe (2002) explicitly examine the dispersion of the private rate of return to post-secondary education and find that 20 per cent of bachelor's degree graduates had negative rates of return on their investment in education. Finnie (2002b) examines the average error associated with individual's expectations of future earnings by comparing the earnings profile predicted by the regression model with individual's actual earnings.

Table 2: Rates of Return by Major Field of Study, 1995
(*per cent*)

Field	Bachelor's		Master's		Ph.D.	
	Men	Women	Men	Women	Men	Women
Total - Non-medical degrees *	9.9	12.1	4.1	8.6	1.3	4.3
Non-Science	9.1	11.8	7.0	9.6	0.0	3.4
Education	5.4	11.3	9.4	11.4	4.0	-0.2
Fine and Applied Arts	b	4.4	3.5	1.3	7.9	7.7
Humanities and Related	3.6	10.0	-6.0	3.8	7.4	5.1
Social Science and Related	10.0	11.7	b	6.2	3.6	7.8
Commerce, Mgt, Bus. and Admin.	13.3	15.9	19.1	23.1	b	2.1
Science	11.5	13.5	1.2	5.2	1.7	6.0
Agricultural and Biological	4.9	9.1	0.7	2.9	6.8	8.9
Engineering	13.0	13.9	-3.9	-0.7	0.9	b
Health Professions	10.4	15.5	16.2	8.2	b	7.1
Math and Physical Science	11.9	14.6	-1.6	2.5	2.9	b
Total - Medical Degrees	15.1	15.9				

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.
** Non-medical degrees exclude degrees in medicine, dentistry, veterinary and optometry, but include degrees in health professions such as nursing and physiotherapy.*

Source: Author's calculations

6.1.1 Bachelor's Degrees

As indicated in Table 2, at the aggregate level the return to a (non-medical) bachelor's degree is 9.9 per cent for men and 12.1 per cent for women. These estimates suggest that from a financial point of view, investing in a bachelor's degree certainly justifies the associated cost. Inspection of returns by major field of study supports this assertion, although there is considerable variation in returns across fields.

A useful initial breakdown across fields of study is to classify them as either science or non-science. When evaluated at this level, we find that science degrees offer higher returns than non-science degrees. However, this does not hold true for all major fields within these groups.

For both genders, the highest returns are to degrees in the commerce and engineering fields. Returns to degrees in the health professions and math and physical sciences are also relatively high for women, and to a lesser degree, for men. Noticeably lower returns are observed for degrees in the humanities and agricultural-biological fields for men, and fine arts for women. Comparison with results from other studies indicates that these

general observations hold true across studies, in particular, the observation that rates of returns to a bachelor's degree are higher for women than men.

However, the rates of returns estimated in this study are generally lower than those estimated in other studies, in particular the returns estimated by VBP using 1995 data. These differences likely reflect differences in methodology noted earlier such as the use of aggregate data and different treatment of taxes (VBP includes deductions for RRSP contributions). [26] The precise causes will be explored in future work.

6.1.2 Master's Degrees

Results at the aggregate level indicate that the returns to pursuing a master's degree are positive, although somewhat less than the returns to a bachelor's degree (4.1 per cent for men vs. 8.6 per cent for women). Again, we observe in the aggregate and across most fields of study that returns are greater for women. In contrast to the case for bachelor's degrees, at the aggregate level the return to a master's degree in a non-science field exceeds the return for a science field by a substantial margin (7.0 per cent vs. 1.2 per cent for men and 9.6 per cent vs. 5.2 per cent for women). Moreover, this holds true for most major fields. The highest returns to a master's degree are for the commerce fields (as was observed for bachelor's degrees) and education. Among science fields, only a degree in health yields a relatively high return. In fact, returns to a master's degree in some fields of study are negative, notably, returns to a master's degree in engineering for both women and men.[27]

6.1.3 Ph.D. Degrees

At the aggregate level, returns to a Ph.D. degree are less than the return to a master's degree for both genders (1.3 per cent for men vs. 4.3 per cent for women), but there is considerable variation in returns across fields. As was the case for bachelor's degrees, a Ph.D. in the sciences offers a higher return than a non-science Ph.D. It is interesting that for both genders the returns to a Ph.D. degree in the fine arts, humanities and agricultural-biological fields are among the highest by field, whereas the returns to a master's degree in these fields was relatively low compared to other fields.

[26] Allowing for deductions of RRSP contributions, as does VA and VBP, will result in greater differences between the earnings stream with the educational investment and the alternative, yielding higher estimated rates of return.

[27] Amongst graduate degrees, particularly at the level of detailed field of study, there are some fields for which the estimated rate of return is negative. However, such fields account for less than 4 per cent of our sample.

6.2 Results by Detailed Field of Study

Results presented in the previous section clearly indicate that for a given level of university education there is substantial heterogeneity in rates of return *across* major fields of study. In this section we examine returns by major fields to determine if the same degree of heterogeneity exists *within* major fields of study.

Table 3a presents rates of return by detailed field of study within social sciences. Inspection reveals considerable variation in returns within this group.

Examination of this table reveals that at the bachelor's level, returns to degrees in economics and law (economics in particular) are noticeably higher than other social science fields. For each social science field, the return to a bachelor's degree for a woman exceeds that of a man, but this female-male differential is more pronounced for geography, psychology and sociology than is indicated for social sciences as a whole.

At the master's level, the highest return for men is found in social work; for women, in economics and social work. Of particular note is the large negative return associated with a woman attaining a master's degree in law relative to a bachelor's degree (-14.2 per cent).

Table 3a: Rates of Return – Social Sciences, 1995
(*per cent*)

	Bachelor's		Master's		Ph.D.	
Field	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Social Science and Related	10.0	11.7	b	6.2	3.6	7.8
Economics	12.1	14.2	3.2	9.1	4.9	6.5
Geography	6.2	10.6	3.5	0.6	4.6	7.5
Law and Jurisprudence	11.1	12.9	b	-14.2	b	b
Politics Sciences	9.3	12.3	0.2	2.1	4.5	4.4
Psychology	5.1	10.0	0.6	6.4	15.1	11.7
Sociology	6.3	11.1	0.3	5.7	9.6	5.9
Social Work	b	11.6	8.0	9.9	a	a
Other Social Sciences and Related Fie	5.0	9.2	5.1	4.0	-1.5	8.2

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.

Source: Author's calculations

At the Ph.D. level, the highest returns for men are to degrees in psychology and sociology. As is the case for men, a Ph.D. in psychology affords women the highest return among social science fields; returns to degrees in economics and geography are also relatively high. With the exception of the "other social sciences" category, the

returns to a Ph.D. are positive for all fields, and in most cases greater than the return to a master's degree.

Table 3b presents rates of return by detailed field of study within commerce, management and business administration. In contrast to the social sciences, there is relatively little variation in returns across detailed fields of study. Moreover, the premium to degrees for women is relatively constant as well. These observations hold true for both bachelor's and master's levels. The data does not allow for evaluation of returns across detailed fields at the Ph.D. level.

