

Private Returns to Canadian University Education: 1991, 2001, 2011

by

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I. Introduction

Understanding the rate of return for a university degree provides valuable information for both individuals and policy makers. University education is an investment, and it is important for individuals to understand the lifetime return for each incremental investment in their education. To fully understand the financial value of further education, it is not enough to simply measure the increase in wages that a university degree will provide. This needs to be balanced against the costs of attending university. If the benefits of a particular education plan do not outweigh the costs, then it does not make financial sense an individual to pursue such a course of action. The decision to attend university, and what to study, can have a huge impact on an individual's earning future. This means it is important for individuals to be as informed as possible about the future returns to their education when making decisions about their education. This project measures the financial benefits through calculating the internal rates of return to university education.

This paper is broken into the following sections: literature review, methodology, data, results, comparisons to previous literature, and conclusion. It will look at the rates of return for university education at the bachelor's, master's, medical school, and PhD level. It will also look at the rates of return to different areas of study at the bachelor's, master's, and PhD level; as there is significant heterogeneity within each level of education, and between. This study is done using Canadian census data from the years 1991, 2001, and 2011 to track changes in returns to university education over this period.

II. Literature Review

For private returns to education, the costs and benefits used in the calculations are private costs and private benefits. The costs associated with attending university are tuition fees, non-tuition fees, and supplies such as textbooks. The private benefits of attending university are the

difference in post-tax income, compared to what they would earn at the previous education level. For total returns, the operating costs of the university (per student) would also be included, and the benefits would be total income rather than post-tax (the government benefits through taxation from the individuals higher wages). If there are no indirect social benefits to the education, then social return and total return would be equal. If there are any indirect benefits, then social return is equal to total return plus the indirect benefits.

Determining the value to education by a change in wages is relatively straightforward, but education can have other indirect socio-economic impacts, such as political involvement, informed decision making, better health outcomes, improvements of communities, etc. These benefits may affect the individual, community, or both. However, these types of benefits are not accounted for in this paper, because of the difficulty of measuring such variables within this type of project.

In “Total and Private Returns to University Education in Canada”, Herb Emery summarizes the results of twenty studies that calculate Canadian returns to education from the 1960s to the 2000s. Over this period, private returns to undergraduate education have typically been over 10%, and women’s returns have been higher than men’s.¹

There are several papers that all follow the same basic methodology for calculating the IRR of university education. Those papers are: Francois Vaillancourt, “The Private and Total Returns to Education, 1985” (1995); Francois Vaillancourt and Sandrine Bourdeau-Primeau, “The Returns to University Education in Canada, 1990 and 1995” (2002), Herb Emery and Kelly Ann Rathje, “Returns to University Education in Canada Using New Estimates of Program Costs” (2002), and Alan Stark’s Department of Finance working paper, “Which Fields Pay, Which

¹ Herb Emery, ‘Total and Private Returns to University Education in Canada: 1960 to 2000 and in Comparison to Other Postsecondary Training’ in Higher Education in Canada, eds. C. M. Beach, R. W. Boadway, & R. M. McInnis (2005), 97-99

Fields Don't? An Examination of the Returns to University Education in Canada by Detailed Field of Study" (2007). These papers all look at the returns to university education in Canada, but Vaillancourt (2002) also looks at public school and community college returns. Below is a summary of their results for private returns to bachelor's degrees.

Table 1
Summary of Literature Results for Private Returns to Bachelor's Degrees

Author (year of publication)	Year of study	Private Returns to Bach	
		Female	Male
Vaillancourt (1995)	1985	18.8%	8.3%
Stager (1996)	1990	17.6%	13.8%
Vaillancourt & Bourdeau-Primeau (2002)	1990	19%	16%
	1995	20%	17%
Emery & Rathje (2002)*	1992	-	-
Stark (2007)**	1995	12.1%	9.9%
	2002	11.2%	9.3%

Sources: publications mentioned above by author and year of publication

*Emery & Rathje only calculated IRRs by field of study level

** Stark's IRR calculations for 2002 used 2002 tuition data, but still used 1995 earnings data

From this summary of results, several patterns are apparent. Firstly, the private rate of returns to a bachelor's is a consistently good investment, significantly above a 4.25% rate of return to capital.² Secondly, rates of return for women are higher than for men. In "Total and Private Returns to University Education in Canada: 1960 to 2000 and in Comparison to Other Postsecondary Training", Emery suggests that pattern is probably due to the upward bias of assuming full-time employment for women from graduation until retirement, the comparatively higher education premium for women compared to men, and lower taxation due to lower average wages.³ Lastly, there is a significant amount of variation within the results. The most significant is between Stark (2007) and Vaillancourt & Bourdeau-Primeau's (2002) estimation of 1995 private returns. There are minor methodological differentiations between the two that explain in

² This value is taken from Kelly Ann Rathje and Herb Emery, "Returns to University Education in Canada Using New Estimates of Program Costs" in *Renovating the Ivory Tower*, ed. David Laidler (Toronto: C.D. Howe Institute, 2002), 245 and will be used as a benchmark value in this paper as to judge the quality of returns.

³ Emery, "Total and Private Returns to University Education in Canada", 99

part the differences between the two sets of results, but also illustrates how estimations of returns to education can be varied.

The basic framework of these studies is consistent. They use ordinary least squares regression of logged earnings on the covariates: age, age squared, ‘field of study’, and ‘field of study’ x age (Emery and Rathje do not include the interaction term). Since they were using OLS, they did not include negative or zero incomes. They also all used census public use microdata, except for Stark (2007), who used 1996 full census data.

This paper does not make any accommodation for ability differences across degrees. The reader is encouraged to come to their own conclusions about how ability differences between populations may affect the results.

III. Methodology

IRRs

In financial terms, the value of education can be determined using the internal rate of return method, or IRR.

$$\text{IRR} = r^* \text{ such that } \sum_{i=1}^N \frac{(A_i - B_i - C_i)}{(1 + r)^i} = 0 \quad (1)$$

N = number of years since the initial investment (age of retirement minus age at enrollment)
r = discount rate such the present cost of education is equal with the present value of its benefits.

A = earnings with the degree

B = earnings from previous level of education

C = associated costs

While completing the degree, A_i is the income earned while studying: for bachelor’s level, this is working during the summer months, and for graduate students, it is the work as TAs and RAs. B_i is forgone wage (earned at the previous education rate). C_i refers to additional costs associated with being a student, ie tuition, non-tuition fees, books and supplies.

After completing the degree, $A_i - B_i$ is the difference in earnings from the two different degree levels, and C_i is zero.

These IRR calculations are done for degree type, at the different quantiles. Therefore, each degree and field of study has three IRR calculations, with earning profiles calculated from the 20th, 50th, and 80th quantiles of each sub-sample. Tuition, fees, and cost of supplies are constant for these calculations, but the opportunity cost changes, as does the alternate wages after graduation. As a result, the IRR changes.

If the returns to education are lower than the expected interest rates, then it would make financial sense to simply put the costs of education into an investment that provides a steady return, rather than to pursue the degree. This assumes that the individual only values the education for the financial return it provides.

The IRRs are also calculated without tuition fees, to remove of changings in tuition fees. By removing tuition fees, which have changed significantly over time, we remove the effects these changes have had on the rates of return. Non-tuition fees and supply costs are still included, but together they are much smaller than tuition fees alone. Without the effects of changing tuition, it is more apparent how the labour market effects the returns to university degrees.

Earnings Regressions

The earnings from different levels of education are estimated using quantile regression. These regressions are done using data from the 1991 census, 2001 census, and 2011 NHS. These earnings are run through the Canadian Tax and Credit Simulator, or CTaCS.

This program calculates provincial and federal taxes based on total income (which I define as wages and self-employed income). Taxes are subtracted from total income to give post-tax earnings. Ontario provincial tax rates are assumed for all individuals, similar to the previous literature.

$$\text{Post-tax Earnings} = \text{Total Income (: wages + self-employed earnings) – Provincial taxes – Federal Taxes} \quad (2)$$

Post-tax earnings are then adjusted to 2011 real dollars. Taking these real post-tax earnings for a given gender and degree level, quantile regression can be run to estimate the effects of age, age squared, and field of study on earnings. The expression for these regressions is given below in equation 3. These regressions are run at the degree level (high school, bachelor's, master's, PhD, and medical school) without the bracketed terms, and also with the bracketed terms for bachelor's, master's, and PhD degrees.

$$Q_t(\ln \text{realearnings}) = B_0(t) + B_1(t)Age + B_2(t)Age^2 + [\sum_{i=1}^9 B_{i3}(t) \text{Field of Study} + \sum_{i=1}^9 B_{i4}(t) \text{Field of Study} \times Age] \quad (3)$$

t = specific quantile

From the regressions results, we can construct estimations of life-time earnings by degree and field of study. Using these life-time earning profiles, we can find the difference in earnings between degrees, and use these to find the IRR of university education.

Since this project is using quantile regression rather than OLS, negative and zero real earnings do not need to be dropped.⁴ To include them, these incomes are changed to '1', as once they are logged, they become a '0'. In this form, they are included in the regression samples.

Degrees and Length of Study

For this project, there are some assumptions that need to be made about the length of programs. Firstly, we assume that high school students at age 18 either decide to enter the work force, or pursue further study. If they pursue a university education, each level of degree will be pursued consecutively (if the student wishes to continue their studies at the master's level, they will do so

⁴ Negative incomes are due to self-employed individuals who reported a negative income. Zero incomes can be due to individuals being unemployed, or out of the labour pool (such as early retirees, or stay at home parents).

immediately after finishing their bachelor's.) The table below describes the length of each degree.

Table 2
Length of Study by Degree Program

Program	Length of Program (Years)	Age of Individuals while Studying
Bachelor's *	4	18-21
Medical School	4	22-25
Master's	2	22-23
Ph.D.	5	24-28

*B. Ed. takes 5 years instead of 4.

Note that while a PhD is designed to be completed in four years (or even less for a small number of individuals), the typical PhD student takes at least five years. The length of study for PhD students is heterogeneous across degree programs (for example, engineering and health science students are typically quicker to their degrees than social science and humanities students).⁵ For simplicities sake, this project uses a five year length of program across all fields.

The bachelor's in education is a special case. While categorized as a bachelor's degree, they are professional degrees typically taken after another bachelor's program is already completed. For this reason, we are treating the B. Ed. as a five year program, with a four year general bachelor's followed by one year of B. Ed. study. This also means that the master's and PhD degrees are started one year later than for other fields of study.

Forgone & Alternative Earnings

Forgone earnings are the opportunity cost of attending university: they are the income the individual would have received from working instead of studying. The forgone earnings are calculated as the income the individual would have received based on their education level

⁵ "Characteristics of Doctoral Graduates" Statistics Canada, last modified February 18, 2013, <https://www150.statcan.gc.ca/n1/pub/81-595-m/2008069/5800013-eng.htm>

before pursuing the incremental degree: for an undergraduate student, their forgone earnings are of a high school graduate.

When looking at a specific field of study, the same approach is used, but with the forgone earnings of the specific field being used. This is not possible at the bachelor's level, as a high school graduate is not assumed to have a field of study. At the graduate level, the forgone earnings of the same field of study are used: a master's of science student's forgone earnings are that of a bachelor's of science graduate, and a PhD in science student's forgone earnings are that of a master's of science graduate. For medical students, the forgone earnings are that of a basic bachelor's degree.

Alternative earnings are used to calculate the wage difference that the university education bestows. The same methods are used as with forgone earnings, regarding both degree level and field of study.

Earnings while studying

Undergraduate students are assumed to be studying for 8 months of the year, and working during the summer. Therefore, they earn $1/3^{\text{rd}}$ of a high school graduate's yearly income during their studies. Graduate students are assumed to be working as teaching and research assistants while completing their studies. Therefore, while they are assumed to be studying all year round, they earn $1/2$ the income of their previous degree level: a master's student earns $1/2$ the yearly income of a bachelor's graduate, and a PhD student earns $1/2$ the yearly income of a master's graduate. This is based off of the methodology of Emery and Rathje.⁶

There are two exceptions to these assumptions. MBA students are professional rather than academic students, and so they are not given TA and RA positions. For medical school students,

⁶ Rathje and Emery, "Returns to University Education in Canada", 244

they are assumed to be focusing on their studies even during their summer break, and do not earn an income during the summer months.

Example of IRR calculation:

Male Bachelor of Science, 50th quantile, 2011

$$\sum_{i=1}^{46} \frac{(EarnMaleBachScience_i - EarnMaleHighSchool_i - Cost\ of\ Studying_i)}{(1 + r)^i} = 0$$

At age 18, in year one of studying, the total costs of tuition, fees, and supplies would be \$6,869. The income he would have earned from working would have been \$6,464, but he does earn 1/3 of this total from working in the summer. The IRR calculation for this year would be:

$$\frac{(2,155 - 6,464 - 6,869)}{(1 + r)^1} = \frac{-11,178}{(1 + r)^1}$$

At age 40, or year 23 of the IRR calculation, his earnings with his Bachelor of Science are \$57,931. His alternate earnings as a high school graduate are \$22,049. As he is no longer studying, his costs are zero. The IRR calculation for this year would be:

$$\frac{(57,931 - 22,049 - 0)}{(1 + r)^{23}} = \frac{35,882}{(1 + r)^{23}}$$

Sum the earning differences from year 1 to 46 and solving for ‘r’, will give the internal rate of return to the degree. In this example, ‘r’ equals 13.4%.

IV. Data

The data used in this study comes from the 1991 Canadian Census, Individuals; the 2001 Canadian Census, Individuals; and the 2011 National Household Survey. The majority of the previous literature used the public use microdata files of the census, but using the full census data allows for greater accuracy by field of study (detailed in the next section).

The life-time earning profiles are estimated for each year independently, for estimating the returns to university education in that year. Using cross-sectional data in this manner assumes that the future earnings of individuals is accurately represented by the current earnings of the

older working population. This is an issue common to this type of project and is present across the previous literature.

Field of Study

The definitions for field of study come from the different censuses, but the definitions change between the years. The 1991 and 2001 censuses both used the same structure of “Major Field of Study”, but the 2011 National Household Survey used the new “Classification of Instructional Programs” definitions. The Statistics Canada concordance tables that define how areas of study change across the variables do not provide a method of defining these categories. This required creating my own definition for ‘Field of Study’, by going through the MFS from 1991 and 2001 censuses, and CIP2000 from NHS 2011, to create a system myself. The categories are very close to the definitions used by the literature and are given below in Table 1. There are some variations between the structuring given by Statistics Canada, and so the full definitions of each category are given in Appendix A with the coding system for each census.

