Report on alumni survey for the Master's programme in statistics at Uppsala University

Mattias Nordin

Study director of the Master's programme

March 8, 2021

Summary

An alumni survey was sent to all graduates from the Master's programme in statistics at Uppsala University, with respondents being asked questions about the skills they learned at the programme in light of their labor market experience as well as information about their previous and current jobs. Respondents to the survey were overwhelmingly positive with 98% reported being happy that they studied on the programme. The labor market prospects for graduates from the programme is exceedingly bright. Most respondents reported a seamless transition to the labor market, with a majority getting their first job before even finishing the programme and 95% having a job within five months of graduation. The median entry salary for the respondents was around 30,000 SEK, with an annual wage growth of around 6–7%. In the report, strengths and weaknesses of the programme in light of the survey is discussed, together with suggestions for improvements for the future.

1 Background

The Master's programme in statistics at Uppsala University has now existed for more than ten years. To ensure high quality and relevance of the programme for the

labor market, it is important to follow up on the career paths of graduates from the programme. To do so, we have sent out a survey to alumni from the programme where we ask about their opinions on the programme, as well as their work experience.

The purpose of this alumni survey is two-fold. First, the results from the survey is relevant for current and future Master students to learn about the career paths that are open for graduates from our programme, both in terms of employment and salaries, as well as the type of work that our graduates are performing. Second, it is an opportunity for us to learn about the alumni's opinions of the programme and its relevance for their job, as well as what they wish the programme had included in light of their work experience. The results will be useful for our continued efforts to make sure the programme is relevant and useful for our students.

2   The survey

In total, 154 individuals have graduated from the Master's programme in statistics at Uppsala University with either a 1-year (21 graduates) or 2-year (133 graduates) Master's degree since its inception (first graduation was in 2010). To invite them to take the survey, we used email addresses from NyA.[1] Email addresses was available for 127 of those individuals, with most of the missing addresses coming from the early years. In addition, for another 11 alumni, the email bounced, meaning that the number of alumni we could contact was 116. Still, it is likely that among these 116 remaining indvidiuals, a number of them never read their email, especially those from earlier years.

Invitation to the survey was sent out on the 2nd of February 2021, with reminders sent out on the 10th and 17th. In total, 55 alumni responded, giving a response rate of 36% (47% of those who received the invitation). Responses were increasing with graduation year, likely because for the graduates from early year, email addresses were no longer in use, as shown by Figure 1.

One third of the respondents were women, which is a bit lower than the share

---

[1]NyA is the system used for university admission in Sweden, see `https://www.uhr.se/nyawebben/publika-sidor`.

of female graduates, which is around ten percentage points higher. Around 76% of respondents did their undergraduate studies in Sweden and 84% are currently living in Sweden.

3 Results

Aside from background questions, the questions in the survey was divided into three parts: i) opinions about the programme, ii) the first job and iii) current job.

3.1 The programme

Results from the survey indiciate that the overwhelming majority of the alumni were satsified with the programme. On the question: "Overall, are you happy that you studied on the Master's programme?", 54 of the 55 respondents (98%) said yes (Figure 2).

When it comes to the skills they acquired during the programme, respondents rated statistical theory the highest with the other four skills: oral presentations, written presentations, programming and applied statistics rated slightly lower (Figure 3). On all questions, more respondents agreed than did not agree that they had learned the respective skill.

Respondents were also asked an open-ended question on if there were any particular skills that they learned at the program which has been useful at their work (Figure 4). From the answers, it is clear that programming was the most important skill, with many students mentioning programming in general or programming in R in particular. Following these skills, a number of students also mentioned statistical theory, such as statistical inference and probability theory, as well as general critical and statistical thinking.

When it comes to skills the alumni wished the had learned more of in the programme, machine learning was the most popular answer (Figure 5). It should be noted that for all but the last cohort (graduates of 2020), the programme did not feature a machine learning course, but nowadays, such a course is included in the

third semster of the programme ("Machine Learning, Big Data, and Artificial Intelligence").

The second most popular skill that the respondents wished they had learned in the programme was to learn SQL or database management followed by more applied statistics working with real data as well as Bayesian statistics. Perhaps surprisingly, a number of students also wished they learned more programming, despite the fact that many respondents rated it as a useful skill that they learned at the programme (Figure 4).

3.2 The first job

The alumni in general got their first job quickly, with more than half getting a job before finishing the programme, and with 95% having a job within five months of graduation (Figure 6). Most of those jobs were qualified jobs, with 42 out of 55 respondents (76%) reported that their first job required a Master's degree or similar. In general, the alumni did not have to apply for many jobs to get hired, with 69% applying for at most five jobs before getting their first job (Figure 7).

