

EPRI #GradEarnings RESEARCH BRIEF #3 (Version '14-11-21)

# How Much Do University Graduates Earn?

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## Overview of EPRI #GradEarnings Research Briefs:

- 1) Introduction
- 2) Data and Methodology
- 3) How Much Do University Graduates Earn?
- 4) The Boom and Bust of ICT Graduates' Earnings Over Time

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## Part I: Introduction

### Major Findings

This Research Brief presents an analysis of labour market outcomes of university graduates with bachelor's degrees using a new dataset that links information on students from the University of Ottawa to tax records held at Statistics Canada. We study their outcomes across different areas of study from 1998 through 2010. We do this by following their earnings on a year-by-year and cohort-by-cohort basis from 1999 through 2011, the last year for which tax data were available. We also compare the earnings of male and female graduates, and compare those at different ranges of the earnings distribution across faculties.

Graduates are separated into seven different faculty groups based on the program they graduated from. These are: 1) Business, 2) Engineering and Computer Sciences, 3) Health, 4) Humanities, 5) Mathematics and Natural Sciences, 6) Social Sciences, and 7) Other.

The major findings are:

1. The earnings in the first year after graduation for all graduates taken together varied between \$41,000 and \$47,000 over the entire 1998-2011 period. Earnings of graduates generally increased substantially in the years following graduation for each of the cohorts examined.
2. Graduates from different faculties had substantially different starting earnings levels, but increases over time also varied, thus highlighting the value of the longer-run perspective of earnings provided here in order to understand post-schooling earnings patterns.
3. Engineering and Computer Sciences, Mathematics and Natural Sciences, and Business graduates experienced more volatile earnings patterns than Health, Social Sciences and Humanities graduates.
4. There were significant differences in earnings patterns between men and women.

### Data and Methodology

The University of Ottawa's Institutional Research and Planning (IRP) office provided administrative data on all graduating students from the University of Ottawa from 1998 through to 2010 to Statistics Canada. The data included information on field of study and gender, among other variables. Statistics

Canada linked these data to each student's tax record so their post-schooling earnings could be tracked on an individual basis.

To measure labour market outcomes, this analysis focuses on total before-tax earnings, combining earnings from the T4 slips, self-employment income and other employment income. We focus on mean (i.e. average) earnings, adjusted to 2011 dollars, although we also look at more detailed breakdowns.

In this initial project, we focus on bachelor degree graduates who were in the labour force. We excluded the following groups from our analysis: graduates whose before-tax annual earnings were less than or equal to \$1,000, graduates who continued their schooling, individuals with advanced degrees, and those with bachelor degrees that cannot be undertaken directly from high school (e.g. education or law).

For a more detailed description of the data and methodology see the Data and Methodology document in this series of briefs.