Table 3
Fields of Study

Education	General Education, Primary School, Special Ed., Counselling, Recreation Services
Fine Arts	Fine Arts, Music, Performing Arts, Visual Arts
Humanities	Classics, History, Language Studies, Philosophy, Religious Studies
Social Sciences	Economics, Political Science, Psychology, Law, Social Work, Anthropology
Business	Business, Commerce, Finance, Industrial Management, Administration, Marketing
Agriculture	Agricultural Science and Technologies
Sciences	Chemistry, Biology, Physics, Mathematics, Computer Science
Engineering	Engineering, Architecture, Applied Technologies, Trades
Health Sciences	Medical Studies, Nursing, Public Health, Rehabilitation, Applied Health Sciences

Due to low cell counts, and RDC requirements for income-related counts, it was necessary to drop the observations that did not sort into the field of study categories. Dropping these observations should have a minimal impact on the regression results, since they were a very

small portion of the total counts. For master's and PhD level regression with field of study variables included, education serves as the base case

Tuition, Fees, and Supplies

Tuition data came from Statistics Canada's Tuition and Living Accommodation Costs Survey (TLAC), Table 8. Since the TLAC uses the same Stats Can categorization of field of study, some adjustments needed to standardize tuition rates across fields of study. Additional compulsory fees also came from the TLAC. Below are average tuition fees by degree level, tuition fees by field of study, and non-tuition fees. The percentage change in the fees across years is also given. In the case of Table 5, the percentage changes are presented in table 5B. All prices are adjusted to 2011 real dollars.

Table 4
Weighted Average Tuition Fees, by degree level

	1991	2001	2011	% change from 1991 to 2001	% change from 2001 to 2011
Bachelor's	\$2,470	\$4,385	\$5,813	78%	33%
Graduate	\$2,634	\$5,513	\$5,450	109%	-1%
Medicine	\$3,003	\$9,144	\$11,313	204%	24%

Source: TLAC 2011/2012, Table 8

Table 5A
Tuition Fees, by degree and FOS

	1991		2001		2011	
	Bachelor's	Graduate	Bachelor's	Graduate	Bachelor's	Graduate
Education	\$2,311	\$2,311	\$3,569	\$3,569	\$3,804	\$5,089
Fine Arts	\$2,488	\$2,488	\$4,238	\$4,238	\$4,591	\$4,409
Humanities	\$2,482	\$2,482	\$4,259	\$4,259	\$4,769	\$4,336
Social Sciences	\$2,482	\$2,482	\$4,259	\$4,259	\$4,656	\$4,556
Business	\$2,355	\$2,355	\$4,335	\$4,335	\$5,673	\$22,823*
Agriculture	\$2,428	\$2,428	\$3,943	\$3,943	\$4,961	\$4,769
Sciences	\$2,508	\$2,508	\$4,349	\$4,349	\$5,514	\$5,674
Engineering	\$2,567	\$2,567	\$4,629	\$4,629	\$6,155	\$5,175
Health Sciences	\$2,508	\$2,508	\$4,349	\$4,349	\$5,247	\$5,632

*: for PhD Business, tuition is \$7,932

Source: TLAC 2011/2012, Table 8

a: for 1991 and 2001, Fine Arts tuition fees come from 'Music. For 2011, Fine Arts tuition comes from "Visual and Performing Arts & Comm. Technologies".

b: for 1991 and 2001, Humanities and Social Sciences come from 'Arts'.

c: for 1991 and 2001, business tuition comes from 'Commerce'. For 2011, bachelor's level Business tuition comes from 'Business Management and Public Administration'. For master's level Business, 'Regular MBA' tuition is used For PhD business, 'Business Management and Public Administration is used'. This is done to differentiate between the MBA which is a professional degree, and the PhD Business which is academic.

d: for 2011, Science tuition comes from the average of 'Physical and Life Sciences and Technologies' and 'Math., Computer and Information Sciences'.

e: for Health Science tuition comes from 'Physical and Life Sciences and Technologies'

Note: For the years 1991 and 2001, the TLAC does not have separate values for bachelor's and graduate level tuition by field of study.

Table 5B

Percentage Change in Tuition Fees

	% change from 1991 to 2001		% change from 2001 to 2011	
	Bachelor's	Graduate	Bachelor's	Graduate
Education	54%	54%	7%	43%
Fine Arts	70%	70%	8%	4%
Humanities	72%	72%	12%	2%
Social Sciences	72%	72%	9%	7%
Business	84%	84%	31%	426%
Agriculture	62%	62%	26%	21%
Sciences	73%	73%	27%	30%
Engineering	80%	80%	33%	12%
Health Sciences	73%	73%	21%	30%

Source: author's calculations

Table 6

Additional compulsory fees, by degree

	1991	2001	2011	% change from 1991 to 2001	% change from 2001 to 2011
Bachelor's	\$430	\$566	\$820	32%	45%
Graduate	\$446	\$582	\$747	31%	28%

Source: TLAC 2011/2012, Table 10

The TLAC reports tuition fees from the basis of an eight-month academic year.⁷ This means that as master's and PhD students are also studying during the summer months, they pay 1.5 times the reported tuition above.

For supplies costs, I was unable to find a consistent source for all years. University estimates of textbooks and supplies are very high, likely due to the university assuming that students both purchase the textbooks for all courses, and pay the full price of a new book. The amount that

⁷ Statistics Canada. "Tuition and Living Accommodation Costs for Fulltime Students at Canadian Degree Granting Institutions - Survey Respondent Guide, Academic Year 2011-2012", (Ottawa: Statistics Canada, 2011), 8

students actually pay is significantly lower. From the Statistics Canada “Survey of Household Spending”, in 2001 the median amount spend on textbooks and supplies at the post-secondary level was \$600 (current dollars).⁸ While similar numbers are not able to be found for 1991 and 2011, this project is using this number as a base mark for 1991, 2001, and 2011 (adjusted for inflation).

Descriptive Statistics

Table 6 has the weighted counts of the sample populations by degree and year. As can be seen, the number of women with university degrees has increased enormously. The number of women with bachelor’s degrees has increased by 64% from 1991 to 2001, and 54% from 2001 to 2011. Medical degrees have increased by close to 20,000 each decade. Master’s degrees increased very consistently: by 88% from 1991 to 2001, and 83% from 2001 to 2011. PhD returns more than doubled across both ten years spans. For men, bachelor’s degrees close to doubled over the twenty year period. Medical degrees increased by close to 11,000 from 1991 to 2011. Master’s degrees increased from 229,650 in 1991 to 326,880 in 2001, and 468,000 in 2011. PhDs increased at a steady rate of close to 20,000 across both decades.

Table 7
Counts by degree and year

	Female			Male		
	1991	2001	2011	1991	2001	2011
High School	2,409,110	2,553,650	2,921,780	2,025,400	2,288,360	2,823,230
Bachelor's	733,350	1,202,860	1,848,400	770,340	1,068,120	1,470,820
Medicine	22,140	39,870	62,220	57,010	64,540	68,140
Master's	141,190	265,260	485,430	229,650	326,880	468,000
PhD	15,360	31,550	63,240	58,970	78,130	99,280

Source: 1991 Census, 2001 Census, 2011 NHS

In 1991, men dominated the number of university degrees across all types. By 2011, there were more women with bachelor’s degrees and master’s degrees, and close to as many medical

⁸ Joseph Berger, Anne Motte, and Andrew Parkin, eds. “The Price of Knowledge: Access and Student Finance in Canada – Fourth Edition”, (Montreal: The Canada Millennium Scholarship Foundation, 2009), 100

degrees. The number of men with every type of university degree has increased, but the rate of growth for women has been much faster.

The counts for each degree by field of study are given below, in table 8-10.

Table 8
Bachelor's - Counts by FOS and year

	Female			Male		
	1991	2001	2011	1991	2001	2011
No FOS	2,200	8,540	890	1,220	3,240	440
Education	186,970	267,130	312,700	84,340	107,710	95,980
Fine Arts	30,230	47,710	73,990	17,140	27,290	42,980
Humanities	107,460	162,410	299,100	75,370	98,160	179,580
Social Sciences	161,610	260,440	371,680	164,910	207,070	236,460
Business	78,740	159,450	295,220	137,430	201,450	308,020
Agriculture	4,770	8,470	13,770	11,290	13,740	18,010
Sciences	69,710	122,010	184,930	115,530	172,260	239,740
Engineering	14,290	41,210	75,710	145,600	210,510	308,760
Health Sciences	77,370	125,490	220,420	17,510	26,700	40,840

Table 9
Master's - Counts by FOS and year

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	32,990	57,490	82,970	36,270	42,010	37,250
Fine Arts	4,960	8,300	14,350	4,570	6,400	9,340
Humanities	27,090	41,420	67,390	29,810	35,930	45,190
Social Sciences	34,090	57,830	100,060	44,910	54,670	63,630
Business	12,330	33,120	76,720	39,730	67,930	124,440
Agriculture	970	1,900	3,980	2,310	2,960	5,150
Sciences	11,990	26,730	56,980	26,910	44,370	71,770
Engineering	4,450	13,330	29,090	37,060	60,380	93,260
Health Sciences	12,330	25,120	53,890	8,060	12,230	17,970

Table 10
PhD - Counts by FOS and year

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	1,590	3,440	4,500	3,470	3,860	2,760
Fine Arts	340	800	1,290	730	920	1,320
Humanities	2,980	4,910	7,690	7,970	9,160	10,020
Social Sciences	4,110	7,820	15,000	10,470	12,280	14,000
Business	250	810	2,280	1,490	2,300	3,580
Agriculture	150	380	830	980	1,290	1,930
Sciences	3,340	7,120	15,650	19,990	26,450	34,200
Engineering	400	1,270	3,340	7,650	12,990	18,350
Health Sciences	2,190	5,000	12,660	6,220	8,890	13,130

Sources: 1991 Census, 2001 Census, and 2011 NHS

V. Results

The regression results used to predict life-time earnings and calculate the internal rate of return to university education are included in the Appendices B-D (organized by quantile). Below the IRR results are presented and discussed. The IRRs are presented by the quantiles they were created from. In order: 50th quantile IRRs, 20th quantile IRRs, then 80th quantile IRRs. The IRRs without tuition are then presented, in the same order.

The 50th quantile results are the most useful for comparing with the previous literature, and the most important for understanding the trends. While the 20th and 80th quantile hold useful information about how different quantiles are effected differently, the 50th quantile IRRs are the set of results that should be given the most importance, and are the set used compare with the previous literature.

IRRs from 50th Quantile Results

The private rates of return at the 50th quantile for general university degrees are given in table 11. From these tables, we can see that returns to a bachelor's degree are very high for both men and women. Women's bachelor's returns fell very slightly from 17.9% in 1991 to 16.4% in 2011, but mostly steady, as are the men's returns. Women's bachelor's returns were consistently higher than men's, ranging from 3.9% higher in 1991, to 1.8% higher in 2011.

Table 11
Private Rates of Return - all years, by Degree
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Bach	17.9%	16.9%	16.4%	14.0%	13.7%	14.6%
Master's	9.4%	6.9%	6.7%	4.5%	4.5%	2.1%
PhD	6.1%	4.3%	3.9%	5.4%	3.5%	3.1%
Medicine	15.7%	9.9%	7.8%	16.6%	11.9%	7.8%

Source: author's calculations from 50th quantile regression results

At the master's level, returns for both genders, were significantly lower than the bachelor's returns, although the women's returns still had a higher rate than the men's. This reduction from

the bachelor's return is due to the elevated opportunity. From 1991 to 2001, women's return dropped 9.4% to 6.9%, but only fell to 6.7% in 2011. For men, returns stayed constant at 4.5% in 1991 and 2001, but dropped to 2.1% in 2011. PhD returns were lower than master's returns for women, with men's PhD exceeding master's return in 1991 and 2011.

Using 4.25% as a benchmark rate of return, bachelor's degrees consistently exceeded this point by a large margin. Graduate studies were significantly closer to this point, and frequently lower. Master's degrees for women from all years exceeded 4.25%, but women's PhD returns fell below this threshold in 2011. For men, master's and PhD returns were above or equal to this point in 1991, but in 2011, neither were.

For medical degrees, there was a significant fall in returns from 1991 to 2011, for both genders. The returns of 7.8% in 2011 were still quite good, but are less than half of what they were in 1991. Medical degrees still offered higher returns than master's or PhD. When broken down by field of study, we see that most bachelor's degrees (table 12) gave a positive investment across all years. Women's returns for all fields of study across all years had returns higher than 4.25%. Fine arts was the only field that failed to meet this mark for men, for all years. The returns for fine arts were the lowest for both genders, with negative or undefined (so negative that the calculation did not reach a solution) returns for men, and between 4.8% to 5.5% for women. Business and engineering were both consistently high for both genders across all years, while for women, health sciences was also very high. In contrast, health sciences for men was below the general rate of return to a bachelor's degree. Men's returns to a humanities' bachelors were significantly lower than the general returns, but still positive. Social sciences had a very strong return for both genders, although these returns were likely inflated by the inclusion of law degrees. Bachelor's of education had good returns for both genders across all years. For women in 2011, education had the 3rd highest returns across all fields of study. These results may appear

surprising to some readers, but education has consistently had strong ordinal returns in the previous literature. The disparity between the very high women's return's to health science and the low men's might be due to the higher portion of women in nursing.

At the master's level (table 13), we see significant differences between men and women for certain fields of study. For the humanities, women saw the rates of return to a master's degree fall from 10.4% in 1991, to 5.9% in 2001, and 4.9% in 2011. While a significant decrease, it still was still above the benchmark of 4.25%. For men, the humanities' rates of return were just above 0 for all years. The returns to a master's in engineering for both genders in 1991 were negative, and while they increased for women to 6.4% in 2001 and 6.8% in 2011, they continued to be negative for men. The master's in education had very strong returns for both genders across all years. For women, returns fell from 14.7% in 1991 to 9.9% 2011, but it was still the highest rate of return for any field of study in 2011. Health sciences had good returns for both genders, although men's health science returns fell from 12.2% in 1991 (when it had the highest returns) to 5.5% in 2011. This still made it, along with education, as the only two fields of study with returns in excess of 4.25% in 2011.

One of the most significant changes across the years is in the master's in business. In 1991, the returns for women and men were 17.1% and 11.5% respectively, and in 2001 they were 12.8% and 12.0%. In 2011, they fell to 4.5% for women, and 2.4% for men. This drastic change is greatly influenced by Statistics Canada's changes to the TLAC. Between the 2001 census, and the 2011 NHS, Statistics Canada switched from the Major Field of Study system for defining area of study, to the Classification of Instructional Program system. During this change, the TLAC changed their system of recording tuition rates as well. With the CIP transition, the TLAC gains a new category for MBA, rather than just 'commerce' as they did before. This means that

the 1991 and 2001 returns were calculated with much lower tuition rates than 2011. This change in returns is discussed further in the returns without tuition section.