Table 3b: Rates of Return – Commerce etc., 1995
(*per cent*)

	Bachelor's		Master's		Ph.D.	
Field	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Commerce, Mgt, Bus. and Admin.	13.3	15.9	19.1	23.1	b	2.1
Business and Commerce	13.7	16.1	21.9	25.8	b	-0.6
Financial Management	14.0	16.4	18.9	22.1	0.8	a
Industrial Management	10.6	15.2	8.9	17.2	-3.2	a
Institutional Management	a	15.5	12.0	24.0	a	a
Marketing	13.3	17.0	15.2	16.6	b	a
Secretarial	5.5	5.8	a	a	a	a
Other Commerce etc.	b	10.6	a	a	a	a

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.

Source: Author's calculations

Returns to degrees in the agricultural and biological fields are presented in Table 3c. Once again, there are significant differences in rates of returns across detailed fields of study. At the bachelor's level the highest return is to a degree in biochemistry for both men and women. The lowest returns are to a degree in zoology for men and a degree in botany for women. At the master's level, most returns for men are similar and close to zero; the main exception being for a degree in botany and the "other" category, both of which represent relatively few people in the population. With the exception of the biology and "other" fields, rates of return to master's degrees for women are undefined.

Table 3c: Rates of Return – Agricultural and Biological, 1995
(*per cent*)

Field	Bachelor's		Master's		Ph.D.	
	Men	Women	Men	Women	Men	Women
Agricultural and Biological	4.9	9.1	0.7	2.9	6.8	8.9
Agricultural	5.4	8.6	-0.2	b	5.7	a
Biochemistry	6.6	11.7	b	b	9.3	6.5
Biology	5.4	8.9	0.6	3.7	5.8	9.2
Botany	b	5.2	7.9	b	16.1	a
Veterinary	a	a	b	b	3.7	a
Zoology	3.9	7.8	1.6	b	5.7	b
Other Agricultural and Biological	b	10.2	4.4	7.2	b	8.1

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.

Source: Author's calculations

For men, there are larger differences in returns across detailed fields at the Ph.D. level than at other levels of education. Relatively high returns are observed for biochemistry and botany although there are few people with these degrees in the population. Returns for men in other fields are closely grouped together and somewhat lower. For women the largest returns are observed for zoology, but again, sample counts for this group are small.

Table 3d reveals that there are few differences in rates of return to a bachelor's degree in specific engineering fields, particularly for men. The only exceptions to this statement are degrees in the fields of resources-environment engineering, aeronautical/aerospace engineering and civil engineering, all of which offer relatively low rates of return compared with bachelor's degrees in other engineering fields.

Table 3d: Rates of Return – Engineering, 1995
(*per cent*)

Field	Bachelor's		Master's		Ph.D.	
	Men	Women	Men	Women	Men	Women
Engineering	13.0	13.9	-3.9	-0.7	0.9	b
Aeronautical/Aerospace Eng	8.4	a	22.4	a	a	a
Biological and Chemistry	15.5	17.7	b	-2.6	0.0	a
Civil Engineering	10.8	13.9	-1.7	-2.7	1.1	a
Design/Systems Engineering	16.6	a	a	a	a	a
Electrical /Electronics	14.6	19.4	-0.4	-2.0	1.2	a
Industrial/Manuf Eng	14.9	b	-4.1	a	5.4	a
Mechanical	14.4	17.0	-7.6	0.9	1.5	a
Mining, Metal and Petroleum	15.1	20.0	-5.8	b	-1.4	a
Resources and Environments	5.0	b	b	18.2	4.0	a
Engineering	11.8	a	1.0	a	9.5	a
Engineering, n.e.c.	14.3	17.1	5.1	3.5	-5.5	a
Other Eng and App	7.6	7.9	-3.9	b	8.0	a

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.

Source: Author's calculations

There is more variation in returns to a master's degree in engineering, although for almost all fields, returns are negative, particularly for men. However, a strongly positive return is obtained for men with master's degrees in aeronautical/aerospace engineering, but this should be viewed with some scepticism since few in the population hold such degrees. Returns for men to a Ph.D. in engineering differ somewhat by field, however, again small sample counts must be taken into consideration. Data limitations prevent estimation of rates of return for women who invest in Ph.D. programs in engineering.

Results in Table 3e reveal considerable heterogeneity in returns across detailed fields to degrees in the math and physical science fields. For both men and women, the greatest return at the bachelor's level is to a degree in actuarial science. Degrees in applied mathematics also offer relatively high returns, particularly for women, whereas returns to degrees in chemistry and physics are relatively low.

Table 3e: Rates of Return – Math and Physical Science, 1995
(*per cent*)

Field	Bachelor's		Master's		Ph.D.	
	Men	Women	Men	Women	Men	Women
Math and Physical Science	11.9	14.6	-1.6	2.5	2.9	b
Actuarial Science	21.6	25.0	b	a	a	a
Applied Mathematics	14.3	19.2	3.5	-0.5	1.5	b
Chemistry	9.1	10.3	-7.2	8.7	6.5	b
Geology	13.0	12.6	-2.0	b	1.6	a
Mathematical Statistics	b	14.9	7.2	b	0.8	a
Mathematics	11.6	14.6	-2.7	1.6	3.9	a
Physics	8.0	9.7	0.5	3.7	5.3	a
Other Math and Physical Sciences	7.6	10.2	-2.1	b	6.2	a

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.

Source: Author's calculations

At the master's level, returns are generally negative for men, the exceptions being applied math and mathematical statistics. For women, positive returns are found for degrees in chemistry, mathematics and physics. Returns to Ph.D. degrees in all fields are positive for men, with the greatest returns accruing to men with degrees in chemistry and physics. Data limitations prevent estimation of rates of return for women who invest in Ph.D. programs in math and the physical sciences.

The final group we will look at is holders of degrees in medicine, dentistry, veterinary and optometry, which shall be referred to as "Medical Degrees". Returns for this group are presented in Table 3f. At the aggregate level returns to a medical degree are quite similar for men and women (15.1 per cent for men vs. 15.9 per cent for women) and this similarity in returns across genders is observed for all detailed fields of study. Furthermore, there is very little variation in returns across fields of study. The only exceptions to this are the lower than average returns to degrees in veterinary medicine (7.4 per cent for men and 9.0 per cent for women) and to a lesser extent, optometry (13.4 per cent and 14.5 per cent for men and women, respectively).

Table 3f: Rates of Return – Medical Degrees, 1995

(*per cent*)

Field	Men	Women
Medical Degrees	15.1	15.9
Veterinary	7.4	9.0
Dentistry or Dental Medicine	15.8	15.4
General Practice Medicine	15.8	16.9
Medical Specialization non surgical	18.3	18.8
Paraclinical	16.2	12.9
Surgery	17.8	17.9
Optometry	13.4	14.5
Other	9.2	12.0
Other Health Professions, Sciences and Technologies	15.2	17.2

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.

Source: Author's calculations

7. Sensitivity to Changes in Tuition Fees

7.1 Introduction

In the previous section we observed that there is considerable heterogeneity in returns to investments in education, however, for most fields of study and levels of education, investments yield a positive return. The question arises as to how sensitive these results are to variations in tuition fees. Over the last decade, tuition fees at Canadian universities have increased sharply. What has been the impact on returns to university education? Are some of these investments no longer financially viable?