## **Part II: Findings**

### **Earning Patterns of 1998 Graduates**

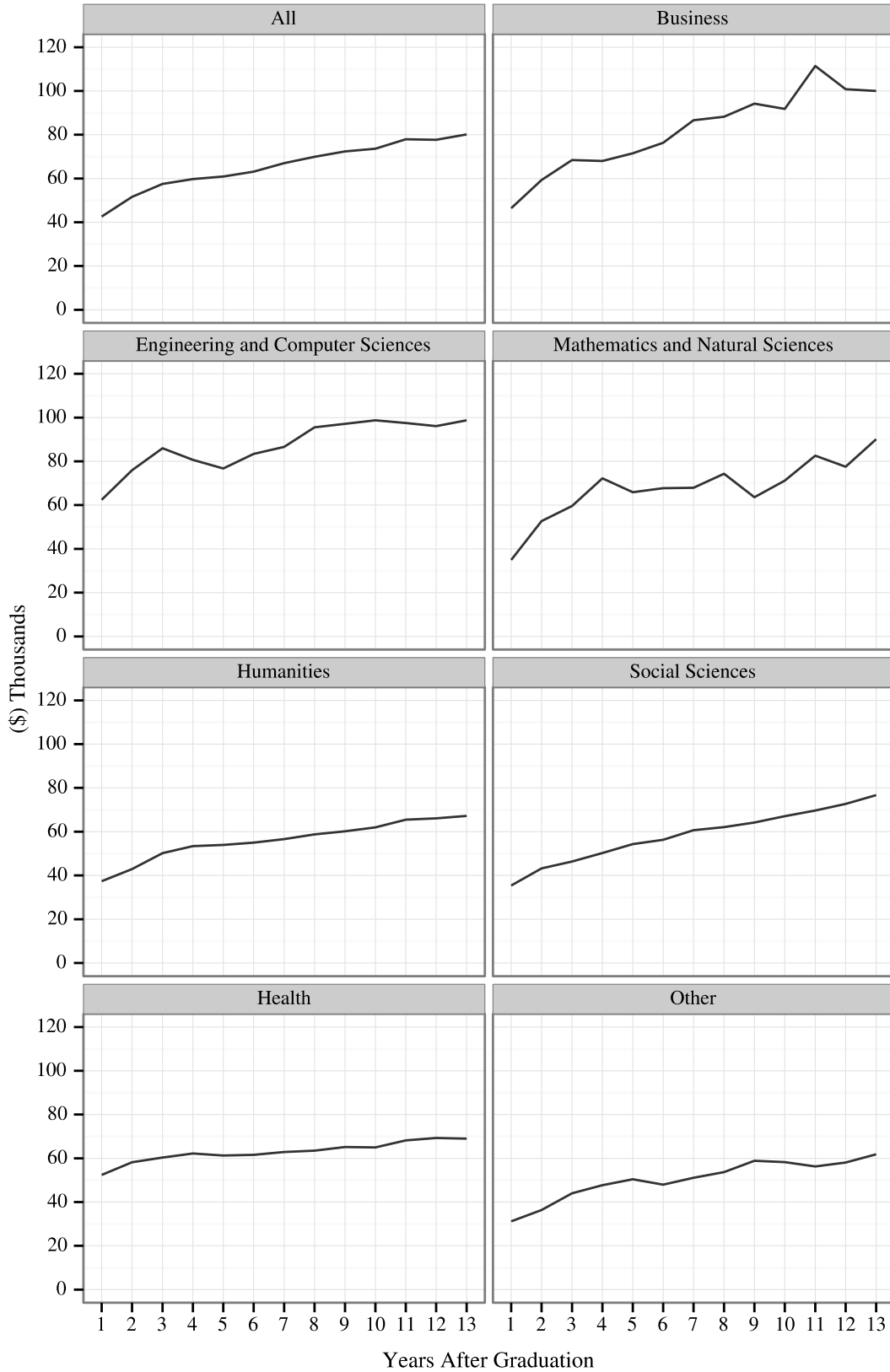
Figure 1 presents the earnings profiles of graduates from the 1998 cohort (i.e. those students who graduated in 1998) for each of the 8 faculty groups included in the analysis. Year 1 after graduation corresponds to fiscal (tax) year 1999, year 2 after graduation corresponds to fiscal year 2000, and so on until year 13 after graduation (fiscal year 2011).

Three important sets of findings are worth mentioning. First, graduates from Engineering and Computer Sciences programs had, on average, the highest earnings in the first year after graduation (around \$62,000). These graduates then saw rapid increases in their yearly earnings that continued up to the bursting of the dot-com bubble in 2001 (year 3 after graduation), the effects of which are evident in the substantial decreases in earnings in the 4th and 5th years after graduation.

Nonetheless, in the 13th year after graduation these graduates were amongst the top earning faculty groups, with mean earnings just below \$100,000.

Second, graduates from Business, and Mathematics and Natural Sciences, like graduates from Engineering and Computer Sciences, had considerable volatility in their earnings, with sharp movements over the period of analysis. In contrast,

Figure 1: Mean Earnings, 1998 Cohort



graduates from Health, Humanities and Social Sciences experienced less volatility, with smaller but steadier increases in earnings.

Third, we see substantial differences in both the level of starting earnings and the rate of earnings increases over time across faculty groups. For example, although graduates from Business had first year earnings much lower than those of Engineering and Computer Sciences, both sets of graduates finished the 13 year period with roughly similar earnings (around \$100,000). Health graduates, on the other hand, started with the second highest earnings in their first year after graduation, but finished roughly on par with graduates from Humanities and Social Sciences. Social Sciences graduates had relatively low starting earnings levels but enjoyed substantial earnings increases over time, to finish above their Humanities and Health colleagues.