Table 12
Private Rates of Return to Bachelor's Degree, by year and FOS
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	16.4%	15.9%	16.9%	10.5%	11.3%	13.9%
Fine Arts	5.0%	4.8%	5.5%	-1.9%	-	-
Humanities	12.8%	12.5%	13.0%	5.1%	5.4%	7.9%
Social Sciences	17.0%	16.4%	16.6%	12.7%	13.4%	13.6%
Business	23.7%	21.5%	18.4%	19.2%	18.4%	16.4%
Agriculture	11.1%	13.2%	12.9%	9.3%	13.9%	12.9%
Sciences	17.4%	14.3%	13.0%	15.5%	14.9%	13.4%
Engineering	25.1%	16.6%	15.8%	21.7%	19.5%	17.9%
Health Sciences	22.6%	20.1%	21.1%	10.8%	11.7%	12.5%

Table 13
Private Rates of Return to Master's Degree, by year and FOS
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	14.7%	11.6%	9.9%	11.5%	13.9%	11.6%
Fine Arts	5.7%	4.1%	-1.8%	5.4%	0.8%	-7.9%
Humanities	10.4%	5.9%	4.9%	0.6%	0.5%	0.4%
Social Sciences	12.1%	9.0%	7.3%	4.4%	2.6%	2.8%
Business	17.1%	12.8%	4.5%	11.5%	12.0%	2.4%
Agriculture	-	-1.2%	2.3%	4.1%	-1.4%	-8.6%
Sciences	4.8%	3.7%	3.9%	0.4%	-1.8%	-5.5%
Engineering	-1.3%	6.4%	6.8%	-1.5%	-0.2%	-1.0%
Health Sciences	7.9%	8.4%	5.5%	12.2%	7.0%	5.5%

Table 14
Private Rates of Return to PhD, by year and FOS
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	1.8%	0.5%	2.3%	3.2%	1.9%	1.6%
Fine Arts	8.1%	8.9%	12.5%	12.2%	8.9%	10.2%
Humanities	8.5%	6.3%	8.3%	9.7%	7.3%	9.4%
Social Sciences	9.3%	5.8%	8.5%	5.9%	5.2%	6.6%
Business	3.7%	-	1.0%	0.9%	-0.3%	4.1%
Agriculture	15.6%	6.9%	11.1%	7.8%	13.2%	3.0%
Sciences	7.5%	7.3%	5.5%	6.9%	6.2%	5.7%
Engineering	8.7%	5.2%	5.1%	5.0%	5.2%	5.1%
Health Sciences	3.9%	-2.3%	0.7%	-0.6%	1.9%	3.2%

Sources: author's calculations from 50th quantile regression results
Note: (-) indicates the IRR calculation was undefined

At the PhD level (table 14), the fields of study in that meet the 4.25% return rate for all years were fine arts, humanities, social sciences, sciences, and engineering, for both genders. For women alone, agriculture also meets the 4.25% return .

There were three fields of study that never have good returns for either gender at the PhD level: education, business, and health sciences. Education returns remained above zero, but were never close to reaching 4.25%. Business returns were low, and are in fact negative for both genders in 2001. This is due to the very high opportunity cost of not working with a master's of business. Health Sciences, which had consistently good master's returns, had low or negative returns for both genders, in all years. Both education and health sciences had strong returns at the master's level for all three years, as did business with the exception for men in 2011. This suggests that studying at the PhD level in these fields does not open many new options for increased wages, after already completing their master's degrees

For men, the only instance of a field of study meeting the 4.25% rate of return across the bachelor's, master's, and PhD levels, is social sciences in 1991. For women in 1991, fine arts, humanities, social sciences and sciences all had good returns at bachelor's, master's and PhD levels. In 2001, humanities, social sciences, and engineering did, and in 2011, humanities, social sciences, and engineering had good returns at bachelor's, master's and PhD. While there are other instances of good PhD returns, these are the only examples where it is clearly a good marginal investment at every degree level.

IRRs from 20th Quantile Results

Looking at IRR calculations from the 20th quantile regressions (table 15), the returns to bachelor's degrees were consistently high with women's returns exceeding men's. For women, returns of the bachelor's degree from the 20th quantile were higher than the median. This result is not too surprising considering that the 20th quantile of women high school graduates were not

working, reducing the opportunity costs.⁹ For men, the 20th quantile returns for a bachelor's were similar to the median returns in 1991, but were higher in 2001 and 2011. Women's bachelors return fell almost 7% from 1991 to 2011, while men's returns decreased slightly from 1991 to 2001, but increased by 5% in 2011.

Table 15
Private Rates of Return - all years, by degree
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Bach	24.2%	18.9%	17.5%	14.1%	12.3%	17.3%
Master's	5.3%	1.4%	-0.8%	3.3%	-0.7%	-6.2%
PhD	7.8%	2.6%	-1.7%	6.3%	1.3%	2.3%
Medicine	9.7%	2.5%	-1.2%	13.0%	6.2%	1.2%

Source: author's calculations from 20th quantile regression results

At the 20th quantile graduate level, the results are significantly different. For the 50th quantile, men's master's returns were low but positive. For the 20th quantile returns, they were similar in 1991 (3.3%), but negative in 2001 and 2011. For women, the 1991 returns were 5.3%, but fell to 1.4% and then -0.8%. PhD returns for both genders were above the 4.25% mark in 1991, but both fell by close to 5% to 2001. In 2011, female PhD returns are negative, while men's were only at 2.3%.

Looking at the rates of return by FOS at the 20th quantile, there were some interesting and confusing results. At the bachelor's level (table 16), education for both genders continued to have very high returns. Bachelor's in fine arts for men were undefined for all three years. For women, the returns for a bachelor's of business fell from over 30% in 1991 to 16.7% in 2011, which still made it one of the highest returns to a bachelor's, but was a significant decrease. Women's returns continued to be much higher than men's for health sciences. The return to a bachelor's in engineering for women also fell significantly: from 23.8% in 1991 to 4.2% in 2001

⁹ In the 20th regression tables, female high school graduates in 1991 and 2001 have very low coefficients for age, age squared, and the constant, as these only represent the negative provincial income tax they earned. In 2011, there was no negative income tax, so they have coefficients of zero for all independent variables.

and 6.0% in 2011. This gave engineering the lowest return of any women's bachelor's for these years. This may suggest that a significant number of women with a bachelor's of engineer exited the work force, or were working outside their field.

At the graduate level (table 17 and 18), there are a significant number of negative and undefined degrees. The only field of study with a consistently good returns for both men and women is education. Engineering has consistently negative returns for men. For women, there is an interesting flip across the value of a master's and PhD in engineering. In 1991, the master's had negative returns, but exceptionally high returns to the PhD. In 2001, both had positive returns, but below the 4.25% threshold. In 2011, the engineering master's returns increased to 4.8%, but the PhD returns had fallen to -0.3%. Health Science PhD returns for women were negative or undefined for all three years. For both genders, a large number of PhDs have good returns, but in 2011, there only a few of them continue to have good returns.

Table 16
Private Rates of Return to Bachelor's Degree, by year and FOS
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	23.1%	20.8%	20.7%	16.1%	16.0%	22.3%
Fine Arts	13.5%	11.2%	9.0%	-	-	-
Humanities	18.7%	13.7%	13.1%	4.4%	3.2%	15.2%
Social Sciences	23.0%	20.0%	19.9%	14.4%	13.1%	18.8%
Business	30.4%	21.9%	16.7%	21.8%	16.5%	17.1%
Agriculture	14.8%	19.1%	14.2%	-	12.9%	9.4%
Sciences	20.3%	14.2%	9.3%	15.6%	12.2%	14.3%
Engineering	23.8%	4.2%	6.0%	21.0%	11.8%	14.7%
Health Sciences	29.4%	23.4%	20.9%	10.2%	8.1%	8.6%

Table 17
Private Rates of Return to Master's Degree, by year and FOS
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	11.3%	9.0%	4.7%	8.6%	6.2%	6.7%
Fine Arts	1.6%	-0.7%	-7.2%	5.8%	-4.7%	-5.0%
Humanities	6.7%	5.4%	0.6%	1.7%	-0.6%	1.8%
Social Sciences	8.2%	4.8%	0.5%	1.8%	-2.0%	-0.2%
Business	9.2%	3.2%	-3.5%	6.2%	0.5%	-7.3%
Agriculture	-	-5.4%	-	3.5%	-	-
Sciences	-1.0%	-4.4%	-3.4%	-1.4%	-	-7.8%
Engineering	-3.5%	2.3%	4.8%	-3.0%	-7.3%	-6.9%
Health Sciences	3.6%	4.0%	4.9%	2.7%	1.3%	4.6%

Table 18
Private Rates of Return to PhD, by year and FOS
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	4.4%	-	-3.6%	2.2%	2.1%	0.0%
Fine Arts	4.4%	3.0%	10.5%	11.0%	10.3%	8.0%
Humanities	9.5%	4.8%	7.0%	11.3%	6.1%	5.8%
Social Sciences	11.4%	6.5%	8.5%	9.3%	3.6%	5.8%
Business	17.3%	-	-6.4%	1.3%	1.2%	-4.3%
Agriculture	-	-	13.3%	9.7%	13.9%	1.2%
Sciences	7.2%	5.7%	3.7%	11.2%	8.9%	4.2%
Engineering	19.5%	3.5%	-0.3%	9.6%	4.9%	7.2%
Health Sciences	-9.1%	-	-	0.8%	-4.8%	-

Sources: author's calculations from 20th quantile regression results
Note: (-) indicates the IRR calculation was undefined

IRRs from 80th Quantile Results

From table 19, we can see the general IRRs for each degree from the 80th quantile regression results. Once again, bachelor's degrees for both genders had strong returns, with women's returns a few percentage points above men's. Both genders saw an increase in bachelor's returns from 1991 to 2001, and minor changes in 2011. Women's master's fell slightly from 10.8% in 1991 to 8.2% in 2011, which remained very good, particularly for graduate returns. Men's master's returns were undefined in 1991, but increased in 3.9% in 2001, and 5.3% in 2011, which is a significant increase. PhD returns for both were low, with women's returns close to 3%, and men's closer to zero.

Table 19
Private Rates of Return - all years, by degree
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Bach	17.3%	18.8%	18.9%	12.5%	15.7%	15.5%
Master's	10.8%	8.8%	8.2%	-	3.9%	5.3%
PhD	3.2%	2.5%	3.1%	1.3%	0.4%	0.6%
Medicine	15.2%	13.2%	11.4%	18.4%	14.7%	10.6%

Source: author's calculations from 80th quantile regression results

Medical degrees saw a consistent downward trend for both genders, although the magnitude of the change is more significant for men. Men's returns to a medical degree were 18.4% in

1991, but fell to 10.6% by 2011. Women's returns were 15.2% in 1991, and fell to 11.4% in 2011, half the decline in returns men had. Men's returns were higher in 1991 and 2001, but fell below women's in 2011.

Looking at women's bachelor's degree returns by field of study (table 20), business, engineering and health sciences offered the highest returns, as they did at in the 50th quantile returns. These three fields all had returns above 20% for all three years. Fine arts had the lowest returns for all years, but was still significant 4.25%. For men, business and engineering had the two highest rates of return, again the same as for the 50th quantile. Social sciences, sciences, and health sciences were in the second tier of returns and fine arts was again the lowest rate of return. Education was interestingly low for men, with rates below 4.25% in 1991 and 2001, while rising to 8.2% in 2011. A bachelor's in education was ordinarily higher compared to the other fields of study in the returns from the 50th quantile, compared to the 80th. This may suggest that there is a ceiling on earnings for men with a bachelor's in education.

Looking at master's returns (table 21), there were some very clear patterns for men. Education, business, and health sciences all yielded a good rate of return across all three years, and in fact no other area of study meet the 4.25% rate for any year. The other areas of study frequently give negative returns, or only slightly above zero. For women, education, social sciences, business, and health sciences gave good returns for all three years. Social sciences offered very high returns across all years: the 3rd highest in 1991, 4th highest in 2001, and the single highest in 2011. It is interesting that social sciences gave such strong returns for women here, but they failed to do so for men. Fine arts was the only field that never reached the 4.25% mark in any year, although it comes close in 1991 and 2011. Fine arts was also the only field of study to not yield a good rate of return for women in 2011.

Table 20
Private Rates of Return to Bachelor's Degree, by year and FOS
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	14.3%	14.3%	15.2%	1.1%	3.5%	8.2%
Fine Arts	9.9%	10.3%	8.4%	-0.7%	-1.0%	0.0%
Humanities	14.2%	16.0%	14.1%	3.4%	6.6%	8.0%
Social Sciences	16.5%	18.2%	17.8%	11.9%	14.1%	14.2%
Business	21.1%	23.3%	20.5%	14.1%	18.2%	17.0%
Agriculture	15.3%	17.0%	16.7%	6.2%	10.1%	14.1%
Sciences	19.3%	18.8%	16.3%	12.0%	16.6%	14.1%
Engineering	24.3%	24.6%	22.7%	15.7%	19.6%	18.1%
Health Sciences	22.0%	22.7%	25.0%	11.9%	13.9%	16.0%

Table 21
Private Rates of Return to Master's Degree, by year and FOS
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	12.1%	7.7%	9.5%	9.0%	10.3%	8.5%
Fine Arts	4.0%	2.7%	4.1%	3.1%	0.9%	-0.9%
Humanities	7.5%	3.3%	8.4%	-11.6%	-3.2%	-6.0%
Social Sciences	11.8%	7.2%	10.0%	-	-3.9%	1.4%
Business	12.9%	13.2%	6.7%	10.5%	16.9%	6.6%
Agriculture	-4.6%	3.9%	7.6%	-6.0%	0.5%	-2.9%
Sciences	4.2%	0.5%	6.6%	-4.7%	-0.4%	-0.5%
Engineering	2.6%	1.7%	5.1%	-11.4%	1.9%	-1.8%
Health Sciences	8.3%	7.5%	6.1%	15.7%	14.7%	10.1%

Table 22
Private Rates of Return to PhD, by year and FOS
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	0.2%	2.3%	2.6%	2.6%	2.9%	3.4%
Fine Arts	7.7%	7.3%	10.3%	5.1%	6.9%	9.8%
Humanities	4.2%	3.8%	4.8%	6.4%	4.1%	7.0%
Social Sciences	4.0%	4.1%	4.9%	0.5%	1.1%	2.6%
Business	-	-3.2%	1.2%	-6.3%	-8.3%	2.7%
Agriculture	11.8%	5.6%	5.5%	4.8%	6.9%	4.0%
Sciences	3.6%	4.1%	4.3%	2.3%	1.5%	3.8%
Engineering	1.4%	5.2%	3.0%	1.3%	-1.6%	2.4%
Health Sciences	4.9%	3.9%	4.5%	-1.1%	-	4.2%

Sources: author's calculations from 80th quantile regression results

Note: (-) indicates the IRR calculation was undefined

At the PhD level (table 22), fine arts was the only field that offers good returns for both genders across all years. For women, agriculture fell from 11.8% in 1991, to 5.6% in 2001, and 5.5% in 2011, which were still good returns. For men, it gave good returns in 1991 and 2001, and is at 4.0% in 2011. Men's humanities gave good returns in 1991 and 2011. Interestingly,

men’s health sciences improved from negative and undefined returns in 1991 and 2001 to 4.2% in 2011, very close to the 4.25% mark. For the 80th quantile rates of return, almost all degrees and field of study for women gave a return above 4.25% in 2011: all bachelor’s degrees did, only fine arts did not at the master’s level, and only education, business and engineering did not at the PhD level.