These questions may be addressed using more recent tuition fee data, specifically, data for the 2002-03 academic year. However, it is problematic to compare changes in fees between two academic years because many institutions report both lower and upper bounds on tuition fees for a given field of study. In the 1995-96 data, the reported range was very narrow and for this reason, only the average of the lower bounds on tuition fees were used to estimate rates of return. But, in the 2002-03 data, the reported range of tuition fees was substantially greater. Accordingly, it is instructive to examine three sets of tuition fees: the average across institutions of the lower bound on tuition fees in 1995-96 and the averages across institutions of both the lower and upper bounds on tuition fees in 2002-03. These data are presented in Table 4a. Consideration of these bounds allows us to document changes in tuition fees between these years and determine the sensitivity of computed rates of return to variations in costs.

7.2 Description of tuition fee increases.

As seen in Table 4a, between the 1995-96 and 2002-03 academic years, tuition fees increased substantially at Canadian universities. Moreover, these increases were not proportionately uniform across fields of study. Among four-year (non-medical) bachelor degree programs, the smallest increase in tuition fees was for persons studying agriculture. However, even these were substantial, with the average lower bound on tuition fees 21 per cent greater in 2002-03 than in 1995-96 and the average upper bound 40 per cent higher.[28,29] At the other extreme, the greatest increase in tuition fees for a four-year program was reported for fields in commerce – in 2002-03 the average lower bound was 42 per cent greater than in 1995-96 and the average upper bound was 66 per cent higher.

[28] Unless stated otherwise, values for tuition fees reported here include additional fees common to all full-time students.

[29] These figures represent the lower and upper bounds on tuition fees averaged across institutions. For a given institution, the range between lower and upper bounds may be greater or less than the corresponding range between average lower and upper bounds.

Table 4a: Average Tuition Fees at Major Canadian Universities, 1995-96 & 2002-03

Major Field	Tuition (includes additional fees)				
	1995-96	2002-03			
		Lower limit		Upper limit	
	Tuition ($ 1995)	Tuition ($ 1995)	*Inc. rel. to 1995-96 (per cent)*	Tuition ($ 1995)	*Inc. rel. to 1995-96 (per cent)*
Non-Medical Bachelor's Degrees					
Non-Science					
Education	2,728	3,503	*28.4*	3,959	*45.1*
Fine and Applied Arts	2,671	3,424	*28.2*	3,821	*43.1*
Humanities and Related	2,671	3,424	*28.2*	3,821	*43.1*
Social Science and Related	2,671	3,424	*28.2*	3,821	*43.1*
Law	2,792	4,358	*56.1*	5,307	*90.1*
Commerce, Mgt, Bus. and Admin.	2,646	3,770	*42.4*	4,381	*65.5*
Science					
Agricultural and Biological					
Agricultural	2,625	3,177	*21.0*	3,667	*39.7*
Biological	2,719	3,430	*26.1*	3,900	*43.4*
Engineering	2,860	3,777	*32.1*	4,320	*51.1*
Health Professions	2,719	3,430	*26.1*	3,900	*43.4*
Math and Physical Science	2,719	3,430	*26.1*	3,900	*43.4*
Medical Degrees					
Dentistry	3,348	5,839	*74.4*	9,980	*198.1*
Medicine	3,368	6,336	*88.1*	7,728	*129.4*
Graduate Degrees	2,710	3,151	*16.2*	5,813	*114.5*

Source: Tuition Fees and Living Accommodation Costs at Canadian Universities Survey, 1995-96 and 2002-03

Tuition increases for second bachelor's degrees were greater still. For example, tuition fees for law school increased between 56 per cent and 90 per cent (lower and upper bounds respectively) between 1995-96 and 2002-03. Even more dramatic were the tuition increases for medical degree programs. Relative to 1995-96, average lower bounds on tuition fees in 2002-03 increased by 74 per cent in medicine and 88 per cent in dentistry. The average upper bounds on tuition fees were commensurately higher – 129 per cent for medicine and a shockingly high 198 per cent for dentistry.[30] On the other hand, tuition

[30] See Frenette (2005) for an examination of the impact of the deregulation of tuition fees in Ontario professional programs in the late 1990s.

increases for graduate programs exhibited only a moderate increase at the lower bound (16 per cent) but a substantial increase at the upper bound (115 per cent).

However, tuition fees (including additional fees mandatory for all full-time students) are only one of the components of total costs. The other component, non-fee costs, is assumed to have remained constant between 1995-96 and 2002-03. Accordingly, increases in total costs between these years are of a lesser magnitude than increases in tuition fees alone. Data on total costs is present in Table 4b. For example, while tuition fees for a commerce program increased 42-66 per cent during this period, total costs only increased 26-40 per cent.

Table 4b: Average Total Costs at Major Canadian Universities, 1995-96 & 2002-03

Major Field	Total Costs (Tuition fees + Non-fee costs)				
	1995-96	2002-03			
		Lower limit		Upper limit	
	Costs ($ 1995)	Costs ($ 1995)	*Inc. rel. to 1995-96 (per cent)*	Costs ($ 1995)	*Inc. rel. to 1995-96 (per cent)*
Non-Medical Bachelor's Degrees					
Non-Science					
Education	4,481	5,256	*17.3*	5,712	*27.5*
Fine and Applied Arts	4,424	5,177	*17.0*	5,574	*26.0*
Humanities and Related	4,424	5,177	*17.0*	5,574	*26.0*
Social Science and Related	4,424	5,177	*17.0*	5,574	*26.0*
Law	4,545	6,111	*34.5*	7,060	*55.3*
Commerce, Mgt, Bus. and Admin.	4,399	5,523	*25.5*	6,134	*39.4*
Science					
Agricultural and Biological					
Agricultural	4,378	4,930	*12.6*	5,420	*23.8*
Biological	4,472	5,183	*15.9*	5,653	*26.4*
Engineering	4,613	5,530	*19.9*	6,073	*31.7*
Health Professions	4,472	5,183	*15.9*	5,653	*26.4*
Math and Physical Science	4,472	5,183	*15.9*	5,653	*26.4*
Medical Degrees					
Dentistry	5,101	7,592	*48.8*	11,733	*130.0*
Medicine	5,121	8,089	*57.9*	9,481	*85.1*
Graduate Degrees	4,463	4,904	*9.9*	7,566	*69.5*

Source: Tuition Fees and Living Accommodation Costs at Canadian Universities Survey, 1995-96 and 2002-03 and Porter and Porter and Jasmin (1987)

7.3 Sensitivity of Rate of Return Calculation to Variations in Tuition Fees

Computation of rates of return using the 2002-03 cost structure, together with the 1995 earnings data allows us to explore how sensitive returns are to variations in costs. The impacts of increased tuition fees may be seen in Tables 5a and 5b (men and women, respectively), which reproduce the estimated returns using the 1995-96 tuition data (presented in Table 2) together with estimates of returns computed using the 2002-03 tuition data. To determine the *maximum* impact of the tuition increase these estimates use averages of the upper bounds of the 2002-03 tuition data.