### **Earnings Patterns of Other Selected Cohorts**

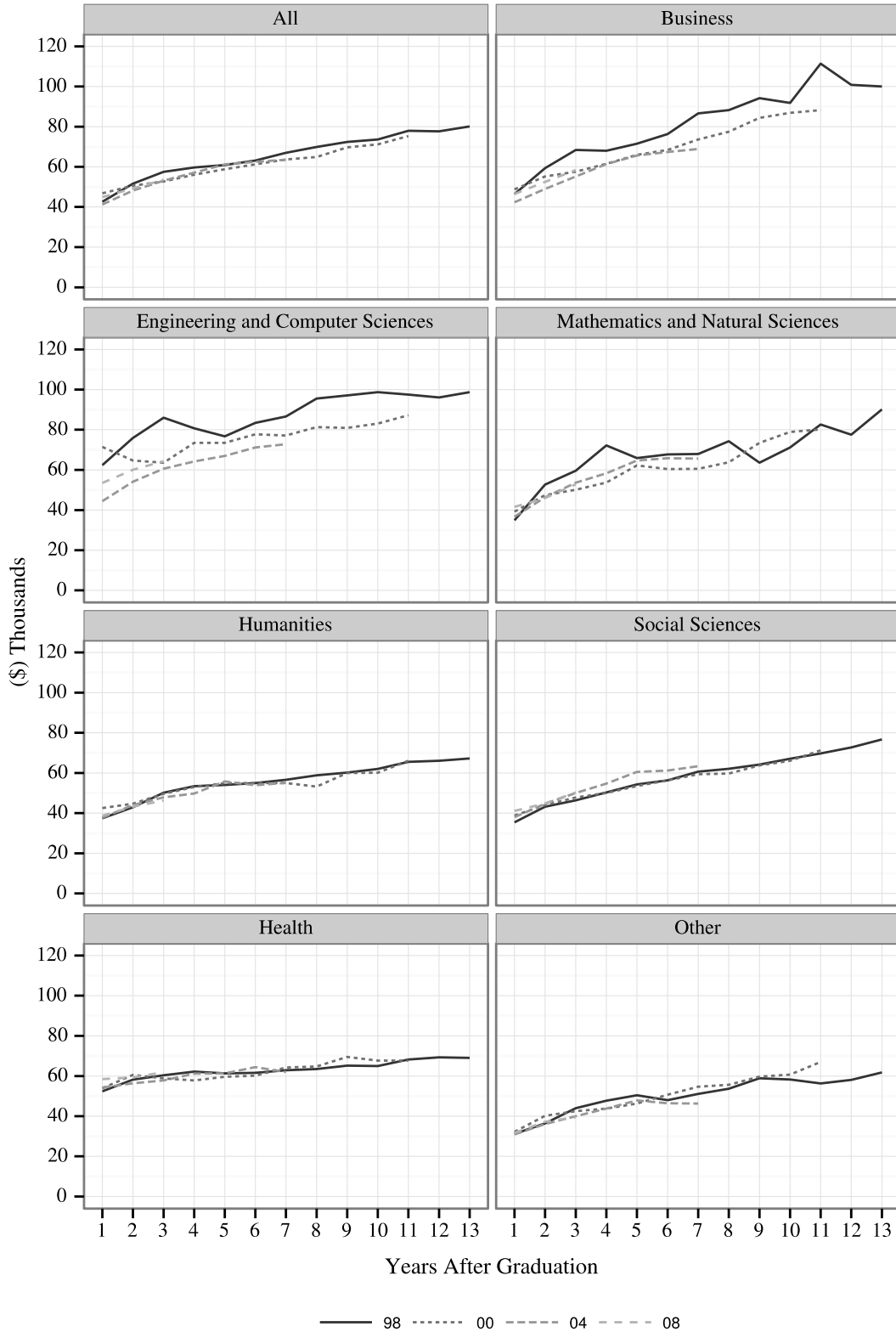
Figure 2 compares four cohorts of graduates from each faculty, allowing us to observe the differences in earnings among graduates from different cohorts at the same point in their careers.

The 2000 cohort of graduates from Engineering and Computer Sciences programs entered the workforce immediately before the dot-com bust of 2001. With the exception of the first year after graduation, the earnings of this cohort never equalled the earnings of the 1998 cohort, who entered the labour market just two years earlier. The 2004 cohort of graduates entered the workforce at the low-point of the dot-com bust - when demand for their skills declined significantly - and, as a result, this cohort had the lowest first year earnings of any of the four cohorts (around \$45,000). Starting earnings then recovered somewhat for the 2008 cohort but still remained consistently below those of the first two cohorts.