No Tuition

The IRR calculations were also run without tuition costs. Non-tuition fees and the cost of supplies were still included.

IRRs from 50th Quantile Results (No Tuition)

We can see the private returns without tuition to general degrees in table 23. Comparing private returns with and without tuition, we can see that removing tuition increased returns to bachelor’s degrees for women by an additional 4.9% in 1991, 8.0% in 2001, and 7.9% in 2011. For men, removing tuition increased return by an additional 3.1% in 1991, 5.0% in 2001, and 5.6% in 2011. Part of the reason for increased differences from 1991 and 2001 was the significant increase in tuition costs over this period.

Table 23
Private Rates of Return (without tuition fees) - all years, by degree
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Bach	22.8%	24.9%	24.3%	17.1%	18.7%	20.2%
Master's	10.9%	9.0%	8.7%	5.3%	6.1%	3.1%
PhD	7.6%	6.6%	5.9%	6.6%	5.0%	4.7%
Medicine	17.6%	13.3%	10.6%	18.1%	14.8%	10.2%

Source: author's calculations from 50th quantile regression results

It is also clear that from 1991 to 2011, returns for both genders have increased. For women, there was a slight decrease from 2001 to 2011, but from 1991 to 2011 the general trend was still increasing. For men, there was a consistent increase in returns. For women’s master’s degrees, returns fell from a high of 10.9% in 1991, but only slightly, and remained high in 2011. For men,

there was a small increase from 5.3% in 1991 to 6.1% in 2001, but fell to 3.1% in 2011, which brought it below the 4.25% threshold. For PhDs, both genders saw slight falls, but remained above 4.25%. Private returns with tuition in 2011 for both genders failed to make this mark. For medical school, there was a clear and consistent decrease in returns for both genders. The difference between returns with and without tuition increased slightly between 1991 and 2001 when there is a significant increase in tuition, but the general trend of decreasing returns to medical school is primarily due to other factors. However, the returns both with and without tuition are still very high: 10.6% and 10.2% for women and men without tuition, 7.8% for both with tuition.

Looking at bachelor returns without tuition by field of study (table 24), it is apparent that the same patterns were present as with returns with tuition. For women, business, engineering and health sciences had the highest returns across all years. For men, engineering and business were the two highest. Fine arts continued to have negative or undefined returns for men. All field of study saw a significant bump in their returns, as mentioned above.

For master's degree returns without tuition (table 25), the increase in returns due to removing tuition was significantly smaller than for bachelor's degrees, due to the increased forgone wages while studying. Similarly to bachelor's degrees without tuition, most of the patterns remained the same. For women, education, humanities, social sciences, business, sciences, and health sciences all met the 4.25% benchmark for all years. Compared to returns with tuition, the only field of study that met this mark due to removing tuition is sciences. For men, the only fields of study that met 4.25% returns are education, business, and health sciences. Compared to returns with tuition, business is the only field of study that did not meet this mark in 2011.

Due to Stats Can's introduction of MBA tuition between 2001 and 2011, it is interesting to see how returns to MBA without tuition has changed. In 1991 and 2001, both genders had very

high returns, for women: 19.5% in 1991 and 15.1% in 2001; for men: 12.8% in 1991, and 14.6% in 2001. In 2011, these returns fell to 8.3% for women, and 6.3% for men. This shows that the fall in returns to MBA was not just due to the significant increase in tuition, but also due to other market factors.

Table 24
Private Rates of Return to Bachelor's Degree (without tuition fees), by year and FOS
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	20.3%	23.1%	24.8%	13.0%	15.6%	19.6%
Fine Arts	6.9%	7.7%	9.8%	-1.7%	-	-10.7%
Humanities	16.2%	18.6%	19.3%	6.0%	7.6%	11.2%
Social Sciences	21.7%	24.0%	23.7%	15.1%	17.8%	17.9%
Business	30.5%	32.2%	28.2%	23.6%	25.1%	23.1%
Agriculture	15.7%	19.5%	19.2%	12.2%	19.7%	18.2%
Sciences	22.4%	20.5%	18.9%	18.9%	19.9%	18.5%
Engineering	32.8%	27.2%	25.7%	26.6%	26.9%	26.3%
Health Sciences	28.9%	28.9%	30.8%	12.7%	15.1%	16.7%

Table 25
Private Rates of Return to Master's Degree (without tuition fees), by year and FOS
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	17.6%	13.9%	12.8%	13.7%	18.9%	17.4%
Fine Arts	6.4%	5.4%	-1.3%	5.9%	1.4%	-7.8%
Humanities	12.2%	7.3%	6.1%	1.0%	1.0%	0.8%
Social Sciences	14.4%	11.3%	9.3%	5.8%	3.8%	3.8%
Business	19.5%	15.1%	8.3%	12.8%	14.6%	6.3%
Agriculture	-	-0.7%	3.1%	4.9%	-1.2%	-8.5%
Sciences	5.3%	5.1%	5.7%	0.6%	-1.5%	-5.3%
Engineering	-1.1%	8.1%	8.5%	-1.4%	0.1%	-0.7%
Health Sciences	8.9%	10.8%	7.2%	13.7%	7.9%	7.4%

Table 26
Private Rates of Return to PhD (without tuition fees), by year and FOS
50th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	2.3%	1.2%	3.4%	3.9%	2.6%	2.4%
Fine Arts	10.8%	11.9%	17.7%	16.6%	11.7%	13.4%
Humanities	10.8%	8.6%	11.4%	12.5%	10.3%	14.2%
Social Sciences	11.3%	8.0%	12.0%	7.2%	6.6%	9.4%
Business	5.1%	-	3.4%	1.2%	0.0%	6.9%
Agriculture	18.3%	9.1%	17.0%	9.1%	12.6%	4.5%
Sciences	9.5%	10.5%	8.0%	8.6%	8.3%	8.3%
Engineering	10.3%	8.4%	6.7%	6.1%	7.2%	7.6%
Health Sciences	4.9%	-1.5%	1.8%	0.1%	3.8%	5.0%

Sources: author's calculations from 50th quantile regression results

Note: (-) indicates the IRR calculation was undefined

At the PhD level (table 26), fine arts, humanities, social sciences, agriculture, sciences, and engineering all met the 4.25% rate of return for all years. For male agriculture in 2011, this was only due to removing tuition. For the others, they met a 4.25% rate of return with or without tuition. Interestingly, for men in 2011, the only field of study that did not reach the 4.25% mark was education. Business, agriculture, and health sciences all reached the 4.25% mark due to removing tuition. For women, the only time a field of study reached the mark due to removing tuition was health sciences in 1991.

IRRs from 20th Quantile Results (No Tuition)

Looking at the general degree returns from the 20th quantile (table 27), the rates of return to women’s bachelor’s degrees were high: close to 40% across all years. This is due to the 20th quantile of high school graduate women not working, and therefore tuition formed a comparatively higher portion of the cost of education than for the 50th or 80th quantiles. For men, bachelor’s degrees increased from 19.5% in 1991, to 21.0% in 2001, and 33.7% in 2011. The difference between returns with and without tuition were 5.4% in 1991, 8.7% in 2001, and 16.4% in 2011. For master’s degrees, both genders saw a decrease in returns. For women, it was from 5.3% in 1991 to -0.8% in 2011, and for men, from 3.3% in 1991 to -6.2% in 2011. Similar decreases were also present for PhDs, although men’s returns increased slightly in 2011.

Table 27
Private Rates of Return (without tuition fees) - all years, by degree
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Bach	40.5%	39.3%	38.1%	19.5%	21.0%	33.7%
Master's	6.6%	2.9%	0.3%	3.8%	0.0%	-5.8%
PhD	11.1%	8.1%	0.5%	8.2%	3.5%	4.6%
Medicine	12.2%	4.8%	0.1%	15.1%	8.2%	2.2%

Source: author's calculations from 20th quantile regression results

Medical degrees for women fell from 9.7% in 1991 to 2.5% in 2001, and -1.2% in 2011. For men, returns fell from 13.0% in 1991 to 6.2% in 2001, to 1.2% in 2011. This suggest that even without paying the high tuition costs, that medical school was still not be a worthwhile investment for individuals at the 20th quantile.

Looking at bachelor's degrees by field of study (table 28), there aren't many new notes of interest. However, it is interesting to see women's bachelor's in engineering fell from 41.9% in 1991 to 14.5% in 2001. This shows that the similar decrease in returns with tuition was due to factors other than tuition increasing. Why engineering should have the lowest returns of any bachelor's degree for women in 2001 and 2011 at the 20th quantile, is unclear. The other interesting result is men's bachelor's of arts in 2011, with a return of 25.9%. For the previous years, the returns were so negative as to be undefined, as were the 2011 returns with tuition.

At the master's level (table 29), education was the only field of study to meet 4.25% rate of return for all years, for both genders. For women, returns for education fell from 13.2% in 1991 to 6.2% in 2011. Master's in business fell significantly for both genders. In 1991, returns were 10.8% for women, and 6.9% for men, which were strong returns. In 2001, returns fell to 4.2% for women, and 1.2% for men, and in 2011, to -1.5% for women, and -5.9% for men. This decline was also seen in the IRRs from the 50th quantile.

Table 28
Private Rates of Return to Bachelor's Degree (without tuition fees), by year and FOS
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	37.6%	41.8%	43.6%	22.3%	29.5%	45.3%
Fine Arts	25.3%	25.9%	24.7%	-	-	25.9%
Humanities	32.7%	30.3%	30.6%	6.2%	8.1%	34.3%
Social Sciences	39.2%	41.4%	41.5%	19.5%	21.7%	36.4%
Business	49.3%	44.2%	37.3%	31.7%	27.6%	34.0%
Agriculture	27.6%	39.5%	30.9%	-	22.6%	18.4%
Sciences	35.0%	30.4%	23.6%	21.4%	20.3%	30.0%
Engineering	41.9%	14.5%	20.3%	29.7%	20.5%	31.2%
Health Sciences	47.2%	45.7%	41.5%	12.2%	11.5%	16.8%

Table 29

Private Rates of Return to Master's Degree (without tuition fees), by year and FOS
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	13.2%	10.9%	6.2%	9.9%	7.6%	9.1%
Fine Arts	2.9%	1.0%	-6.1%	6.7%	-4.0%	-4.4%
Humanities	8.6%	8.2%	2.5%	2.1%	0.2%	2.8%
Social Sciences	10.2%	6.4%	1.6%	2.4%	-1.4%	0.7%
Business	10.8%	4.2%	-1.5%	6.9%	1.2%	-5.9%
Agriculture	-	-5.0%	-	4.3%	-	-
Sciences	-0.4%	-3.8%	-1.9%	-1.3%	-	-7.5%
Engineering	-3.2%	6.2%	9.5%	-2.9%	-7.1%	-6.6%
Health Sciences	4.4%	5.1%	6.5%	3.0%	1.8%	7.7%

Table 30

Private Rates of Return to PhD (without tuition fees), by year and FOS
20th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	5.6%	-	-2.7%	2.8%	3.5%	0.7%
Fine Arts	6.4%	13.4%	20.6%	15.7%	18.6%	24.2%
Humanities	13.9%	11.0%	18.9%	17.6%	9.8%	8.8%
Social Sciences	15.1%	10.8%	14.5%	12.2%	6.0%	8.8%
Business	27.2%	-	-3.8%	1.6%	2.1%	-2.6%
Agriculture	-	-	34.0%	12.6%	18.9%	3.1%
Sciences	12.3%	19.1%	8.2%	17.1%	15.9%	6.8%
Engineering	33.7%	15.5%	3.2%	13.2%	11.6%	16.3%
Health Sciences	-8.5%	-	-	2.3%	-3.9%	-

Source: author's calculations from 20th quantile regression results

Note: (-) indicates the IRR calculation was undefined

From the PhD returns (table 30), we can see that the fine arts, humanities, social sciences, and sciences were all above 4.25% for both genders across all years. For men, engineering also meets this qualification. For women, engineering saw a remarkable decrease from 33.7% in 1991, to 15.5% in 2001, to 3.2% in 2011. Women's agriculture had a strange result of being undefined in 1991 and 2001, but returns of 24.0% in 2011, the highest returns of any field of study for women. Men's agriculture also followed a strange path, rising from 12.6% in 1991 to 18.9% in 2001, down to 3.1% in 2011.

IRRs from 80th Quantile Results

From table 31, we can see the rates of return without tuition for the 80th quantile. At the bachelor's level, both genders saw consistent increases: for women, returns rose from 20.2% in 1991, to 24.6% in 2001, and a small increase to 25.1% in 2011. For men, returns rose from 14.1% in 1991 to 19.3%, to 19.8% in 2011. In both cases, the increase between 1991 and 2001 were much larger than between 2001 and 2011. For master's degrees, women's returns decreased slightly from 12.7% to 10.9% from 1991 to 2011. For men, they were undefined in 1991, but increased to 5.9% in 2001, and 7.0% in 2011. PhD returns for women fell very slightly from 4.0% in 1991 to 3.7% in 2001, and then increased to 4.4% in 2011. Men's PhD returns varied slightly at or above 1%. Medical degrees fell for both genders, for women from 16.2% in 1991 to 13.4% in 2011; for men, from 19.3% in 1991 to 10.9% in 2011. As with the returns with tuition, men's returns were higher than women's in 1991 and 2001, but reversed in 2011.

Table 31
Private Rates of Return (without tuition fees) - all years, by degree
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Bach	20.2%	24.6%	25.1%	14.1%	19.3%	19.8%
Master's	12.7%	12.1%	10.9%	-	5.9%	7.0%
PhD	4.0%	3.7%	4.4%	1.8%	1.0%	1.4%
Medicine	16.2%	15.4%	12.4%	19.3%	16.7%	10.9%

Source: author's calculations from 80th quantile regression results

The increases in returns due to removing tuition were much smaller at the 80th quantile than the 20th. At the bachelor's level, returns increased for women by 2.9% in 1991, 5.8% in 2001, and 6.2% in 2011. For men, returns increased due to removing tuition by 1.6% in 1991, 3.6% in 2001, and 4.3% in 2011. At the master's level, women's returns increased by 1.9% in 1991, 3.3% in 2001, and 2.7% in 2011. For men, they were increased by close to 2% (except for 1991, which were undefined). For PhD, women's returns were increased by close to 1%, and men's by less than 1%.

At the bachelor's level by field of study (table 32), we can see that as with previous results, business, engineering, and health sciences had the highest returns for women, and for men, it is business and engineering. For men, fine arts was negative for 1991 and 2001, and just above zero in 2011. As with the returns with tuition, education remained relatively lower than at other quantiles. For women, all fields of study far exceed 4.25% rates of return for all years, and for men, other fine arts, education and humanities in 1991 were the only fields that fail to reach this mark.