Inspection of these results reveals that use of 2002-03 tuition levels has relatively moderate impacts on estimates of rates of return. For no major field-education level combination does the higher tuition fees render a previously profitable investment unprofitable. The return to a bachelor's degree is reduced by no more than 1.7 percentage points, although total costs increased by as much as 40 per cent and tuition fees increased 66 per cent).[31] The maximum increase in tuition fees for graduate degrees was 115 per

Table 5a: Rates of Return by Major Field of Study, 1995 and 2002, Men
(per cent)

	Bachelor's		Master's		Ph.D.	
Field	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**
Total - Non-medical degrees *	9.9	9.3	4.1	3.2	1.3	0.8
Non-Science	9.1	8.5	7.0	5.6	0.0	-0.4
Education	5.4	5.0	9.4	8.0	4.0	3.1
Fine and Applied Arts	b	b	3.5	3.0	7.9	6.4
Humanities and Related	3.6	3.3	-6.0	-6.2	7.4	6.2
Social Science and Related	10.0	9.5	b	b	3.6	2.7
Commerce, Mgt, Bus. and Admin.	13.3	12.2	19.1	16.3	b	b
Science	11.5	10.7	1.2	0.8	1.7	1.2
Agricultural and Biological	4.9	4.6	0.7	0.2	6.8	5.7
Engineering	13.0	12.1	-3.9	-4.1	0.9	0.5
Health Professions	10.4	9.7	16.2	14.6	b	b
Math and Physical Science	11.9	11.1	-1.6	-1.8	2.9	2.3
Total - Medical Degrees	15.1	13.6				

Note: *'a' indicates that the group had insufficient aggregate points for identification.*
'b' indicates that the program did not converge to a solution.
** Non-medical degrees exclude degrees in medicine, dentistry, veterinary and optometry, but includes degrees in health professions such as nursing and physiotherapy.*

Source: Author's calculations

[31] RE explore the feasibility of a differential tuition fee scheme by computing tuition levels that would yield a 4.25 per cent rate of return to a bachelor's degree. Their results suggest the relationship between tuition increases and returns is of a magnitude similar to our findings.

cent, which increased total costs by 70 per cent, leading to a maximum reduction of the return to a master's degree of 3.7 p.p. and to a Ph.D. degree of 1.6 p.p.

The maximum increase in tuition fees was observed for medicine and dentistry, for whom total costs increased by 85 per cent and 130 per cent, respectively. However, even increases of this magnitude resulted in only moderate reductions in rates of returns (1.9 p.p. and 2.6 p.p., respectively).

Table 5b: Rates of Return by Major Field of Study, 1995 and 2002, Women

(per cent)

	Bachelor's		Master's		Ph.D.	
Field	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**
Total - Non-medical degrees *	12.1	11.2	8.6	7.2	4.3	3.4
Non-Science	11.8	10.8	9.6	8.1	3.4	2.6
Education	11.3	10.5	11.4	9.7	-0.2	-0.7
Fine and Applied Arts	4.4	3.9	1.3	0.8	7.7	6.6
Humanities and Related	10.0	9.3	3.8	3.1	5.1	4.1
Social Science and Related	11.7	10.9	6.2	5.1	7.8	6.4
Commerce, Mgt, Bus. and Admin.	15.9	14.2	23.1	19.5	2.1	1.4
Science	13.5	12.4	5.2	4.4	6.0	4.9
Agricultural and Biological	9.1	8.4	2.9	1.7	8.9	7.4
Engineering	13.9	12.6	-0.7	-1.1	b	b
Health Professions	15.5	14.4	8.2	7.1	7.1	6.2
Math and Physical Science	14.6	13.6	2.5	2.0	b	b
Total - Medical Degrees	15.9	14.0				

Note: 'a' indicates that the group had insufficient aggregate points for identification.
'b' indicates that the program did not converge to a solution.
** Non-medical degrees exclude degrees in medicine, dentistry, veterinary and optometry, but includes degrees in health professions such as nursing and physiotherapy.*

Source: Author's calculations

8. Conclusions and Future Work

This study has examined rates of return to different levels of university education by field of study. Results indicate that the heterogeneity in return across major fields of study reported in other studies extends within fields as well. At the bachelor's level, this is particularly noticeable for detailed fields within social sciences, agricultural-biological sciences and mathematics and physical sciences. At the master's and Ph.D. levels varying degrees of heterogeneity are observed. It is likely that this is influenced by the assumption that the alternative earnings series corresponds to the same field of study as the investment. It must be remembered that the rates of return associated with the completion of different bachelor's programs are relative to the common benchmark of high school completion. But, returns for graduate programs are relative to completion of the next lowest education level in the same field of study. Returns to medical degrees are remarkably similar across both gender and field of study. However, the return to a degree in veterinary medicine is roughly one-half that of other medical degrees. Returns to a degree in optometry are somewhat lower as well.

Rates of return to bachelor's degrees are found to be positive for all detailed fields of study; thus, from a strictly financial point of view, pursuing an undergraduate education is a sound investment. The same holds true for the vast majority of individuals pursuing graduate degrees. Pursuing a master's degree in commerce, management, business and administration pays off very handsomely. There are some fields for which a master's degree will not pay for itself, although individuals pursuing these fields comprise less than 4 per cent of our sample. Notably, for some fields such as social sciences, agricultural-biological sciences and math and physical sciences, the return to a Ph.D. degree often exceeds the return to a master's degree. Indeed, for these fields, the primary reward of obtaining a master's degree may be that it allows an individual to pursue a Ph.D. degree.

Use of the 2002-03 tuition fee data with the 1995 earnings data indicates that the recent increases in tuition fees has a noticeable, but not overwhelming, impact on rates of return. In general, no field that was profitable under the 1995-96 cost structure is rendered unprofitable despite the substantial increases in costs experienced between these time periods. Even degrees in the medical fields, with the greatest increases in tuition fees, exhibited only moderate declines in rates of return: 1.5 p.p. for medicine and 2.6 p.p. for dentistry.

It should be noted that the results in this work should be considered within the context of the assumptions involved in the analysis. Issues such as sample selection and the richness of the data must be taken into account when interpreting results. In particular, it must be remembered that the earnings profiles used to compute rates of return represent only an

expectation of what a person will earn at each stage of their life. In reality there is not a single earnings value corresponding to a particular age, but rather a distribution of earnings. Accordingly, there exists a distribution of rates of returns as well. Nevertheless, these results illustrate important differences in returns across university programs and provide a useful staring point for future work.