Graduates from Business and from Mathematics and Natural Sciences programs also experienced significant differences in first year earnings and even larger differences in earnings for a given year following graduation across cohorts relative to the other faculty groups. In contrast, the more stable faculty groups (Health, Humanities, and Social Sciences), are characterised by smaller differences in earnings across the cohorts at the same point in their careers.

The key findings regarding initial earnings levels versus increases over time mentioned above generally hold across all cohorts for these different types of graduates.

Figure 2: Mean Earnings, Selected Cohorts





### **First Year Earnings Across All Graduating Cohorts**

Figure 3 profiles only the first year earnings of each cohort from the faculty groups examined, presenting the information by fiscal/tax year. Fiscal year 1999 indicates the first year earnings of the 1998 cohort, fiscal year 2000 indicates the first year earnings of the 1999 cohort and so on.

Graduates from the Engineering and Computer Sciences group had the highest first year earnings of all graduates from 1999 through to 2001. However, from 2001 to 2004, their first year earnings decreased by around \$30,000 – a remarkable decline.

The Health group had the second highest first year earnings for each of the 13 cohorts examined, second only to the Engineering and Computer Sciences group. Business graduates had the third highest first year earnings throughout.

Social Sciences and Humanities graduates had first year earnings lower than the sample mean (All group) for all but one year. There was a large increase in first year earnings of Humanities graduates between 2002 and 2003, a finding that appears to be driven by a small number of high earners in the 2002 cohort.

### **The Distribution of Earnings**

Figure 4 presents the average (mean) earnings of each earnings quintile for the 1998 cohort of graduates – that is, it presents earnings levels for those at the top, in the middle, and at the bottom within each faculty group. To generate these quintile means, each faculty group is divided into five equally sized groups, sorted by earnings level. The mean earnings are then calculated for each group. There are significant differences between the lowest and the highest earning quintiles for each of the faculty groups, and these differences tend to grow over time.

We have already seen in the analysis of first year earnings that in the 1998 cohort, Engineering and Computer Sciences graduates had the highest first year earnings of all faculty groups. Now we see that this pattern also holds true for each of the top four quintiles.

Business graduates registered the largest difference in earnings between the highest and lowest earning quintiles, with the top earning quintile experiencing the greatest increases in earnings year-over-year of all of the faculty groups examined. This quintile finished the 13-year period with mean earnings of around \$218,000, thus significantly pulling up the mean earnings of this cohort of Business graduates.