At the master's level (table 33), education offers one of the highest rates of return for all years, for both genders. For men, education, along with business and health sciences, were the only fields of study that exceed 4.25%, and did so by a wide margin. They all exceeded 10% for all years. Health sciences did decline quite significantly, from 17.1% in 1991 and 16.3% in 2001, to 11.7% in 2011. For women, education, humanities, social sciences, business, and health sciences meet 4.25% for all years. For both genders, there was a fall in business returns between 2001 and 2011. This decrease was also seen at the 50th and 20th quantiles, in returns with and without tuition.

Table 32
Private Rates of Return to Bachelor's Degree (without tuition fees), by year and FOS
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	16.6%	18.4%	19.9%	1.9%	5.2%	11.1%
Fine Arts	11.5%	13.7%	11.2%	-0.5%	-0.2%	0.8%
Humanities	16.4%	20.8%	18.6%	4.0%	8.5%	10.3%
Social Sciences	19.1%	23.7%	23.0%	13.1%	17.1%	17.4%
Business	24.4%	30.2%	27.7%	15.8%	22.3%	21.8%
Agriculture	18.0%	22.0%	22.5%	7.3%	12.9%	18.2%
Sciences	22.6%	24.4%	21.8%	13.8%	20.6%	18.2%
Engineering	28.4%	32.5%	31.5%	17.7%	24.3%	23.8%
Health Sciences	25.7%	29.5%	33.1%	13.6%	17.3%	20.6%

Table 33

Private Rates of Return to Master's Degree (without tuition fees), by year and FOS
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	13.8%	9.4%	12.4%	10.3%	12.7%	11.3%
Fine Arts	4.4%	3.4%	5.2%	3.7%	1.3%	-0.5%
Humanities	8.9%	4.4%	10.8%	-11.6%	-3.0%	-5.8%
Social Sciences	14.5%	9.5%	13.3%	-	-3.0%	2.6%
Business	14.0%	15.2%	11.6%	11.3%	19.3%	11.4%
Agriculture	-4.3%	5.3%	9.3%	-5.8%	0.8%	-2.6%
Sciences	4.9%	1.6%	9.8%	-4.5%	0.1%	0.2%
Engineering	3.0%	2.3%	6.0%	-11.3%	2.5%	-1.4%
Health Sciences	9.3%	9.3%	7.6%	17.1%	16.3%	11.7%

Table 34

Private Rates of Return to PhD (without tuition fees), by year and FOS
80th Quantile

	Female			Male		
	1991	2001	2011	1991	2001	2011
Education	0.7%	3.2%	3.7%	3.1%	3.7%	4.4%
Fine Arts	9.4%	9.6%	13.8%	6.4%	9.3%	12.7%
Humanities	5.1%	5.1%	6.2%	7.6%	5.4%	8.9%
Social Sciences	4.9%	5.3%	6.4%	1.0%	1.7%	3.7%
Business	-	-2.8%	3.0%	-6.2%	-8.2%	4.6%
Agriculture	13.2%	6.5%	7.4%	5.5%	4.0%	5.4%
Sciences	4.3%	5.4%	5.8%	2.8%	2.3%	5.1%
Engineering	2.2%	7.2%	4.3%	1.9%	-1.0%	3.6%
Health Sciences	5.7%	4.8%	5.9%	-0.6%	-	5.7%

Sources: author's calculations from 80th quantile regression results

Note: (-) indicates the IRR calculation was undefined

At the PhD level (table 34), women had good returns for all years from fine arts, humanities, social sciences, agriculture, sciences, and health sciences. For men, only fine arts and humanities exceeded 4.25% across all years. In 2011, business, agriculture, sciences, and health sciences all exceeded the mark due to removing tuition. Business had a significant increase for men, from negative returns in 1991 and 2001, to 4.6% in 2011. It would not have exceeded 4.25% without removing tuition (it has a 2.7% rate of return with tuition), but connecting it with the decreasing returns to an MBA, it may be that the increased number of MBAs means that the PhD will continue to increase in returns in the future. Men's health science PhD saw a significant increase from 1991 and 2001, to 2011, that was also present in the returns with tuition.

VI. Comparisons to Previous Literature

The only year of results that can be effectively compared with the previous literature is 1991. Stager (1996), Vaillancourt and Bourdeau-Primeau (2002), and Rathje and Emery (2002) all have private returns from 1990 to 1992, which can be compared with the 1991 returns. Stark's returns for 2002 (2007) did not form an effective comparison with the 2001 results due to his use of 1995 earnings profiles for his 2002 results. His 2002 IRR calculations were to test the impact of tuition increases.¹⁰ Therefore, they do not serve as an effective point of comparison. There is no literature on private returns to university education for 2011, or any close year.

Table 35 has this project's and the literature's results for 1990 and 1991 private returns. Rathje and Emery did not calculate returns by degree level, and are therefore are not included in this table. Stager only calculated returns at the bachelor level, and therefore does not have results for graduate degrees. The 50th quantile bachelor's returns from 1991 of this project were very similar to values of both Stager and Vaillancourt and Bourdeau-Primeau. Vaillancourt and Bourdeau-Primeau had slightly higher returns consistently across all degree types, but the decline from bachelor's to graduate degrees were of very similar magnitudes. The exception is male master's returns, where men's master's returns were half the value of Vaillancourt and Bourdeau-Primeau's.

Table 35
Comparison of 50th quantile General IRRs with literature

Author (year of publication)	Year of study	Private Returns to Bachelor's		Private Returns to Master's		Private Returns to PhD	
		Female	Male	Female	Male	Female	Male
Stager (1996)	1990	17.6%	13.8%				
Vaillancourt & Bourdeau-Primeau (2002)	1990	19%	16%	10%	9%	8%	7%
Balcom (2019)	1991	17.9%	14.0%	9.4%	4.5%	6.1%	5.4%

Note: blank entries refers to the author not reporting a return for the category

¹⁰ Alan Stark, "Which Fields Pay, Which Fields Don't?: An Examination of the Returns to University Education in Canada by Detailed Field of Study", (Ottawa: Department of Finance, 2007), 23

Comparing bachelor's returns by field of study (table 36), there were some adjustments that needed to be made due to differing systems for the field of study. Vaillancourt and Bourdeau-Primeau's returns for women's bachelor's exceeded the results of this paper for every field of study, but their returns for men's bachelor's were generally lower, with the exception of education. The returns to bachelor's in education for Vaillancourt and Bourdeau-Primeau are significantly higher than the returns of this project, which is likely in part due to their approach of it being a four year degree, when this project assumes five years.

Compared to Rathje and Emery, the results of this project far exceeded their returns for most fields, frequently doubling their returns. Rathje and Emery commented in their paper on their returns being lower than Vaillancourt and Bourdeau-Primeau's study, and suggested this is due to their use of higher tuition and forgone wages. Their tuition fees and supplies costs were higher than the ones used in this project (they used University of Calgary tuition fees, and the university estimates of textbooks and supplies), which would explain some of the difference in returns.¹¹ Their returns for medical degrees were also much lower.

Table 36
Comparison of 50th quantile Bachelor's Private Returns with literature

	Balcom (2019), 1991		V & S (2002), 1990		R & E (2002), 1992*		Stager (1996), 1990	
	Female	Male	Female	Male	Female	Male	Female	Male
Education	16.4%	10.5%	19%	19%	8.95%	3.40%		
Fine Arts	5.0%	-1.9%			4.94%	-2.91%		
Humanities ^a	12.8%	5.1%	13%	1%	7.31%	1.75%	14.8%	7.3%
Social Sciences	17.0%	12.7%	19%	12%	7.63%	6.18%	17.0%	12.8%
Business	23.7%	19.2%	27%	15%	8.60%	7.40%	15.0%	16.2%
Agriculture ^b	11.1%	9.3%			6.58%	3.90%	15.0%	6.8%
Sciences	17.4%	15.5%	22%	14%	10.25%	7.89%	21.2%	15.1%
Engineering	25.1%	21.7%	37%	20%	10.35%	9.62%	19.8%	16.0%
Health Sciences ^c	22.6%	10.8%	26%	8%	10.51%	6.39%	21.0%	14.9%
Medicine	15.7%	16.6%			1.26%	5.39%		

Sources: publications mentioned above by author and year of publication

Note: publication year in brackets, year of study adjacent

Note: blank entries refers to the author not reporting a return for the category

* Rathje and Emery use 1998 tuition data with 1986, 1991, and 1996 earnings data

a: Stager (1996) combined humanities and fine arts

¹¹ Rathje and Emery, "Returns to University Education in Canada", 244-245

b: Stager (1996) separated biological sciences and math, physical sciences. Agriculture has the results of biological sciences

c: Rathje and Emery (2002) separated nursing from health sciences

Stager's results were quite close to this project's, and women's returns to a bachelor's in the social sciences were exactly the same. It was surprising that his returns for humanities for both gender exceeded the returns of this project, when his categorization included the fine arts with humanities.

The patterns for highest returns for specific fields of study were very similar across all the projects. For women, Vaillancourt and Bourdeau-Primeau's highest returns were from business and engineering, Rathje and Emery's were sciences, engineering, and health sciences, and Stager's were sciences, engineering, and health sciences as well. Business, Engineering and health sciences were the highest returning fields for women in this project, and sciences also offered strong returns. These ordinal results match up very closely. For men, the highest returning fields for Vaillancourt and Bourdeau-Primeau were education, business, and engineering. For Rathje and Emery, the highest fields for men were business, sciences, and engineering. For Stager, it was business, sciences, and engineering. Again, these were very similar ordinal results to this project, where business and engineering had the highest returns, and sciences' returns were just a tier below.

VII. Conclusion

From the 50th quantile IRRs, women's returns to university education were generally higher than men's. Private returns to bachelor's degrees for both genders, across all years and quantiles, were very high. Returns across the twenty year period were generally steady for both genders, falling slightly for women. In 2011, women's returns were 16.4%, and men's returns 14.6%. Both master's level and PhD level returns were significantly lower than bachelor's level, for both genders. Medical degree returns almost halved over the 20 year period, but still have a higher

rate of return than graduate degrees. The strongest returns at the bachelor's level for women across the twenty year period were business, engineering, and health sciences. The highest fields for men were business and engineering. The lowest field for both genders was fine arts, and was the only field in 2011 to not give returns in excess of 4.25% for men (it gave returns of 5.5% for women).

At the master's level, education and health sciences had the highest returns for all years, along with business for 1991 and 2001. Business' decline at the master's level was in part due to the significant increase in tuition, and in part due to other market factors. For women, master's returns were generally good. For men, master's returns were good in 1991 and 2001, but fell to 3.1% in 2011.

At the PhD level, most of the other fields of study (fine arts, humanities, social sciences, agriculture, and sciences) had good returns across 1991, 2001, and 2011. This means that with a master's degree, it would be a positive investment to pursue a PhD, although it does not tell us if pursuing the master's degree to then pursue a PhD is a worthwhile investment. This would be a good area to be explored. Generally, PhD returns were good for both genders. It was rare for any field of study for men to have good returns at the bachelor's, master's, and PhD level. It was however more common for women.

From the 20th quantile returns, bachelor's degree returns were higher compared to the 50th quantile returns, likely due to the lower opportunity cost associated. Graduate and medical degrees had lower returns compared to the 50th quantile. From the 80th quantile results, female bachelor's returns were quite similar to the 50th quantile returns, while male returns were slightly lower. Female master's returns were higher, while men's were negative in 1991, but increased to 7.0% in 2011, which was higher than the 50th quantile returns. PhD returns for both genders were

below the returns from the 50th quantile, although for women they still exceeded 4.25%. For men, they were close to 1%.

Overall, university education is an excellent private investment. The returns without tuition suggest that the value of a bachelor's degree has increased from 1991 to 2011, although tuition increases have kept returns from increasing overall. Individuals that are deciding whether or not to attend university should be aware of the financial impacts of attending, and the importance of what they choose to study. The financial returns to graduate degrees are much more varied, but are still a good investment in many circumstances.

Taking the 2011 50th quantile IRRs as the best estimate of current private returns, business and engineering offer the highest bachelor's returns for both gender, along with health sciences for women. Fine arts offer the lowest returns for both genders. At the master's level, education, humanities, social sciences, business, engineering and health sciences all offer good returns for women. For men, only education and health sciences have returns above 4.25%. For women looking at undertaking a PhD, fine arts, humanities, social sciences, agriculture, sciences and engineering all have good returns. For men, fine arts, humanities, social sciences, sciences, and engineering have good returns. No field of study for men has good returns across all degree levels, but humanities, social sciences, and engineering offer good returns at all degree levels for women. This means each degree level is a good investment.

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Appendix A – Field of Study by Statistics Canada Code

Table A1
Fields of Study Break Down, by Statistics Canada Variables and year

	1991 & 2001 MFS	2011 Cip2000
Education	1-46	13, 31
Fine Arts	47-74, 76, 79, 91	50
Humanities	80-90, 92-134	09, 16, 23-25, 30.12-30.15, 30.21-30.22, 38-39, 54-55
Social Sciences	125-157, 161-187, 198, 249-250	05, 19, 22, 29, 30.05, 30.10-30.11, 30.17, 30.20, 30.23, 30.25, 42, 43.01-43.02, 43.99, 44-45
Business	188-197, 199-220	30.16, 52
Agriculture	221-238	01
Sciences	158-160, 239-248, 252, 257-266, 294-298, 318-312, 442-479, 480	03, 11, 26-27, 30.01, 30.06, 30.08, 30.18-30.19, 40-41
Engineering	267-293, 299-317, 322-369	04, 10, 14-15, 46-49
Health Sciences	255-256, 370-441	30.24, 51, 60

Note: for Cip2000, the four digit version was used. Any numbers above with two digits refer inclusively to any code that begins with those two digits

Appendix B – 50th Quantile Regression Results

Table B1
1991 - Quantile Regression Results (50th quantile), General Level
ln(Post-Tax Income)

	High School	Bachelors	Women		
			Medicine	Master's	PhD
Age	0.319*** (0.00254)	0.262*** (0.00334)	0.238*** (0.0229)	0.241*** (0.00836)	0.201*** (0.0229)
Age squared	-0.00433*** (4.03e-05)	-0.00323*** (4.65e-05)	-0.00274*** (0.000308)	-0.00268*** (0.000101)	-0.00201*** (0.000257)
Constant	4.074*** (0.0387)	5.183*** (0.0585)	5.856*** (0.418)	5.288*** (0.171)	5.882*** (0.508)
	High School	Bachelors	Men		
			Medicine	Master's	PhD
Age	0.250*** (0.00116)	0.216*** (0.00208)	0.201*** (0.00590)	0.217*** (0.00447)	0.152*** (0.00640)
Age squared	-0.00292*** (1.61e-05)	-0.00242*** (2.63e-05)	-0.00206*** (6.62e-05)	-0.00232*** (5.11e-05)	-0.00143*** (6.74e-05)
Constant	5.290*** (0.0206)	6.087*** (0.0407)	6.603*** (0.126)	5.912*** (0.0976)	7.107*** (0.151)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 1991 Census, and author's calculations

Table B2
2001 - Quantile Regression Results (50th quantile), General Level
ln(Post-Tax Income)