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Appendix

Table A1: Regression Results - Bachelor's Degree - Aggregate

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	5.9425 *	0.0872			6.4705 *	0.0772		
Age	0.2153 *	0.0045			0.1804 *	0.0041		
Age2	-0.0023 *	0.0001			-0.0020 *	0.0001		
* = Stat. Sig at 5% level	R^2 =	0.7183	N =	1858	R^2 =	0.7019	N =	1615

Table A2: Regression Results - Master's Degree - Aggregate

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	5.7574 *	0.1524			6.5854 *	0.1400		
Age	0.2224 *	0.0072			0.1728 *	0.0069		
Age2	-0.0023 *	0.0001			-0.0018 *	0.0001		
* = Stat. Sig at 5% level	R^2 =	0.4839	N =	1653	R^2 =	0.5017	N =	1278

Table A3: Regression Results - Ph.D. Degree - Aggregate

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	6.5132 *	0.2048			7.7225 *	0.3534		
Age	0.1749 *	0.0090			0.1187 *	0.0160		
Age2	-0.0016 *	0.0001			-0.0011 *	0.0002		
	R^2 =	0.4569	N =	1223	R^2 =	0.2782	N =	479

Table A4: Regression Results - Medical Degrees (incl. Dentistry, Veterinary & Optometry) - Aggregate

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	7.5394 *	0.3392			8.2034 *	0.4354		
Age	0.1695 *	0.0155			0.1288 *	0.0213		
Age2	-0.0017 *	0.0002			-0.0013 *	0.0003		
	R^2 =	0.3769	N =	308	R^2 =	0.2325	N =	220

Table A5: Regression Results - Bachelor's Degree - Major Fields

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	6.0176 *	0.0879			6.3512 *	0.0774		
Age	0.2067 *	0.0038			0.1827 *	0.0038		
Age2	-0.0022 *	0.0000			-0.0020 *	0.0000		
Field Variables	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**
Fine and Applied Arts	-0.5341 *	0.1431	0.0056	0.0037	-0.1660	0.0991	-0.0032	0.0026
Humanities and Related	-0.3626 *	0.0789	0.0076 *	0.0019	-0.0804	0.0582	0.0005	0.0015
Eng and Applied Science	0.0292	0.4309	-0.0022	0.0101	0.9594	1.1006	-0.0368	0.0324
Social Sciences	-0.2619 *	0.0687	0.0121 *	0.0017	0.0119	0.0522	0.0001	0.0014
Comm/Mgmt/Admin	0.1705 *	0.0695	0.0036 *	0.0017	0.5653 *	0.0643	-0.0118 *	0.0018
Agricultural/Biological	-0.2573 *	0.1046	0.0062 *	0.0027	-0.0469	0.0849	-0.0016	0.0023
Eng	0.1765 *	0.0691	0.0032	0.0017	0.5497 *	0.1341	-0.0136 *	0.0040
Health	0.1602	0.1299	0.0004	0.0032	0.4192 *	0.0664	-0.0075 *	0.0017
Math/PhySci	0.2663 *	0.0789	-0.0011	0.0020	0.2835 *	0.0918	-0.0043	0.0025
* = Stat. Sig at 5% level	R^2 =	0.8312	N =	1858	R^2 = 1	0.782	N =	1615

Table A6: Regression Results - Master's Degree - Major Fields

	Men				Women				
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**			
Constant	5.9170 *	0.1451			6.3904 *	0.1280			
Age	0.2125 *	0.0057			0.1809 *	0.0056	#		
Age2	-0.0022 *	0.0001			-0.0018 *	0.0001	#		
Field Variables	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**		**Field*Age Coef.**	**Std. Err.**
Fine and Applied Arts	-1.1457 *	0.2077	0.0178 *	0.0048	-0.5172 *	0.1540	#	0.0004	0.0037
Humanities and Related	-0.6291 *	0.1105	0.0090 *	0.0024	-0.2780 *	0.0832	#	0.0017	0.0019
Eng and Applied Science	-0.6716	0.7136	0.0114	0.0175	-2.4840	5.7032	#	0.0430	0.1316
Social Sciences	-0.2410 *	0.1060	0.0075 *	0.0023	0.0074	0.0794	#	-0.0024	0.0018
Comm/Mgmt/Admin	0.4615 *	0.1018	-0.0008	0.0022	0.8951 *	0.1011	#	-0.0156 *	0.0025
Agricultural/Biological	-0.4111 *	0.1622	0.0066	0.0037	0.1494	0.1435	#	-0.0101 *	0.0037
Eng	-0.0079	0.1044	0.0034	0.0023	0.4473 *	0.1795	#	-0.0161 *	0.0048
Health	-0.3231	0.1650	0.0184 *	0.0037	0.2782 *	0.1045	#	-0.0052 *	0.0025
Math/PhySci	-0.1190	0.1201	0.0038	0.0027	-0.0663	0.1418	#	0.0000	0.0035
* = Stat. Sig at 5% level	R^2 =	0.752	N =	1653	R^2 = 1	0.7285	# N =	1278	

Table A7: Regression Results - Ph.D. Degree - Major Fields

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	6.9045 *	0.2921			7.0400 *	0.4354		
Age	0.1645 *	0.0097			0.1422 *	0.0169		
Age2	-0.0016 *	0.0001			-0.0013 *	0.0002		
Field Variables	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**
Fine and Applied Arts	-1.0282 *	0.3939	0.0170 *	0.0081	-1.1853 *	0.5618	0.0221	0.0123
Humanities and Related	-0.7984 *	0.2276	0.0150 *	0.0045	-0.1928	0.2665	0.0030	0.0055
Eng and Applied Science	0.1930	0.7994	-0.0135	0.0173	(dropped)		(dropped)	
Social Sciences	-0.1432	0.2229	0.0048	0.0044	0.3965	0.2578	-0.0064	0.0054
Comm/Mgmt/Admin	0.3520	0.3328	-0.0047	0.0068	1.1932	0.6896	-0.0205	0.0164
Agricultural/Biological	-0.4687 *	0.2291	0.0095 *	0.0046	0.4095	0.3003	-0.0096	0.0066
Eng	-0.3494	0.2204	0.0090 *	0.0044	2.4925 *	0.9947	-0.0675 *	0.0270
Health	-0.2012	0.2296	0.0105 *	0.0046	0.1863	0.2857	0.0021	0.0062
Math/PhySci	-0.4650 *	0.2125	0.0107 *	0.0042	0.8744 *	0.3411	-0.0218 *	0.0078
* = Stat. Sig at 5% level	R^2 =	0.5470	N =	1223	R^2 =	0.4224	N =	479