Figure 3: First Year Mean Earnings

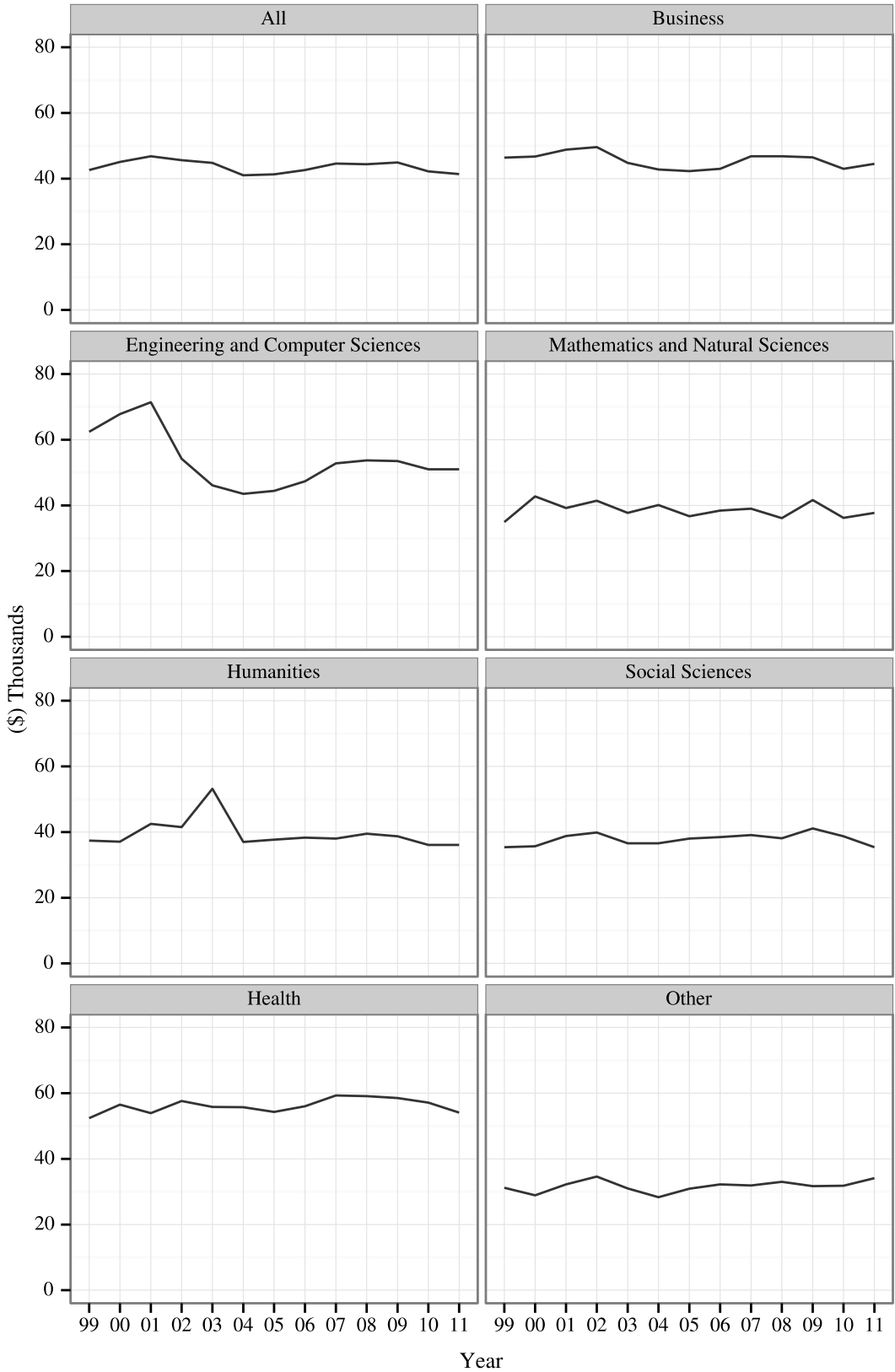
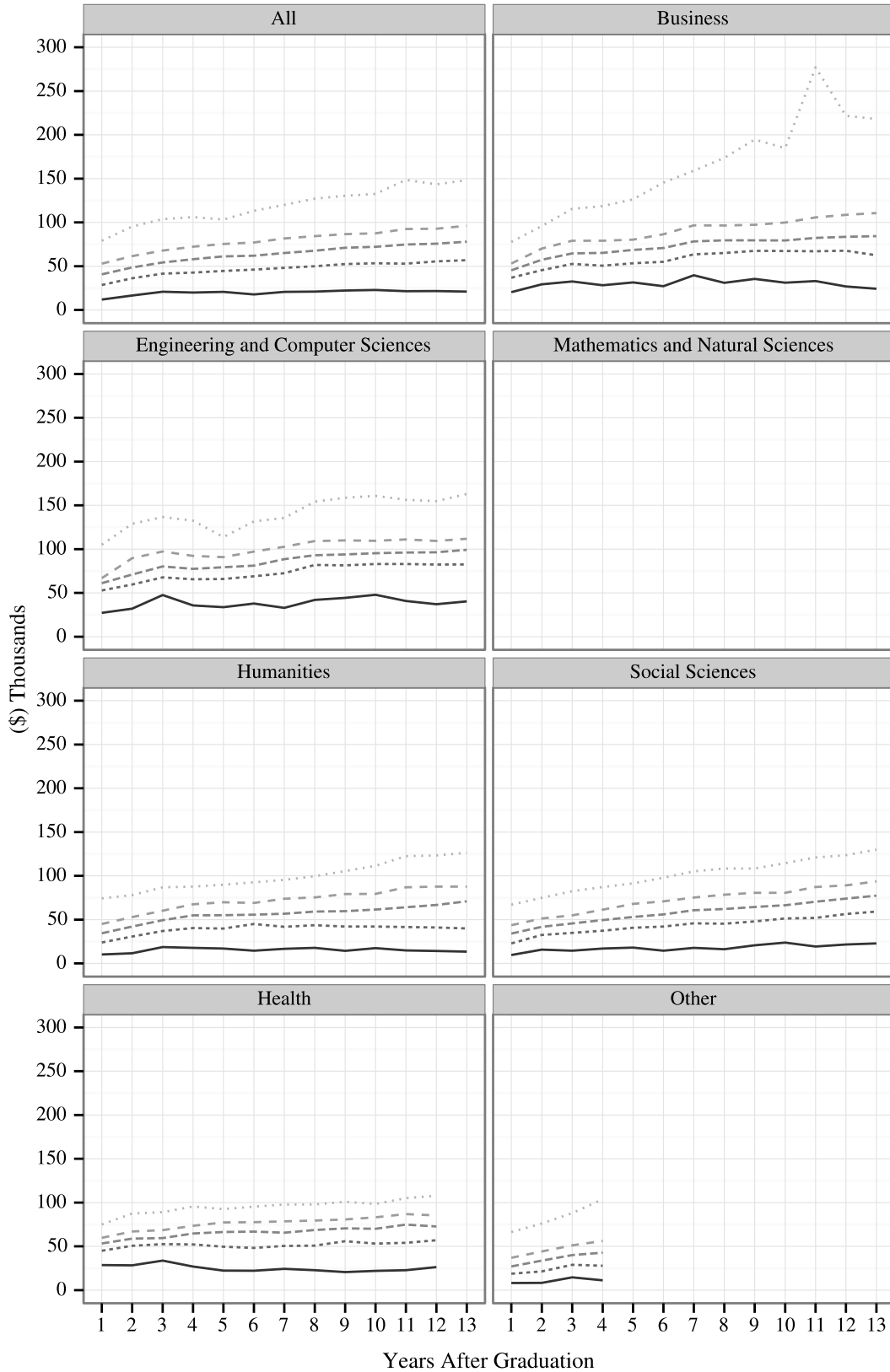