	High School	Bachelors	Women		
			Medicine	Master's	PhD
Age	0.295*** (0.00202)	0.279*** (0.00246)	0.236*** (0.0154)	0.266*** (0.00633)	0.229*** (0.0202)
Age squared	-0.00379*** (2.99e-05)	-0.00341*** (3.34e-05)	-0.00262*** (0.000187)	-0.00296*** (7.55e-05)	-0.00232*** (0.000225)
Constant	4.291*** (0.0329)	4.892*** (0.0445)	5.696*** (0.309)	4.801*** (0.131)	5.293*** (0.449)
	High School	Bachelors	Men		
			Medicine	Master's	PhD
Age	0.263*** (0.000889)	0.270*** (0.00225)	0.241*** (0.00797)	0.281*** (0.00523)	0.170*** (0.00893)
Age squared	-0.00310*** (1.27e-05)	-0.00314*** (2.85e-05)	-0.00246*** (9.08e-05)	-0.00312*** (6.00e-05)	-0.00163*** (9.32e-05)
Constant	5.034*** (0.0149)	5.146*** (0.0438)	5.613*** (0.169)	4.723*** (0.113)	6.702*** (0.211)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2001 Census, and author's calculations

Table B3
 2011 - Quantile Regression Results (50th quantile), General Level
 ln(Post-Tax Income)

	Women				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.221*** (0.00174)	0.253*** (0.00204)	0.193*** (0.0101)	0.261*** (0.00484)	0.245*** (0.0152)
Age squared	-0.00266*** (2.37e-05)	-0.00298*** (2.64e-05)	-0.00196*** (0.000116)	-0.00285*** (5.70e-05)	-0.00245*** (0.000165)
Constant	5.417*** (0.0304)	5.291*** (0.0381)	6.295*** (0.207)	4.868*** (0.100)	4.892*** (0.343)
	Men				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.244*** (0.00127)	0.271*** (0.00206)	0.195*** (0.00996)	0.285*** (0.00480)	0.217*** (0.0105)
Age squared	-0.00283*** (1.69e-05)	-0.00308*** (2.55e-05)	-0.00190*** (0.000106)	-0.00310*** (5.39e-05)	-0.00214*** (0.000110)
Constant	5.299*** (0.0227)	5.072*** (0.0407)	6.379*** (0.231)	4.544*** (0.105)	5.681*** (0.249)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2011 NHS, and author's calculations

Table B4
 1991 - Quantile Regression Results (50th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.249*** (0.00859)	0.211*** (0.0126)	0.241*** (0.00867)	0.207*** (0.00472)	0.207*** (0.0258)	0.145*** (0.00670)
Age squared	-0.00325*** (4.81e-05)	-0.00239*** (2.70e-05)	-0.00267*** (9.88e-05)	-0.00226*** (5.13e-05)	-0.00199*** (0.000258)	-0.00143*** (6.43e-05)
<u>Field of Study</u>						
Education	-0.356 (0.257)	0.149 (0.396)				
Fine Arts	-0.212 (0.282)	-0.557 (0.408)	-0.849*** (0.210)	-1.599*** (0.177)	-0.295 (2.056)	-1.006*** (0.316)
Humanities	-0.357 (0.258)	-0.439 (0.397)	-0.351*** (0.122)	-0.885*** (0.0756)	0.386 (0.366)	-0.523*** (0.161)
Social Sciences	-0.169 (0.257)	-0.173 (0.396)	-0.00255 (0.108)	-0.277*** (0.0645)	0.681** (0.331)	-0.188 (0.132)
Business	0.301 (0.259)	0.380 (0.396)	0.923*** (0.146)	0.308*** (0.0654)	2.058*** (0.662)	-0.243 (0.205)
Agriculture	0.280 (0.368)	0.232 (0.414)	0.667 (0.906)	-0.108 (0.318)	-0.658 (0.831)	-0.397 (0.283)
Sciences	-0.133 (0.261)	0.117 (0.396)	-0.496*** (0.178)	-0.589*** (0.0828)	0.141 (0.405)	-0.370*** (0.126)
Engineering	0.369 (0.286)	0.329 (0.396)	0.216 (0.325)	-0.188*** (0.0669)	0.308 (0.494)	-0.0851 (0.134)
Health Sciences	-0.0404 (0.258)	-0.278 (0.403)	-0.0332 (0.131)	-0.905*** (0.144)	0.500 (0.440)	-0.538*** (0.164)
<u>Field of Study x age</u>						
Education x age	0.0208*** (0.00797)	0.000111 (0.0125)				
Fine Arts x age	0.00276 (0.00877)	0.00977 (0.0128)	0.00472 (0.00483)	0.0293*** (0.00408)	-0.00207 (0.0442)	0.0197*** (0.00607)
Humanities x age	0.0141* (0.00803)	0.0114 (0.0125)	0.00182 (0.00297)	0.0146*** (0.00170)	-0.00973 (0.00766)	0.00951*** (0.00330)
Social Sciences x age	0.0124 (0.00799)	0.00993 (0.0125)	-0.00346 (0.00258)	0.00628*** (0.00146)	-0.0130* (0.00686)	0.00548** (0.00274)
Business x age	0.00274 (0.00806)	-0.00275 (0.0125)	-0.0218*** (0.00386)	-0.00342** (0.00155)	-0.0452*** (0.0174)	0.00715* (0.00432)
Agriculture x age	-0.00774 (0.0112)	-0.00453 (0.0130)	-0.0397 (0.0292)	-0.00206 (0.00806)	0.0159 (0.0202)	0.00812 (0.00582)
Sciences x age	0.0117 (0.00811)	0.00313 (0.0125)	0.00486 (0.00431)	0.0122*** (0.00185)	-0.00515 (0.00905)	0.00870*** (0.00259)
Engineering x age	0.00227 (0.00877)	0.00146 (0.0125)	-0.0136 (0.00897)	0.00574*** (0.00152)	-0.00790 (0.0112)	0.00406 (0.00278)
Health Sciences x age	0.0142* (0.00801)	0.0114 (0.0126)	-6.70e-05 (0.00311)	0.0248*** (0.00334)	-0.0102 (0.0100)	0.0145*** (0.00336)
Constant	5.359*** (0.261)	6.035*** (0.396)	5.421*** (0.193)	6.255*** (0.112)	5.564*** (0.665)	7.391*** (0.191)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 1991 Census, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Table B5
 2001 - Quantile Regression Results (50th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.269*** (0.00624)	0.267*** (0.00562)	0.252*** (0.00637)	0.255*** (0.00548)	0.239*** (0.0250)	0.164*** (0.00991)
Age squared	-0.00330*** (3.54e-05)	-0.00303*** (2.89e-05)	-0.00279*** (7.20e-05)	-0.00296*** (6.24e-05)	-0.00241*** (0.000252)	-0.00164*** (9.23e-05)
<u>Field of Study</u>						
Education	0.460** (0.216)	0.524** (0.214)				
Fine Arts	-0.0135 (0.226)	0.0576 (0.227)	-0.655*** (0.177)	-1.271*** (0.202)	-1.284 (0.826)	-1.447* (0.759)
Humanities	0.216 (0.218)	0.0970 (0.216)	-0.412*** (0.0965)	-1.225*** (0.0962)	-0.414 (0.410)	-0.732*** (0.226)
Social Sciences	0.303 (0.217)	0.247 (0.214)	-0.132 (0.0822)	-0.725*** (0.0791)	0.182 (0.352)	-0.345 (0.211)
Business	0.785*** (0.218)	0.627*** (0.214)	0.416*** (0.0974)	0.0453 (0.0754)	0.545 (1.188)	-0.469 (0.297)
Agriculture	0.308 (0.272)	0.756*** (0.238)	0.0334 (0.457)	-1.404*** (0.343)	-0.423 (1.432)	-0.859** (0.415)
Sciences	0.0340 (0.219)	0.331 (0.214)	-0.150 (0.118)	-0.757*** (0.0860)	0.324 (0.374)	-0.289 (0.197)
Engineering	0.972*** (0.236)	0.664*** (0.214)	0.331* (0.186)	-0.661*** (0.0794)	1.000 (1.002)	-0.0199 (0.213)
Health Sciences	0.270 (0.217)	-0.0215 (0.224)	0.110 (0.0979)	-1.665*** (0.155)	0.518 (0.442)	-0.583*** (0.225)
<u>Field of Study x age</u>						
Education x age	-0.000705 (0.00568)	-0.00910* (0.00516)				
Fine Arts x age	-0.000389 (0.00596)	-0.00612 (0.00555)	0.000634 (0.00452)	0.0185*** (0.00499)	0.0244 (0.0192)	0.0288** (0.0137)
Humanities x age	0.000106 (0.00573)	-0.00260 (0.00520)	0.00196 (0.00223)	0.0215*** (0.00224)	0.00704 (0.00844)	0.0138*** (0.00455)
Social Sciences x age	0.00164 (0.00568)	-0.000584 (0.00514)	0.000367 (0.00192)	0.0164*** (0.00188)	-0.00262 (0.00732)	0.00937** (0.00423)
Business x age	-0.00874 (0.00573)	-0.00783 (0.00515)	-0.00714*** (0.00232)	0.00381** (0.00183)	-0.0145 (0.0270)	0.0123** (0.00597)
Agriculture x age	-0.00238 (0.00742)	-0.0164*** (0.00578)	-0.0134 (0.0123)	0.0254*** (0.00811)	0.00454 (0.0307)	0.0176** (0.00762)
Sciences x age	0.00802 (0.00576)	-0.00169 (0.00515)	-0.00321 (0.00290)	0.0163*** (0.00206)	-0.00827 (0.00799)	0.00822** (0.00398)
Engineering x age	-0.0202*** (0.00633)	-0.00757 (0.00515)	-0.0162*** (0.00486)	0.0164*** (0.00190)	-0.0267 (0.0240)	0.00347 (0.00439)
Health Sciences x age	0.00753 (0.00570)	0.00595 (0.00539)	-0.00213 (0.00230)	0.0412*** (0.00347)	-0.0119 (0.00986)	0.0159*** (0.00462)
Constant	4.710*** (0.220)	4.881*** (0.217)	5.207*** (0.142)	5.547*** (0.122)	5.018*** (0.651)	6.951*** (0.292)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2001 Census, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Table B6
 2011 - Quantile Regression Results (50th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.242*** (0.0107)	0.245*** (0.00872)	0.242*** (0.00469)	0.248*** (0.00454)	0.240*** (0.0155)	0.199*** (0.0115)
Age squared	-0.00286*** (2.69e-05)	-0.00299*** (2.47e-05)	-0.00270*** (5.38e-05)	-0.00290*** (5.02e-05)	-0.00239*** (0.000156)	-0.00207*** (0.000106)
<u>Field of Study</u>						
Education	0.299 (0.359)	0.137 (0.288)				
Fine Arts	-0.102 (0.364)	-0.506* (0.294)	-0.840*** (0.213)	-1.255*** (0.204)	-0.816 (0.520)	-1.600*** (0.424)
Humanities	0.000120 (0.360)	-0.375 (0.288)	-0.604*** (0.0825)	-1.523*** (0.0904)	-0.205 (0.320)	-0.582* (0.304)
Social Sciences	-0.0351 (0.359)	-0.397 (0.287)	-0.404*** (0.0687)	-1.007*** (0.0825)	0.421 (0.273)	-0.273 (0.275)
Business	0.224 (0.359)	-0.139 (0.287)	-0.308*** (0.0787)	-0.595*** (0.0738)	0.355 (0.542)	0.0705 (0.357)
Agriculture	-0.0538 (0.387)	-0.0896 (0.309)	-0.696* (0.400)	-0.907*** (0.225)	0.344 (0.406)	-0.680 (0.567)
Sciences	-0.404 (0.360)	-0.398 (0.287)	-0.705*** (0.0896)	-1.144*** (0.0864)	-0.586** (0.297)	-0.732*** (0.267)
Engineering	0.326 (0.365)	0.0950 (0.287)	-0.326** (0.127)	-0.840*** (0.0793)	-0.656 (0.446)	-0.152 (0.279)
Health Sciences	0.0699 (0.360)	-0.558* (0.294)	-0.228*** (0.0737)	-1.156*** (0.128)	0.0857 (0.303)	-0.613** (0.302)
<u>Field of Study x age</u>						
Education x age	-0.00322 (0.0105)	0.00893 (0.00866)				
Fine Arts x age	-0.00641 (0.0107)	0.0148* (0.00883)	0.00105 (0.00547)	0.0149*** (0.00522)	0.0137 (0.0123)	0.0316*** (0.00944)
Humanities x age	-0.00246 (0.0105)	0.0166* (0.00867)	0.00588*** (0.00199)	0.0279*** (0.00213)	0.00208 (0.00701)	0.0106 (0.00648)
Social Sciences x age	0.00305 (0.0105)	0.0225*** (0.00864)	0.00655*** (0.00166)	0.0225*** (0.00200)	-0.00794 (0.00589)	0.00805 (0.00591)
Business x age	-0.00178 (0.0105)	0.0184** (0.00864)	0.00695*** (0.00187)	0.0161*** (0.00180)	-0.00821 (0.0109)	0.00239 (0.00793)
Agriculture x age	-0.000728 (0.0111)	0.0125 (0.00908)	0.00670 (0.00893)	0.0138** (0.00544)	-0.0100 (0.00883)	0.00923 (0.0122)
Sciences x age	0.0109 (0.0106)	0.0230*** (0.00864)	0.0107*** (0.00221)	0.0234*** (0.00208)	0.0107* (0.00629)	0.0162*** (0.00575)
Engineering x age	-0.00811 (0.0107)	0.0130 (0.00864)	0.00325 (0.00300)	0.0191*** (0.00192)	0.0132 (0.00969)	0.00505 (0.00601)
Health Sciences x age	0.00671 (0.0105)	0.0266*** (0.00877)	0.00717*** (0.00175)	0.0274*** (0.00293)	-0.00107 (0.00653)	0.0151** (0.00650)
Constant	5.434*** (0.360)	5.429*** (0.286)	5.513*** (0.104)	5.773*** (0.107)	5.043*** (0.415)	6.325*** (0.346)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2011 NHS, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Appendix C – 20th Quantile Regression Results

Table C1
1991 - Quantile Regression Results (20th quantile), General Level
ln(Post-Tax Income)

	Women				
	High School	Bachelors	Medicine	Master's	PhD
Age	-0.145*** (0.00572)	0.374*** (0.00794)	0.714*** (0.0621)	0.714*** (0.0225)	0.978*** (0.163)
Age squared	0.00125*** (6.01e-05)	-0.00546*** (0.000108)	-0.00906*** (0.000746)	-0.00875*** (0.000263)	-0.0107*** (0.00184)
Constant	9.148*** (0.131)	2.798*** (0.133)	-4.074*** (1.246)	-4.891*** (0.471)	-12.03*** (3.592)
	Men				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.576*** (0.00218)	0.541*** (0.0107)	0.394*** (0.0225)	0.737*** (0.0283)	0.629*** (0.0518)
Age squared	-0.00769*** (2.51e-05)	-0.00678*** (0.000152)	-0.00422*** (0.000255)	-0.00844*** (0.000345)	-0.00654*** (0.000557)
Constant	-0.797*** (0.0444)	-0.363* (0.186)	1.769*** (0.493)	-5.430*** (0.581)	-4.259*** (1.205)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 1991 Census, and author's calculations