Table A8: Regression Results - Bachelor's Degree - Detailed Fields

	Men				Women			
Variable	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	5.9140 *	0.0686			6.4168 *	0.0671		
Age	0.2121 *	0.0030			0.1792 *	0.0033		
Age2	-0.0023 *	0.0000			-0.0019 *	0.0000		
Field Variables	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**
Fine and Applied Arts	-0.5269 *	0.1101	0.0054	0.0028	-0.1674 *	0.0849	-0.0031	0.0022
Humanities and Related	-0.3587 *	0.0607	0.0075 *	0.0015	-0.0828	0.0498	0.0005	0.0013
Economics	0.0039	0.0782	0.0072 *	0.0020	0.4710 *	0.1218	-0.0110 *	0.0034
Geography	-0.1340	0.1056	0.0042	0.0028	-0.1096	0.1416	0.0021	0.0040
Law and Jurisprudence	-0.4575 *	0.0851	0.0248 *	0.0020	-0.1382	0.1148	0.0146 *	0.0032
Politics Sciences	0.1785	0.0943	-0.0014	0.0025	0.0842	0.1154	-0.0013	0.0034
Psychology	-0.3573 *	0.0964	0.0089 *	0.0025	-0.0878	0.0668	0.0007	0.0018
Sociology	0.0253	0.1073	0.0000	0.0028	0.0177	0.0804	-0.0010	0.0022
Social Work	0.2300	0.2114	-0.0074	0.0052	0.2104 *	0.1038	-0.0061 *	0.0027
Other Social Sciences	-0.1433	0.1240	0.0033	0.0033	-0.2754 *	0.1027	0.0050	0.0028
Business/Commerce	0.1135	0.0650	0.0059 *	0.0016	0.5774 *	0.0821	-0.0120 *	0.0023
Financial Mgmt	0.2564 *	0.0682	0.0019	0.0017	0.6167 *	0.0825	-0.0129 *	0.0023
Industrial Mgmt	0.1153	0.1015	0.0019	0.0026	0.3224 *	0.1216	-0.0048	0.0035
Institutional Mgmt	(dropped)		0.0068	0.0195	-0.0452	1.0167	0.0075	0.0213
Marketing	0.3954 *	0.1316	-0.0033	0.0036	0.7175 *	0.1719	-0.0155 *	0.0053
Secretarial	-0.1825	0.6425	0.0048	0.0154	-0.0550	0.2904	-0.0050	0.0072
Other Comm/Mgmt/Admin	0.4129	0.4028	-0.0113	0.0111	0.3675	0.5022	-0.0122	0.0163
Agricultural	0.0692	0.1394	-0.0019	0.0033	0.2590	0.2377	-0.0111	0.0067
Biochemistry	-0.4029 *	0.1989	0.0117 *	0.0055	-0.1430	0.2375	0.0048	0.0070
Biology	-0.4322 *	0.1091	0.0111 *	0.0029	-0.2292 *	0.1090	0.0034	0.0031
Botany	-0.0215	0.7462	-0.0100	0.0202	-0.2955	0.5126	0.0008	0.0147
Veterinary	-2.0465	1.9348	0.0452	0.0454	-6.6009 *	3.3101	0.2285	0.1260
Zoology	-0.3480	0.2769	0.0075	0.0070	-0.0974	0.3219	-0.0018	0.0092
Other Agricultural	0.1466	0.3786	-0.0048	0.0103	0.1679	0.1220	-0.0066 *	0.0031
Aeronautical/ Aerospace Eng	-0.2236	0.3136	0.0090	0.0082	-1.3035	8.7487	0.0751	0.3572
Bio/Chem Eng	0.1800	0.1336	0.0067 *	0.0032	0.6994 *	0.2911	-0.0136	0.0086
Civil Eng	-0.0549	0.0917	0.0073 *	0.0022	0.7243 *	0.2859	-0.0194 *	0.0085
Design/Systems Eng	0.4809	0.8763	-0.0016	0.0268	-0.9099	2.8960	0.0548	0.1005
Electrical/Electronics Eng	0.4060 *	0.0795	-0.0018	0.0020	1.0140 *	0.3233	-0.0221 *	0.0100
Industrial/Manuf Eng	0.7168 *	0.2341	-0.0115	0.0061	1.1627	0.7102	-0.0326	0.0221
Mechanical Eng	0.3103 *	0.0834	0.0010	0.0021	1.0076 *	0.3635	-0.0251 *	0.0113
Mining/Metal/Petrol Eng	0.0322	0.1725	0.0107 *	0.0041	0.1672	0.8957	0.0080	0.0277
Resource/Environ Eng	-0.0785	0.2257	0.0018	0.0062	0.1945	0.4730	-0.0124	0.0161
Eng	0.0642	0.2727	0.0051	0.0069	-1.3915	2.3313	0.0549	0.0844
Eng, n.e.c.	0.2056 *	0.0905	0.0041	0.0022	0.6027 *	0.3053	-0.0112	0.0089
Other Eng and App	-0.1486	0.1093	0.0061 *	0.0026	-0.1158	0.2377	-0.0010	0.0069
Eng and Applied Science	0.0235	0.3313	-0.0021	0.0078	0.9489	0.9424	-0.0365	0.0277
Dentistry	-1.4760 *	0.7022	0.0344	0.0192	-2.6521 *	1.2771	0.0775	0.0411
Genl Prac Med	-1.7935 *	0.4447	0.0417 *	0.0118	-2.3668 *	0.5580	0.0557 *	0.0161
Medl Spec non surg	0.3367	1.7436	-0.0086	0.0538	-1.7541	0.9787	0.0339	0.0313
Paraclinical	-2.1692	1.5499	0.0670	0.0559	0.2462	2.0730	-0.0114	0.0766
Surgery	(dropped)		(dropped)		(dropped)		(dropped)	
Nursing	0.3193	0.2719	-0.0088	0.0071	0.2965 *	0.0709	-0.0048 *	0.0017
Optometry	(dropped)		(dropped)		(dropped)		-0.0290	0.0378
Other	0.5334 *	0.1196	-0.0058 *	0.0029	0.8094 *	0.0880	-0.0162 *	0.0023
Other Health	-0.0023	0.2668	-0.0017	0.0075	-0.1105	0.2125	0.0035	0.0058
Actuarial Science	0.3422	0.3081	0.0102	0.0091	0.0292	0.7387	0.0209	0.0251
App Math	0.7122 *	0.0945	-0.0122 *	0.0026	0.5931 *	0.1665	-0.0081	0.0048
Chemistry	-0.1702	0.1275	0.0083 *	0.0030	-0.0412	0.1869	-0.0002	0.0049
Geology	0.3661 *	0.1637	-0.0027	0.0040	0.1656	0.3735	-0.0034	0.0106
Math Stats	0.3142	0.4595	-0.0082	0.0131	-0.1841	0.5935	0.0111	0.0185
Math	0.1584	0.1235	0.0019	0.0030	0.2323	0.1649	-0.0027	0.0042
Physics	-0.1409	0.1445	0.0062	0.0035	-0.5863	0.3758	0.0147	0.0104
Other Math/PhySci	-0.2151	0.1139	0.0078 *	0.0028	-0.1170	0.1422	0.0019	0.0037
* = Stat. Sig at 5% level	R^2 = 0.9048		N = 1858		R^2 = 0.8489		N = 1615	