Figure 4: Mean Earnings by Quintile, 1998 Cohort



Health graduates had the narrowest distribution of earnings compared to the other faculty groups.

There are interesting similarities between the Humanities and Social Science graduates, for the top three quintiles. These graduates started and finished with comparable earnings. The bottom two quintiles, however, are considerably different, with the Social Science graduates finishing with higher earnings, which raises the overall Social Sciences average relative to Humanities graduates. The first, second and third quintiles of Social Science and Humanities graduates had mean earnings in the range of \$125,000, \$90,000, and \$75,000 13 years after graduation.

There were insufficient sample sizes in both the Mathematics and Natural Sciences and Other faculty groups to examine the distribution of earnings for this cohort.

Finally, it is interesting to note how comparable mean earnings were for those in the third – or middle – earnings quintiles for graduates from Business, the Social Sciences, and the Humanities. The ‘average’ graduate from these disciplines (defined in this way) achieved about the same earnings.

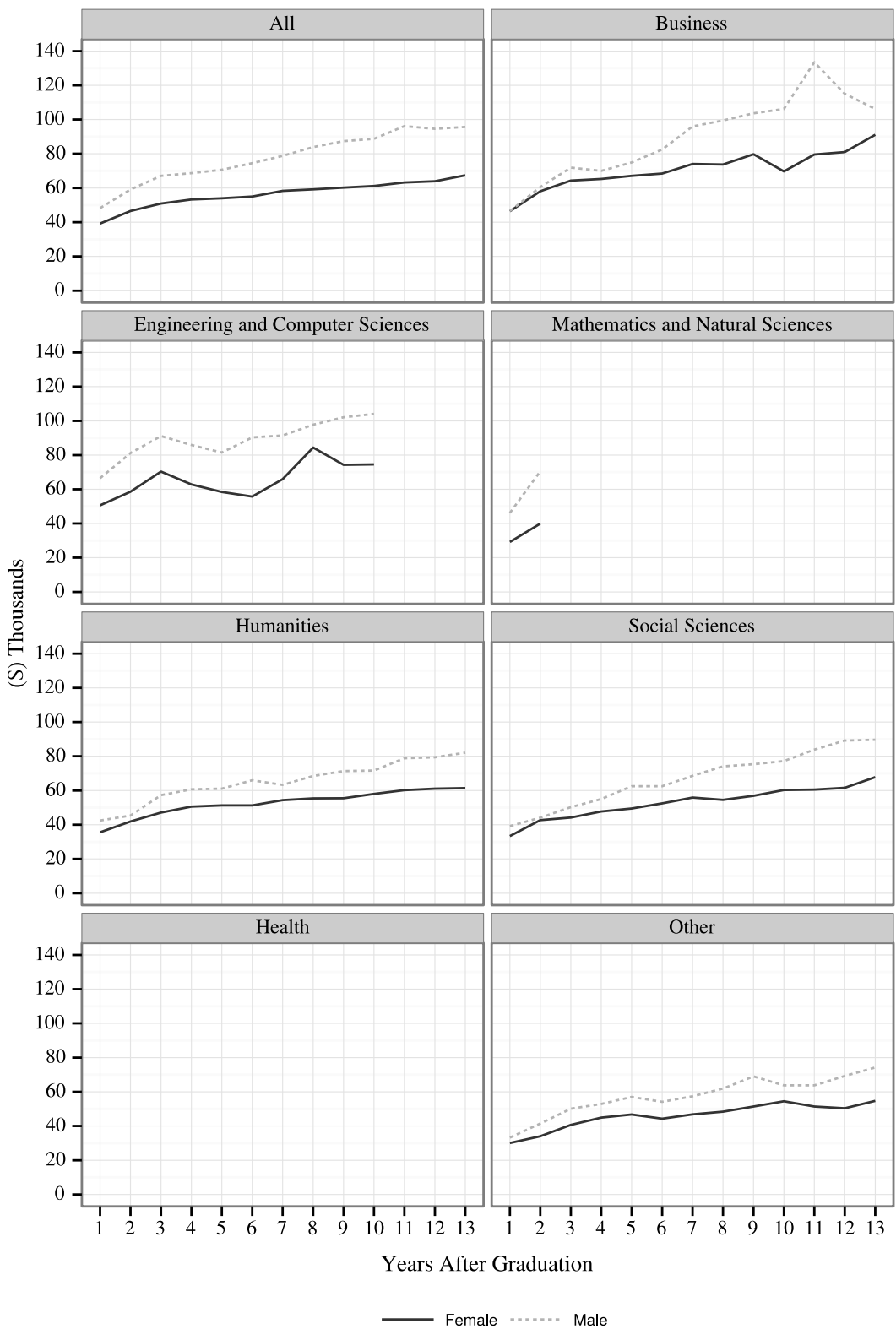
That said, it would be interesting to know more about those at the lower earnings levels of these groups. Were they part-time workers, perhaps by choice – or not? Did they have significant family responsibilities that affected their earnings? Or were they low performers as students, with these performance gaps simply carrying over into the labour market? Further analysis may well address at least some of these issues.