Table C2
2001 - Quantile Regression Results (20th quantile), General Level
ln(Post-Tax Income)

	Women				
	High School	Bachelor's	Medicine	Master's	PhD
Age	-0.109*** (0.00846)	0.510*** (0.00503)	1.071*** (0.0714)	0.917*** (0.0301)	1.084*** (0.117)
Age squared	0.000916*** (8.64e-05)	-0.00715*** (6.24e-05)	-0.0123*** (0.000832)	-0.0110*** (0.000345)	-0.0121*** (0.00131)
Constant	8.041*** (0.203)	0.293*** (0.0890)	-13.31*** (1.493)	-9.401*** (0.646)	-14.22*** (2.583)
	Men				
	High School	Bachelor's	Medicine	Master's	PhD
Age	0.657*** (0.00298)	0.741*** (0.00718)	0.669*** (0.0616)	1.099*** (0.0148)	0.893*** (0.0754)
Age squared	-0.00870*** (3.49e-05)	-0.00956*** (9.16e-05)	-0.00718*** (0.000679)	-0.0130*** (0.000165)	-0.00968*** (0.000826)
Constant	-2.490*** (0.0608)	-3.938*** (0.138)	-4.720*** (1.393)	-12.66*** (0.328)	-10.03*** (1.718)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2001 Census, and author's calculations

Table C3
 2011 - Quantile Regression Results (20th quantile), General Level
 ln(Post-Tax Income)

	Women				
	High School	Bachelors	Medicine	Master's	PhD
Age	0 (0)	0.867*** (0.00328)	1.799*** (0.151)	1.477*** (0.0160)	1.898*** (0.214)
Age squared	0 (0)	-0.0123*** (4.11e-05)	-0.0194*** (0.00187)	-0.0181*** (0.000155)	-0.0206*** (0.00242)
Constant	0 (0)	-5.667*** (0.0525)	-31.84*** (3.000)	-20.32*** (0.410)	-33.79*** (4.720)
	Men				
	High School	Bachelors	Medicine	Master's	PhD
Age	1.559*** (0.00880)	1.198*** (0.0147)	1.345*** (0.150)	1.671*** (0.0535)	1.258*** (0.150)
Age squared	-0.0192*** (8.28e-05)	-0.0157*** (0.000191)	-0.0138*** (0.00157)	-0.0203*** (0.000639)	-0.0135*** (0.00160)
Constant	-21.82*** (0.230)	-12.33*** (0.281)	-22.07*** (3.577)	-23.90*** (1.122)	-18.76*** (3.515)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2011 NHS, and author's calculations

Table C4
 1991 - Quantile Regression Results (20th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.400*** (0.0331)	0.481*** (0.0185)	0.733*** (0.0305)	0.678*** (0.0280)	1.033*** (0.163)	0.583*** (0.0490)
Age squared	-0.00550*** (8.25e-05)	-0.00658*** (0.000132)	-0.00898*** (0.000358)	-0.00807*** (0.000331)	-0.0110*** (0.00171)	-0.00630*** (0.000511)
<u>Field of Study</u>						
Education	2.060 (1.645)	-1.149 (0.765)				
Fine Arts	1.686 (1.660)	-1.020 (0.822)	-1.927 (1.655)	-2.290** (0.969)	-9.402 (7.055)	-2.143** (1.011)
Humanities	1.869 (1.648)	-1.574** (0.772)	-0.640 (0.468)	-2.691*** (0.394)	1.078 (2.242)	-1.437* (0.805)
Social Sciences	2.184 (1.648)	-1.524** (0.762)	0.160 (0.413)	-0.913*** (0.302)	1.254 (2.159)	-0.304 (0.752)
Business	2.625 (1.649)	-0.473 (0.763)	1.770*** (0.577)	0.262 (0.298)	8.689*** (2.872)	-2.924 (1.807)
Agriculture	2.125 (1.979)	-0.208 (0.792)	4.251 (4.230)	-0.687 (1.512)	4.414 (29.07)	-2.069 (1.729)
Sciences	1.833 (1.647)	-1.376* (0.765)	-1.603** (0.623)	-2.547*** (0.432)	0.647 (2.502)	-1.167 (0.724)
Engineering	2.806* (1.682)	-1.054 (0.763)	-3.670* (2.128)	-1.967*** (0.346)	1.488 (2.311)	-1.109 (0.897)
Health Sciences	1.696 (1.647)	-3.167*** (0.809)	-0.297 (0.549)	-4.197*** (0.683)	3.208 (2.566)	-2.221** (0.956)
<u>Field of Study x age</u>						
Education x age	-0.0196 (0.0321)	0.0454*** (0.0153)				
Fine Arts x age	-0.0376 (0.0326)	0.0176 (0.0175)	0.0133 (0.0404)	0.0350 (0.0247)	0.170 (0.163)	0.0406* (0.0243)
Humanities x age	-0.0311 (0.0323)	0.0443*** (0.0156)	-0.00146 (0.0112)	0.0490*** (0.00939)	-0.0296 (0.0499)	0.0269 (0.0178)
Social Sciences x age	-0.0325 (0.0323)	0.0530*** (0.0151)	-0.0142 (0.0103)	0.0167** (0.00752)	-0.0245 (0.0479)	0.00823 (0.0168)
Business x age	-0.0351 (0.0325)	0.0272* (0.0152)	-0.0476*** (0.0159)	-0.00696 (0.00757)	-0.206*** (0.0678)	0.0605 (0.0369)
Agriculture x age	-0.0501 (0.0521)	-0.00383 (0.0159)	-0.179* (0.0914)	-0.00658 (0.0358)	-0.197 (0.804)	0.0371 (0.0399)
Sciences x age	-0.0257 (0.0322)	0.0499*** (0.0153)	0.0138 (0.0125)	0.0517*** (0.0104)	-0.0297 (0.0558)	0.0253 (0.0162)
Engineering x age	-0.0533 (0.0343)	0.0464*** (0.0152)	0.0553 (0.0549)	0.0414*** (0.00824)	-0.0319 (0.0547)	0.0260 (0.0195)
Health Sciences x age	-0.000585 (0.0323)	0.0943*** (0.0166)	0.00584 (0.0140)	0.0929*** (0.0153)	-0.0823 (0.0579)	0.0447** (0.0212)
Constant	0.751 (1.652)	1.178 (0.785)	-4.847*** (0.666)	-3.402*** (0.602)	-13.74*** (4.040)	-2.645** (1.251)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 1991 Census, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Table C5
 2001 - Quantile Regression Results (20th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.576*** (0.0291)	0.724*** (0.0261)	0.857*** (0.0241)	0.982*** (0.0150)	0.991*** (0.109)	0.821*** (0.0774)
Age squared	-0.00703*** (7.04e-05)	-0.00917*** (6.48e-05)	-0.0106*** (0.000273)	-0.0123*** (0.000149)	-0.0116*** (0.00111)	-0.00952*** (0.000785)
<u>Field of Study</u>						
Education	5.366*** (1.451)	2.217* (1.232)				
Fine Arts	3.986*** (1.475)	0.377 (1.245)	-2.639*** (0.983)	-2.727*** (0.625)	-0.983 (2.724)	-2.970 (4.092)
Humanities	4.253*** (1.458)	0.856 (1.234)	-1.617*** (0.398)	-2.656*** (0.232)	-1.868 (2.179)	-3.617** (1.604)
Social Sciences	4.897*** (1.454)	0.824 (1.232)	-1.222*** (0.312)	-2.649*** (0.206)	-3.035 (1.967)	-2.521 (1.563)
Business	4.749*** (1.454)	1.159 (1.231)	-2.087*** (0.434)	-1.668*** (0.209)	1.064 (2.398)	-3.462 (2.344)
Agriculture	5.145*** (1.494)	1.358 (1.247)	-4.194 (2.883)	-3.084** (1.330)	-6.432 (9.509)	0.0398 (2.506)
Sciences	3.908*** (1.460)	0.744 (1.232)	-4.048*** (0.576)	-2.701*** (0.282)	-1.330 (2.207)	-2.508* (1.460)
Engineering	2.676* (1.547)	0.873 (1.233)	-4.451*** (0.813)	-3.519*** (0.250)	-2.334 (4.410)	-2.043 (1.591)
Health Sciences	4.389*** (1.452)	-1.136 (1.249)	-1.648*** (0.386)	-7.526*** (0.423)	-3.217 (2.416)	-4.898*** (1.616)
<u>Field of Study x age</u>						
Education x age	-0.0880*** (0.0282)	-0.0426* (0.0254)				
Fine Arts x age	-0.0766*** (0.0289)	-0.0113 (0.0258)	0.0308 (0.0204)	0.0440*** (0.0118)	0.00798 (0.0548)	0.0609 (0.0917)
Humanities x age	-0.0772*** (0.0285)	-0.0170 (0.0256)	0.0212** (0.00857)	0.0510*** (0.00485)	0.0421 (0.0475)	0.0754** (0.0367)
Social Sciences x age	-0.0815*** (0.0284)	-0.00599 (0.0254)	0.0211*** (0.00722)	0.0591*** (0.00427)	0.0787* (0.0417)	0.0539 (0.0361)
Business x age	-0.0710** (0.0283)	-0.0112 (0.0254)	0.0454*** (0.0102)	0.0407*** (0.00474)	-0.0323 (0.0529)	0.0765 (0.0544)
Agriculture x age	-0.0945*** (0.0311)	-0.0228 (0.0260)	0.0681 (0.0644)	0.0497 (0.0319)	0.103 (0.192)	-0.0225 (0.0538)
Sciences x age	-0.0641** (0.0286)	-0.00474 (0.0254)	0.0657*** (0.0133)	0.0517*** (0.00635)	0.0208 (0.0477)	0.0534 (0.0338)
Engineering x age	-0.0596* (0.0308)	-0.00872 (0.0255)	0.0665*** (0.0207)	0.0734*** (0.00549)	0.0365 (0.0943)	0.0390 (0.0369)
Health Sciences x age	-0.0544* (0.0282)	0.0418 (0.0259)	0.0406*** (0.00960)	0.171*** (0.00969)	0.0680 (0.0525)	0.101*** (0.0370)
Constant	-4.195*** (1.460)	-4.416*** (1.237)	-7.067*** (0.531)	-8.820*** (0.379)	-11.16*** (2.932)	-6.925*** (2.086)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2001 Census, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Table C6
 2011 - Quantile Regression Results (20th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.850*** (0.0132)	0.935* (0.524)	1.383*** (0.0468)	1.253*** (0.0659)	1.746*** (0.0975)	1.397*** (0.201)
Age squared	-0.0119*** (7.36e-05)	-0.0138*** (0.000226)	-0.0174*** (0.000505)	-0.0164*** (0.000687)	-0.0192*** (0.00135)	-0.0151*** (0.00191)
<u>Field of Study</u>						
Education	1.492** (0.628)	-1.120 (14.46)				
Fine Arts	0.460 (0.741)	-3.470 (14.46)	-2.909 (1.950)	-5.730*** (1.758)	-0.792 (4.067)	5.417 (7.205)
Humanities	0.295 (0.658)	-2.724 (14.46)	-1.433** (0.594)	-5.011*** (0.927)	6.517*** (1.824)	-1.690 (4.075)
Social Sciences	0.943 (0.633)	-3.408 (14.46)	-1.351*** (0.522)	-3.658*** (0.770)	1.450 (1.445)	1.088 (3.777)
Business	-0.00311 (0.637)	-4.511 (14.46)	-6.440*** (0.807)	-4.480*** (0.613)	-2.256 (5.967)	1.999 (6.544)
Agriculture	-0.706 (0.688)	-8.236 (14.50)	-4.033 (4.423)	-8.223*** (1.615)	8.028*** (1.778)	-6.072 (6.988)
Sciences	-1.728** (0.692)	-4.839 (14.46)	-5.081*** (1.338)	-5.421*** (0.783)	-11.76*** (1.801)	-4.235 (3.646)
Engineering	-1.438 (0.926)	-4.889 (14.46)	-3.915** (1.633)	-6.035*** (0.690)	-3.955 (4.091)	2.566 (3.773)
Health Sciences	-0.481 (0.655)	-8.868 (14.47)	-2.356*** (0.579)	-9.371*** (1.434)	-3.193* (1.915)	0.428 (4.509)
<u>Field of Study x age</u>						
Education x age	-0.0342*** (0.0115)	0.0465 (0.524)				
Fine Arts x age	-0.0458*** (0.0160)	0.0901 (0.525)	0.0207 (0.0392)	0.114*** (0.0411)	0.0163 (0.101)	-0.140 (0.172)
Humanities x age	-0.0258** (0.0128)	0.0781 (0.524)	0.00956 (0.0121)	0.112*** (0.0241)	-0.157*** (0.0461)	0.0350 (0.0854)
Social Sciences x age	-0.0270** (0.0120)	0.106 (0.524)	0.0212* (0.0123)	0.0850*** (0.0194)	-0.0231 (0.0375)	-0.0219 (0.0803)
Business x age	4.86e-05 (0.0119)	0.139 (0.524)	0.138*** (0.0173)	0.105*** (0.0153)	0.0358 (0.122)	-0.0532 (0.149)
Agriculture x age	0.0110 (0.0154)	0.224 (0.525)	0.0400 (0.0813)	0.183*** (0.0403)	-0.195*** (0.0454)	0.115 (0.144)
Sciences x age	0.0270* (0.0140)	0.142 (0.524)	0.0896*** (0.0314)	0.121*** (0.0197)	0.236*** (0.0440)	0.0866 (0.0759)
Engineering x age	0.00776 (0.0205)	0.146 (0.524)	0.0689* (0.0377)	0.138*** (0.0168)	0.0702 (0.0878)	-0.0590 (0.0798)
Health Sciences x age	0.0266** (0.0131)	0.239 (0.525)	0.0635*** (0.0149)	0.220*** (0.0318)	0.0586 (0.0484)	-0.0241 (0.0988)
Constant	-5.549*** (0.640)	-5.839 (14.46)	-17.10*** (1.065)	-13.14*** (1.503)	-29.42*** (1.688)	-21.52*** (5.755)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2011 NHS, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Appendix D – 80th Quantile Regression Results

Table D1
1991 - Quantile Regression Results (80th quantile), General Level
ln(Post-Tax Income)