Table A9: Regression Results - Master's Degree - Detailed Fields

	Men				Women			
Variable	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	5.8984 *	0.1169			6.4012 *	0.1168		
Age	0.2133 *	0.0046			0.1804 *	0.0052		
Age2	-0.0022 *	0.0000			-0.0018 *	0.0001		
Field Variable	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**
Fine and Applied Arts	-1.1434 *	0.1653	0.0177 *	0.0038	-0.5181 *	0.1375	0.0004	0.0033
Humanities and Related	-0.6274 *	0.0880	0.0090 *	0.0019	-0.2786 *	0.0744	0.0017	0.0017
Economics	-0.0120	0.1262	0.0051	0.0029	0.3695 *	0.1772	-0.0091 *	0.0045
Geography	-0.4897 *	0.2156	0.0103 *	0.0050	-0.1376	0.2898	-0.0018	0.0074
Law and Jurisprudence	-0.0751	0.1411	0.0139 *	0.0032	-0.0313	0.1958	0.0063	0.0049
Politics Sciences	-0.3116 *	0.1573	0.0063	0.0038	0.0944	0.1897	-0.0057	0.0050
Psychology	-0.4958 *	0.1587	0.0089 *	0.0035	-0.0735	0.1064	-0.0022	0.0025
Sociology	-0.7875 *	0.2119	0.0148 *	0.0048	-0.0362	0.1730	-0.0024	0.0042
Social Work	-0.1402	0.2074	0.0021	0.0043	0.0961	0.1132	-0.0035	0.0026
Other Social Sciences	-0.3586 *	0.1547	0.0069	0.0036	-0.2119	0.1509	-0.0001	0.0037
Business/Commerce	0.4168 *	0.0893	0.0024	0.0020	0.8941 *	0.1201	-0.0138 *	0.0031
Financial Mgmt	0.6660 *	0.1202	-0.0063 *	0.0027	1.0759 *	0.1938	-0.0214 *	0.0051
Industrial Mgmt	0.0962	0.1366	0.0021	0.0030	0.6842 *	0.1562	-0.0128 *	0.0039
Institutional Mgmt	0.3162	0.4674	-0.0014	0.0105	0.7042 *	0.3065	-0.0105	0.0072
Marketing	0.4396 *	0.2159	-0.0018	0.0052	0.8926 *	0.3346	-0.0176	0.0095
Secretarial	6.2901	5.2845	-0.1115	0.0950	(dropped)		(dropped)	
Other Comm/Mgmt/Admin	(dropped)		0.0053	0.0173	3.4022 *	1.6382	-0.1069 *	0.0429
Agricultural	-0.0840	0.2321	-0.0016	0.0053	0.5090	0.3846	-0.0220 *	0.0105
Biochemistry	-0.3903	0.3772	0.0060	0.0097	0.0674	0.3179	-0.0057	0.0083
Biology	-0.5957 *	0.1767	0.0116 *	0.0043	-0.0646	0.1825	-0.0042	0.0047
Botany	-1.1468	0.8670	0.0194	0.0203	0.6328	0.5447	-0.0282 *	0.0140
Veterinary	0.0778	0.7954	-0.0005	0.0179	-0.3068	0.9303	0.0070	0.0247
Zoology	-0.3485	0.3127	0.0047	0.0071	0.0525	0.5180	-0.0109	0.0139
Other Agricultural	-0.7752	0.7648	0.0156	0.0191	0.5750 *	0.2721	-0.0194 *	0.0067
Aeronautical/ Aerospace Eng	0.3814	0.3458	-0.0041	0.0085	(dropped)		(dropped)	
Bio/Chem Eng	0.0655	0.1965	0.0035	0.0046	0.3590	0.4278	-0.0117	0.0120
Civil Eng	-0.3193 *	0.1342	0.0094 *	0.0030	0.6674	0.4053	-0.0233 *	0.0109
Design/Systems Eng	1.1608	1.6528	-0.0273	0.0430	(dropped)		0.0255	0.0186
Electrical/Electronics Eng	0.1676	0.1239	0.0003	0.0029	0.4382	0.3539	-0.0147	0.0095
Industrial/Manuf Eng	0.1612	0.4618	-0.0038	0.0118	1.9852	1.8767	-0.0555	0.0529
Mechanical Eng	-0.1278	0.1448	0.0052	0.0033	0.5304	0.5187	-0.0180	0.0138
Mining/Metal/Petrol Eng	-0.2941	0.2517	0.0131 *	0.0058	0.5632	1.1308	-0.0208	0.0303
Resource/Environ Eng	0.3675	0.2830	-0.0110	0.0070	0.0530	0.4626	-0.0032	0.0129
Eng	0.0977	0.4754	0.0015	0.0113	-6.3679	6.4706	0.1967	0.2057
Eng, n.e.c.	0.4726 *	0.1372	-0.0043	0.0031	0.5696	0.4893	-0.0139	0.0132
Other Eng and App	-0.5834 *	0.1694	0.0110 *	0.0038	0.1326	0.3295	-0.0123	0.0086
Eng and Applied Science	-0.6677	0.5678	0.0113	0.0139	-2.4841	5.0931	0.0430	0.1175
Dentistry	-0.1007	0.4688	0.0149	0.0101	0.4410	0.8948	-0.0080	0.0225
Genl Prac Med	0.0663	0.2054	0.0154 *	0.0046	0.4812	0.3090	0.0003	0.0077
Medl Spec non surg	-1.4875 *	0.6347	0.0502 *	0.0156	-1.7141 *	0.5067	0.0506 *	0.0134
Paraclinical	0.1635	0.9589	-0.0117	0.0278	-1.1114 *	0.5302	0.0177	0.0144
Surgery	0.1342	0.7326	0.0158	0.0176	(dropped)		(dropped)	
Nursing	0.1788	1.0526	-0.0047	0.0225	-0.0069	0.1636	0.0002	0.0036
Optometry	(dropped)		0.0145	0.0103	115.7912 *	29.9467	-3.1740 *	0.8226
Other	0.3663	0.2510	-0.0056	0.0059	0.6860 *	0.1308	-0.0161 *	0.0033
Other Health	-0.8773 *	0.2352	0.0286 *	0.0058	-0.1364	0.2442	0.0023	0.0064
Actuarial Science	-1.4933	0.9783	0.0358	0.0229	(dropped)		(dropped)	
App Math	0.4686 *	0.1509	-0.0082 *	0.0037	0.3542	0.2692	-0.0076	0.0071
Chemistry	-0.4467 *	0.2010	0.0095 *	0.0045	0.0088	0.2444	-0.0029	0.0060
Geology	-0.0626	0.1977	0.0029	0.0046	0.9868 *	0.4556	-0.0294 *	0.0126
Math Stats	-0.1221	0.3430	0.0026	0.0081	0.4094	0.5879	-0.0069	0.0161
Math	-0.5487 *	0.2012	0.0128 *	0.0044	-1.0288 *	0.2730	0.0212 *	0.0065
Physics	-0.6838 *	0.1802	0.0150 *	0.0042	-1.8162 *	0.4520	0.0387 *	0.0105
Other Math/PhySci	-0.3842	0.2123	0.0078	0.0048	0.0901	0.3077	-0.0072	0.0077
* = Stat. Sig at 5% level	R^2 = 0.8514		N = 1653		R^2 = 0.7974		N = 1278	