## **Gender**

Figure 5 presents the earnings profile of the 1998 cohort of graduates separated by gender. On average (the All group), male graduates in 1998 had higher earnings than female graduates. This gap widened over time, from \$10,000 in the first year after graduation to \$20,000 by the 13th year after graduation.

Two other findings merit mentions. First, the earnings differential between men and women was most pronounced in the Engineering and Computer Sciences faculty group. In the first year after graduation there was already a substantial earnings gap, with men earning around \$15,000 more than women on average. In the final year, men registered an earnings premium of around \$30,000.

Figure 5: Mean Earnings by Gender, 1998 Cohort



Secondly, across all faculty groups, the earnings gap between men and women was smaller (and sometimes almost absent) at the start of the graduates' careers, but then grew over time. At the end of the 13-year period, men were earning around \$20,000 more than women in each of the faculty groups.

### **2008 Recession**

To capture the effects of the 2008 recession on graduates' earnings, Figure 6 shows the first year earnings of the faculty groups, but spanning only the period 2006 through 2011. This period captures the lead-up to the recession, the recession itself, and the subsequent recovery period.

The 2008 recession does appear to have negatively affected the earnings of graduates entering the labour market, but the year of comparison is very important. When compared to the peak years which were observed at different points over the 2007 through 2009 period, varying by faculty group, earnings levels in 2010 and 2011 were indeed lower – as much as \$5,000 in the case of Health graduates. But when compared to the pre-peak years – as captured here by 2006 entry earnings levels – the decreases were much smaller, in the range of two to three thousand dollars (max) and, in the case of Engineering and Computer Sciences and Business graduates, earnings were actually higher in 2011 than in 2006. Obviously, these trends will be important to watch as they continue to unfold.