	Women				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.150*** (0.00105)	0.114*** (0.00134)	0.185*** (0.0152)	0.0966*** (0.00253)	0.0845*** (0.00770)
Age squared	-0.00179*** (1.38e-05)	-0.00129*** (1.73e-05)	-0.00198*** (0.000190)	-0.00101*** (3.00e-05)	-0.000777*** (8.64e-05)
Constant	7.310*** (0.0195)	8.316*** (0.0253)	7.229*** (0.297)	8.668*** (0.0522)	8.833*** (0.169)
	Men				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.157*** (0.000671)	0.125*** (0.00110)	0.174*** (0.00634)	0.118*** (0.00221)	0.0916*** (0.00377)
Age squared	-0.00173*** (8.83e-06)	-0.00129*** (1.43e-05)	-0.00178*** (7.07e-05)	-0.00122*** (2.63e-05)	-0.000819*** (4.12e-05)
Constant	7.416*** (0.0123)	8.191*** (0.0206)	7.672*** (0.136)	8.349*** (0.0454)	8.741*** (0.0842)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 1991 Census, and author's calculations

Table D2
2001- Quantile Regression Results (80th quantile), General Level
ln(Post-Tax Income)

	Women				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.171*** (0.000682)	0.134*** (0.00101)	0.204*** (0.00816)	0.118*** (0.00226)	0.0831*** (0.00805)
Age squared	-0.00196*** (9.06e-06)	-0.00151*** (1.25e-05)	-0.00215*** (0.000102)	-0.00126*** (2.58e-05)	-0.000750*** (8.85e-05)
Constant	6.836*** (0.0120)	7.985*** (0.0199)	6.816*** (0.156)	8.314*** (0.0484)	8.910*** (0.180)
	Men				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.171*** (0.000781)	0.153*** (0.00131)	0.204*** (0.00806)	0.145*** (0.00268)	0.0811*** (0.00446)
Age squared	-0.00190*** (1.03e-05)	-0.00168*** (1.64e-05)	-0.00205*** (8.78e-05)	-0.00157*** (3.00e-05)	-0.000722*** (4.50e-05)
Constant	7.135*** (0.0140)	7.803*** (0.0252)	6.966*** (0.181)	7.976*** (0.0579)	9.091*** (0.108)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2001 Census, and author's calculations

Table D3
 2011 - Quantile Regression Results (80th quantile), General Level
 ln(Post-Tax Income)

	Women				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.153*** (0.000728)	0.137*** (0.00108)	0.166*** (0.00644)	0.117*** (0.00188)	0.0989*** (0.00635)
Age squared	-0.00167*** (9.35e-06)	-0.00150*** (1.31e-05)	-0.00166*** (7.85e-05)	-0.00120*** (2.13e-05)	-0.000905*** (6.90e-05)
Constant	7.137*** (0.0130)	7.960*** (0.0216)	7.529*** (0.123)	8.348*** (0.0402)	8.649*** (0.143)
	Men				
	High School	Bachelors	Medicine	Master's	PhD
Age	0.176*** (0.000783)	0.150*** (0.00119)	0.188*** (0.00770)	0.146*** (0.00211)	0.102*** (0.00465)
Age squared	-0.00193*** (9.98e-06)	-0.00159*** (1.43e-05)	-0.00183*** (8.66e-05)	-0.00150*** (2.43e-05)	-0.000922*** (4.94e-05)
Constant	7.021*** (0.0142)	7.822*** (0.0236)	7.096*** (0.162)	7.879*** (0.0441)	8.674*** (0.107)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2011 NHS, and author's calculations

Table D4
 1991 - Quantile Regression Results (80th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.122*** (0.00541)	0.131*** (0.00169)	0.101*** (0.00270)	0.120*** (0.00239)	0.0852*** (0.00806)	0.0949*** (0.00468)
Age squared	-0.00129*** (1.63e-05)	-0.00133*** (1.35e-05)	-0.00104*** (3.08e-05)	-0.00125*** (2.58e-05)	0.000760*** (8.57e-05)	0.000856*** (4.54e-05)
<u>Field of Study</u>						
Education	0.425** (0.190)	0.303*** (0.0599)				
Fine Arts	0.109 (0.197)	-0.184** (0.0785)	-0.713*** (0.160)	-0.647*** (0.0794)	-0.296 (0.373)	-0.322 (0.273)
Humanities	0.185 (0.191)	0.0355 (0.0619)	-0.233*** (0.0384)	-0.400*** (0.0364)	0.0131 (0.133)	-0.149 (0.0979)
Social Sciences	0.286 (0.191)	-0.0123 (0.0622)	0.0216 (0.0367)	-0.0628 (0.0408)	0.252** (0.109)	0.0894 (0.102)
Business	0.596*** (0.191)	0.264*** (0.0611)	0.286*** (0.0565)	0.105** (0.0447)	1.075*** (0.284)	0.183 (0.206)
Agriculture	0.484** (0.225)	0.242*** (0.0734)	0.125 (0.196)	-0.107 (0.121)	-0.0820 (0.564)	-0.246 (0.181)
Sciences	0.550*** (0.192)	0.343*** (0.0609)	-0.0112 (0.0512)	-0.0421 (0.0403)	0.0159 (0.126)	-0.0142 (0.0887)
Engineering	0.769*** (0.197)	0.342*** (0.0600)	0.0692 (0.0956)	-0.00577 (0.0347)	0.376** (0.158)	0.139 (0.0997)
Health Sciences	0.704*** (0.191)	0.334*** (0.0711)	0.117** (0.0537)	-0.457*** (0.109)	0.106 (0.192)	-0.0927 (0.170)
<u>Field of Study x age</u>						
Education x age	-0.00695 (0.00528)	-0.00858*** (0.00103)				
Fine Arts x age	-0.00352 (0.00544)	0.00146 (0.00163)	0.0103*** (0.00392)	0.0120*** (0.00163)	0.00463 (0.00906)	0.00554 (0.00517)
Humanities x age	-0.00211 (0.00530)	-0.00172 (0.00107)	0.00290*** (0.000909)	0.00606*** (0.000765)	-0.000594 (0.00283)	0.00230 (0.00200)
Social Sciences x age	-0.00333 (0.00529)	0.00536*** (0.00114)	-0.00132 (0.000871)	0.00436*** (0.000983)	-0.00437* (0.00236)	-0.000104 (0.00214)
Business x age	-0.0100* (0.00531)	-0.00150 (0.00109)	-0.00361** (0.00161)	0.00487*** (0.00112)	-0.0233*** (0.00852)	-2.20e-05 (0.00456)
Agriculture x age	-0.0112* (0.00640)	-0.00575*** (0.00152)	-0.0101** (0.00457)	0.000839 (0.00301)	0.00494 (0.0165)	0.00530 (0.00353)
Sciences x age	-0.00985* (0.00533)	-0.00544*** (0.00108)	-0.00208* (0.00118)	0.00197** (0.000954)	-0.000680 (0.00267)	0.00107 (0.00184)
Engineering x age	-0.0130** (0.00550)	-0.00266** (0.00104)	-0.00241 (0.00292)	0.00358*** (0.000820)	-0.00835** (0.00329)	-0.000374 (0.00210)
Health Sciences x age	-0.0129** (0.00529)	-0.00524*** (0.00141)	-0.00260* (0.00136)	0.0208*** (0.00264)	0.000544 (0.00400)	0.0111*** (0.00354)
Constant	7.872*** (0.191)	7.865*** (0.0671)	8.585*** (0.0595)	8.224*** (0.0566)	8.738*** (0.195)	8.605*** (0.132)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 1991 Census, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Table D5
 2001 - Quantile Regression Results (80th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.134*** (0.00248)	0.149*** (0.00318)	0.991*** -0.109	0.821*** -0.0774	0.991*** -0.109	0.821*** -0.0774
Age squared	-0.00151*** (1.34e-05)	-0.00160*** (1.48e-05)	-0.0116*** -0.00111	-0.00952*** -0.000785	-0.0116*** -0.00111	-0.00952*** -0.000785
<u>Field of Study</u>						
Education	0.0841 (0.0901)	0.154 (0.124)				
Fine Arts	-0.176* (0.100)	-0.0681 (0.131)	-0.983 -2.724	-2.97 -4.092	-0.983 -2.724	-2.97 -4.092
Humanities	-0.0214 (0.0913)	0.0348 (0.125)	-1.868 -2.179	-3.617** -1.604	-1.868 -2.179	-3.617** -1.604
Social Sciences	0.0784 (0.0907)	0.0667 (0.124)	-3.035 -1.967	-2.521 -1.563	-3.035 -1.967	-2.521 -1.563
Business	0.359*** (0.0921)	0.309** (0.124)	1.064 -2.398	-3.462 -2.344	1.064 -2.398	-3.462 -2.344
Agriculture	0.140 (0.127)	0.257* (0.139)	-6.432 -9.509	0.0398 -2.506	-6.432 -9.509	0.0398 -2.506
Sciences	0.0654 (0.0922)	0.359*** (0.124)	-1.33 -2.207	-2.508* -1.46	-1.33 -2.207	-2.508* -1.46
Engineering	0.522*** (0.100)	0.411*** (0.124)	-2.334 -4.41	-2.043 -1.591	-2.334 -4.41	-2.043 -1.591
Health Sciences	0.346*** (0.0910)	0.225* (0.127)	-3.217 -2.416	-4.898*** -1.616	-3.217 -2.416	-4.898*** -1.616
<u>Field of Study x age</u>						
Education x age	0.00169 (0.00226)	-0.00493* (0.00296)				
Fine Arts x age	0.00362 (0.00255)	-0.00137 (0.00312)	0.00798 -0.0548	0.0609 -0.0917	0.00798 -0.0548	0.0609 -0.0917
Humanities x age	0.00363 (0.00229)	-0.00117 (0.00299)	0.0421 -0.0475	0.0754** -0.0367	0.0421 -0.0475	0.0754** -0.0367
Social Sciences x age	0.00240 (0.00228)	0.00323 (0.00297)	0.0787* -0.0417	0.0539 -0.0361	0.0787* -0.0417	0.0539 -0.0361
Business x age	-0.00251 (0.00233)	-0.00112 (0.00297)	-0.0323 -0.0529	0.0765 -0.0544	-0.0323 -0.0529	0.0765 -0.0544
Agriculture x age	-0.00120 (0.00324)	-0.00573* (0.00342)	0.103 -0.192	-0.0225 -0.0538	0.103 -0.192	-0.0225 -0.0538
Sciences x age	0.00351 (0.00231)	-0.00421 (0.00298)	0.0208 -0.0477	0.0534 -0.0338	0.0208 -0.0477	0.0534 -0.0338
Engineering x age	-0.00679*** (0.00261)	-0.00320 (0.00296)	0.0365 -0.0943	0.039 -0.0369	0.0365 -0.0943	0.039 -0.0369
Health Sciences x age	-0.00263 (0.00228)	-0.00199 (0.00305)	0.068 -0.0525	0.101*** -0.037	0.068 -0.0525	0.101*** -0.037
Constant	7.820*** (0.0918)	7.637*** (0.125)	-11.16*** -2.932	-6.925*** -2.086	-11.16*** -2.932	-6.925*** -2.086

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2001 Census, and author's calculations

Note: Education serves as the base case for master's and PhD regressions

Table D6
 2011 - Quantile Regression Results (80th quantile), by Field of Study
 ln(Post-Tax Income)

	Bachelor's		Master's		PhD	
	Female	Male	Female	Male	Female	Male
Age	0.124*** (0.00597)	0.117*** (0.00293)	0.113*** (0.00190)	0.132*** (0.00210)	0.107*** (0.00660)	0.102*** (0.00450)
Age squared	-0.00146*** (1.29e-05)	-0.00159*** (1.39e-05)	-0.00116*** (2.08e-05)	-0.00141*** (2.33e-05)	-0.000983*** (6.51e-05)	-0.000937*** (4.67e-05)
<u>Field of Study</u>						
Education	-0.147 (0.205)	-0.848*** (0.0787)				
Fine Arts	-0.592*** (0.208)	-1.238*** (0.0933)	-0.678*** (0.0790)	-0.788*** (0.131)	-0.0971 (0.337)	-0.409** (0.161)
Humanities	-0.371* (0.205)	-1.090*** (0.0795)	-0.271*** (0.0347)	-0.445*** (0.0416)	-0.189 (0.126)	-0.170* (0.0871)
Social Sciences	-0.263 (0.205)	-1.103*** (0.0793)	-0.0526* (0.0271)	-0.256*** (0.0367)	0.174 (0.120)	0.0885 (0.0871)
Business	-0.0881 (0.205)	-0.886*** (0.0784)	0.0513 (0.0365)	-0.00971 (0.0334)	0.349 (0.323)	0.456*** (0.120)
Agriculture	-0.0908 (0.231)	-0.780*** (0.114)	-0.143 (0.103)	-0.324*** (0.0898)	0.154 (0.223)	-0.131 (0.142)
Sciences	-0.371* (0.205)	-0.932*** (0.0784)	-0.145*** (0.0340)	-0.214*** (0.0331)	-0.188 (0.123)	-0.133* (0.0732)
Engineering	0.207 (0.206)	-0.778*** (0.0780)	0.0159 (0.0481)	-0.153*** (0.0315)	0.124 (0.185)	0.104 (0.0831)
Health Sciences	0.168 (0.205)	-0.798*** (0.0858)	0.161*** (0.0305)	-0.414*** (0.0770)	0.226 (0.143)	-0.111 (0.134)
<u>Field of Study x age</u>						
Education x age	0.00898 (0.00590)	0.0276*** (0.00286)				
Fine Arts x age	0.0137** (0.00599)	0.0332*** (0.00305)	0.00852*** (0.00180)	0.0120*** (0.00253)	-0.000278 (0.00656)	0.00715** (0.00302)
Humanities x age	0.0118** (0.00591)	0.0329*** (0.00287)	0.00359*** (0.000775)	0.00667*** (0.000879)	0.00291 (0.00256)	0.00235 (0.00205)
Social Sciences x age	0.0117** (0.00590)	0.0380*** (0.00287)	0.000911 (0.000601)	0.00853*** (0.000889)	-0.00296 (0.00246)	-9.33e-05 (0.00207)
Business x age	0.00941 (0.00591)	0.0340*** (0.00285)	0.00237*** (0.000851)	0.00713*** (0.000805)	-0.00475 (0.00676)	-0.00391 (0.00278)
Agriculture x age	0.00496 (0.00641)	0.0276*** (0.00343)	0.000809 (0.00227)	0.00582*** (0.00189)	-0.00419 (0.00463)	0.00154 (0.00355)
Sciences x age	0.0145** (0.00591)	0.0328*** (0.00285)	0.00232*** (0.000777)	0.00598*** (0.000748)	0.00437* (0.00252)	0.00413** (0.00183)
Engineering x age	0.00163 (0.00595)	0.0317*** (0.00285)	-4.19e-05 (0.00115)	0.00659*** (0.000740)	-0.00219 (0.00390)	-4.53e-05 (0.00200)
Health Sciences x age	0.00454 (0.00590)	0.0299*** (0.00296)	-0.00152** (0.000697)	0.0157*** (0.00198)	-0.00172 (0.00308)	0.00850*** (0.00307)
Constant	8.177*** (0.205)	8.726*** (0.0774)	8.436*** (0.0437)	8.167*** (0.0466)	8.430*** (0.180)	8.638*** (0.110)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: 2011 NHS, and author's calculations

Note: Education serves as the base case for master's and PhD regressions