Table A10: Regression Results - Ph.D. degree - Detailed Fields

	Men				Women			
Variable	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Constant	6.8482 *	0.2666			6.8601 *	0.4276		
Age	0.1668 *	0.0090			0.1500 *	0.0167		
Age2	-0.0016 *	0.0001			-0.0014 *	0.0002		
Field Variables	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**
Fine and Applied Arts	-1.0214 *	0.3551	0.0169 *	0.0073	-1.1637 *	0.5322	0.0216	0.0116
Humanities and Related	-0.7948 *	0.2052	0.0149 *	0.0040	-0.1833	0.2525	0.0028	0.0053
Economics	-0.2872	0.2688	0.0119 *	0.0054	1.0356	0.8320	-0.0204	0.0197
Geography	-0.7082	0.4055	0.0154	0.0082	-1.7250	1.2741	0.0411	0.0293
Law and Jurisprudence	0.5070	0.4054	-0.0087	0.0084	0.8830	0.8803	-0.0169	0.0212
Politics Sciences	-0.5079	0.3734	0.0110	0.0076	-0.4163	0.8224	0.0090	0.0190
Psychology	0.2834	0.2337	-0.0038	0.0047	0.5478 *	0.2596	-0.0090	0.0055
Sociology	-0.5806	0.3464	0.0130	0.0069	-0.0092	0.4208	0.0011	0.0091
Social Work	1.1256	2.0543	-0.0224	0.0421	-0.7948	1.2304	0.0169	0.0248
Other Social Sciences	-0.9408 *	0.3437	0.0160 *	0.0069	0.0719	0.4422	-0.0011	0.0092
Business/Commerce	0.1740	0.3644	-0.0009	0.0074	1.0394	0.7118	-0.0166	0.0167
Financial Mgmt	0.7235	0.5869	-0.0091	0.0124	(dropped)		0.0113	0.0065
Industrial Mgmt	0.0539	0.6436	-0.0002	0.0133	2.7332	1.9406	-0.0559	0.0460
Institutional Mgmt	(dropped)		(dropped)		(dropped)		(dropped)	
Marketing	3.0654 *	1.0360	-0.0760 *	0.0240	(dropped)		-0.0026	0.0107
Secretarial	(dropped)		(dropped)		(dropped)		(dropped)	
Other Comm/Mgmt/Admin	(dropped)		(dropped)		(dropped)		(dropped)	
Agricultural	-0.4186	0.3514	0.0074	0.0072	0.1307	1.8142	-0.0009	0.0465
Biochemistry	-0.3108	0.2852	0.0075	0.0059	0.6833	0.3737	-0.0158	0.0082
Biology	-0.6614 *	0.2368	0.0139 *	0.0049	0.0412	0.3589	0.0003	0.0083
Botany	-0.5781	0.4539	0.0131	0.0092	-1.1435	5.0421	0.0182	0.1329
Veterinary	-0.4029	0.6441	0.0103	0.0140	(dropped)		0.0115	0.0110
Zoology	-0.3927	0.3787	0.0067	0.0078	2.2837 *	0.9754	-0.0539 *	0.0218
Other Agricultural	0.5944	0.5885	-0.0180	0.0120	0.7030	0.6472	-0.0156	0.0149
Aeronautical/ Aerospace Eng	0.0540	0.7741	0.0008	0.0169	(dropped)		(dropped)	
Bio/Chem Eng	-0.2638	0.2830	0.0084	0.0059	(dropped)		(dropped)	
Civil Eng	-0.8409 *	0.2888	0.0187 *	0.0060	-40.1438	21.2899	1.2023	0.6354
Design/Systems Eng	(dropped)		-0.0081	0.0086	(dropped)		(dropped)	
Electrical/Electronics Eng	-0.3204	0.2480	0.0093	0.0052	3.2333 *	1.2918	-0.0872 *	0.0366
Industrial/Manuf Eng	-0.4465	1.6046	0.0115	0.0337	(dropped)		(dropped)	
Mechanical Eng	-0.4294	0.2783	0.0103	0.0059	(dropped)		(dropped)	
Mining/Metal/Petrol Eng	-0.2644	0.4359	0.0097	0.0088	(dropped)		0.0014	0.0100
Resource/Environ Eng	-1.2997 *	0.6387	0.0272	0.0153	(dropped)		-0.0301 *	0.0095
Eng	0.7884	1.1313	-0.0124	0.0318	(dropped)		(dropped)	
Eng, n.e.c.	-0.0127	0.2888	0.0013	0.0059	(dropped)		(dropped)	
Other Eng and App	-0.1017	0.4201	0.0015	0.0087	3.8483	3.5154	-0.0884	0.0830
Eng and Applied Science	0.1994	0.7204	-0.0136	0.0156	(dropped)		(dropped)	
Dentistry	3.1190 *	1.0973	-0.0696 *	0.0259	(dropped)		(dropped)	
Genl Prac Med	0.3823	0.2896	0.0044	0.0058	0.6356	0.4192	-0.0010	0.0095
Medl Spec non surg	-0.1884	0.4100	0.0143	0.0089	-1.7352 *	0.6568	0.0476 *	0.0145
Paraclinical	-1.2193 *	0.4062	0.0259 *	0.0086	0.1045	0.8935	-0.0038	0.0238
Surgery	0.9189	0.5207	-0.0032	0.0101	(dropped)		(dropped)	
Nursing	(dropped)		-0.0409 *	0.0120	-0.2041	0.9183	0.0042	0.0189
Optometry	(dropped)		0.0048	0.0068	(dropped)		(dropped)	
Other	0.6152	0.3331	-0.0131	0.0073	0.7027	0.4295	-0.0120	0.0103
Other Health	-0.1298	0.2466	0.0050	0.0051	0.2896	0.3531	-0.0022	0.0079
Actuarial Science	(dropped)		0.0152	0.0080	(dropped)		(dropped)	
App Math	-0.3199	0.2848	0.0079	0.0062	1.0827	0.8435	-0.0274	0.0214
Chemistry	-0.4071	0.2135	0.0099 *	0.0043	1.1204 *	0.3611	-0.0275 *	0.0084
Geology	-0.2350	0.2577	0.0054	0.0052	0.4301	1.0371	-0.0088	0.0249
Math Stats	-0.6452	0.6559	0.0120	0.0142	(dropped)		0.0058	0.0126
Math	-0.5806 *	0.2628	0.0131 *	0.0054	0.6967	1.2498	-0.0129	0.0291
Physics	-0.6576 *	0.2234	0.0148 *	0.0045	0.6113	0.7126	-0.0197	0.0176
Other Math/PhySci	-0.3445	0.3278	0.0080	0.0066	-1.8506	1.6186	0.0363	0.0379
* = Stat. Sig at 5% level	R^2 = 0.6565		N = 1223		R^2 = 0.545		N = 479	

Table A11: Regression Results - Med. Degrees (incl. Dentistry, Veterinary & Optometry) - Detailed Fields

	Men				Women			
Variables	**Coef.**	**Std. Err.**			**Coef.**	**Std. Err.**		
Constant	7.7686 *	0.2306			8.4857 *	0.3281		
Age	0.1700 *	0.0098			0.1309 *	0.0149		
Age2	-0.0019 *	0.0001			-0.0017 *	0.0002		
Field Variables	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**	**Field Coef.**	**Std. Err.**	**Field*Age Coef.**	**Std. Err.**
Veterinary	-0.9409 *	0.2191	0.0088	0.0049	-0.4528	0.3192	0.0005	0.0087
Gen Prac Med	-0.5219 *	0.1307	0.0150 *	0.0029	-0.7682 *	0.2012	0.0267 *	0.0052
Med Spec non surg	-0.2409	0.2212	0.0128 *	0.0048	-0.9859 *	0.3082	0.0384 *	0.0075
Paraclinical	-0.7794	1.1590	0.0234	0.0227	-4.5164	2.4551	0.1169	0.0602
Surgery	-0.5608 *	0.2290	0.0210 *	0.0049	-0.8342	0.4829	0.0312 *	0.0124
Nursing	(dropped)		(dropped)		(dropped)		(dropped)	
Optometry	0.2375	0.3083	-0.0122	0.0070	-0.3248	0.5077	0.0077	0.0143
Other	-1.1634 *	0.2889	0.0180 *	0.0067	-0.5997	0.4794	0.0102	0.0126
Other Health	-0.5467	0.3370	0.0144	0.0075	0.1236	0.5336	0.0006	0.0135
* = Stat. Sig at 5% level	R^2 = 0.7761		N = 308		R^2 = 0.6944		N = 220	