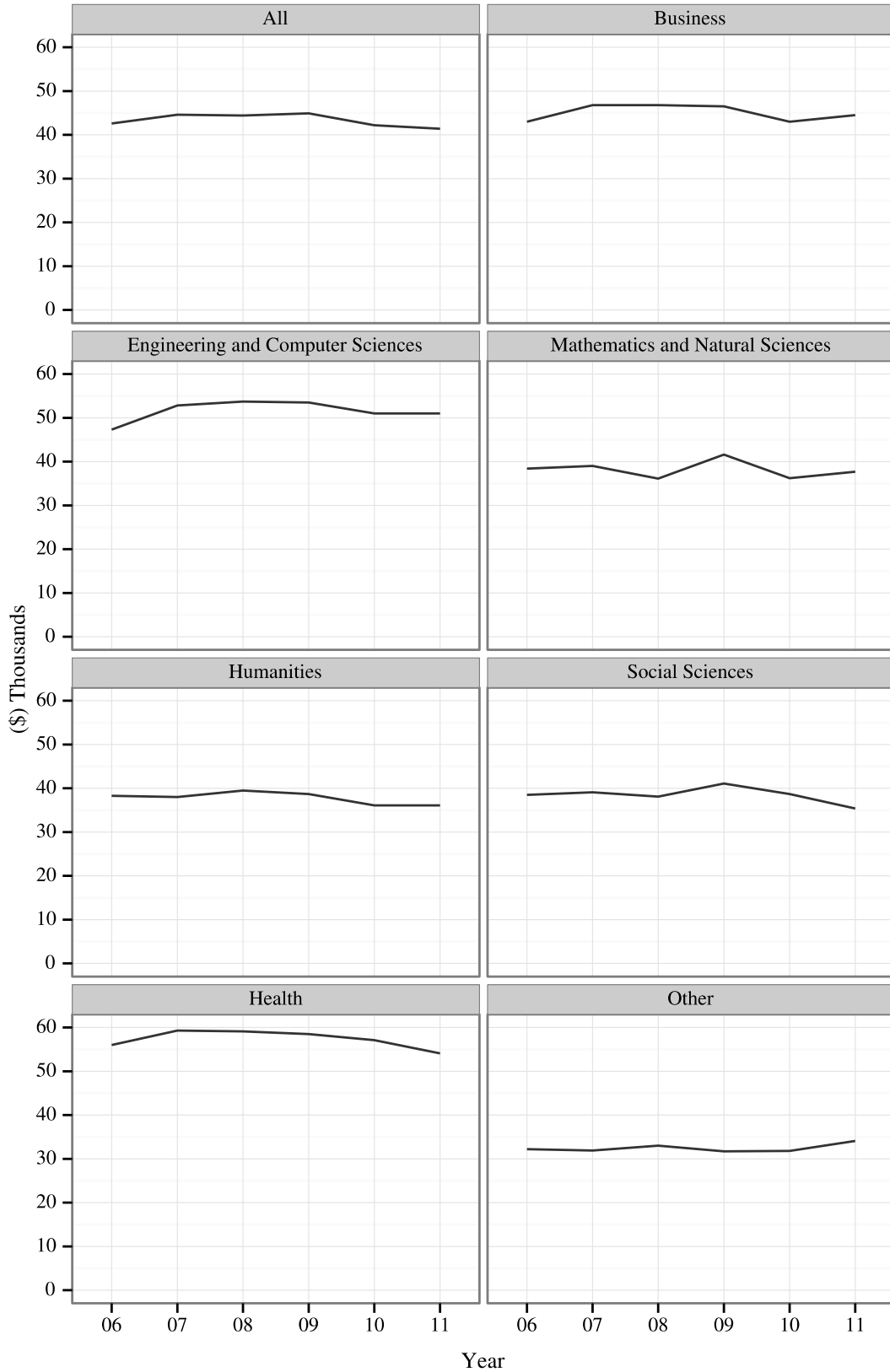
### **Part III: Conclusion**

The findings in this analysis demonstrate that those who performed best in the labour market tended to be Engineering and Computer Science graduates. Business graduates also did well, but this was almost entirely driven by the top earners, with other Business graduates faring not all that differently from graduates in other cohorts.

At the same time, graduates in disciplines that were better compensated relative to others also tended to have more variable earnings, suggesting a greater vulnerability to changes in the business cycle. Earnings of Social Science, Humanities and Health graduates were, in contrast, remarkably stable across all 13 cohorts of graduates captured here.

The findings also demonstrate the value of looking at earnings longitudinally, on a year-by-year basis for an extended number of years after graduation, in order to gain an accurate picture of the labour market performance of graduates. This

Figure 6: 2008 Recession, First Year Mean Earnings



unique approach allows us to observe, for example, that Health graduates perform better than most other disciplines in the first few years after graduation, but that over time graduates from the Humanities and (especially) Social Sciences tend to catch-up and surpass them.

This kind of information on labour market outcomes of graduates from different areas of study could be extremely useful to students making schooling choices, as well as to policy makers, employers, and the general public. This will be especially true once a greater number of graduates from more institutions across the country are included.