The alumni got their first job in many different ways (Figure 8), with the most common being finding a job on the employers website (25%), followed by connections (20%), LinkedIn (15%) and internship/trainee spot (9%). The median monthly entry salary was around 31,000 SEK with a large spread: three alumni had an entry salary of over 60,000 SEK (Figure 9).[2] Entry salaries have been increasing over time, with the median entry salary being 27,000 SEK for graduates in 2012–2014, 31,000 SEK for graduates in 2015–2017 and 32,000 SEK for the most recent graduates.

3.3 Current job

Respondents were also asked about their current employment. Most respondents reported working full-time (75%), with another 18% being PhD students (Figure

---

[2]The median salary is in the interval 30,001–35,000 SEK. To get a single number, it is assumed that salaries are uniformly distributed in the interval. This approach is taken for all numbers presented in this report. In text (but not in calculation), salaries are rounded to the nearest thousand.

10). The alumni work in diverse industries with the financial/insurance sector (24%) followed by the university (22%, mostly PhD students) being the most common areas of work (Figure 11). Other common areas include consultancy firms (11%), tech industry (9%), government agencies (7%) and life sciences (7%).

The alumni were also asked about their current salary, where there is a sharp increase compared to the entry salary (Figure 12): the median salary was 39,000 SEK, with 13% of respondents earning above 60,000 SEK. Because time since graduation greatly affect current salary (individuals with greater work experience generally earn more), it is relevant to break down these numbers for different cohorts. For both those graduating in 2012–2014 and 2015–2017, the median salary was 42,000 SEK, whereas for the latest cohort (graduation 2018–2020), the median was 37,000 SEK. Using the entry salaries above, with some approximations, it is possible to calculate the annual wage increase since labor market entry for the median wage to be 5.7%, 6.3% and 7.5% for each of the three cohorts.[3]

In their work, the alumni reported using a wide variety of statistical softwares and programming languages (Figure 13), with the most common being R (70%). After that follows Excel (63%), but presumably it is not used much for statistical analyses. Other common softwares and languages include SQL (43%), Python (41%) and SAS (24%). When it comes to the statistical methods that are relevant in their work, by far the most common responses were regression analysis and machine learning (Figure 14). Other methods mentioned frequently include time series analysis, survival analysis and categorical data analysis.

4   Discussion of results

The bottom line from the survey is a very positive one: almost all our alumni were happy they studied on the programme (98%). The status of our graduates on the

---

[3]Let w_{0j} be median entry salary, w_{1j} be median entry salary and T_j be number of years since graduation for cohort j, the annual percentage wage increase is calculated as $((\exp((\ln(w_{1j}) - \ln(w_{0j}))/T_j)) - 1) \cdot 100$, with the number of years since graduation being set to 8, 5 and 2 for the three cohorts. Note that these wage increases may not correspond to the wage increase for any one individual.

labor market is very strong, with most graduates getting a qualified first job immediately after graduating. The entry wage is generally good, with a very strong wage growth. The alummi work in a wide variety of sectors, both in the private and public sphere.

The respondents to the survey mentioned a wide variety of skills that they learned at the programme that are useful in their work, with the number one skill clearly being programming, especially using R. It is noteworthy that almost half of respondents mentioned machine learning as something that they use in their current work, and it was also the most common answer that the respondents wished the programme included more of. Fortunately, with the introduction of a dedicated course in machine learning in the fall of 2019, the programme is nowadays better suited to give current and future students a solid foundation in the topic.

Based on the responses to the survey, there are a couple of areas that the programme could be improved in for the future. Some respondents felt that the programme at times lacked structure and that there was a lack of communication between teachers. This is something that we know has been a problem and that we actively work to improve upon. There are also a couple of areas that we should introduce our students to. Many alumni reported using SQL in their work, and something that they wished had been taught at the programme. While it may not be necessary with a full course in SQL and working with databases, it seems as if a short introduction to the topic for a couple of lectures would be useful and appreciated.

Another common comment was that the alumni wanted to work more with real data and applied statistics during the programme. While it is important that our students get a solid theoretical foundation to stand on (and it is also something that respondents mentioned as positive), we will have to continuously discuss the appropriate division between statistical theory and applied statistics.

Finally, based on the survey responses, there are two topics we should consider including more of in the programme either as full courses, or as major parts of existing courses: Bayesian statistics and survival analysis. Currently, the programme does not include a dedicated course in Bayesian statistics, and it is also not something that is discussed much in our courses in general. I believe the programme would

improve even further if that was added to the curriculum. When it comes to survival analysis, it is one area a lot of our alumni work with. We have previously offered a course on that topic, but the course has not been given recently. I believe we should consider reintroducing such a course.
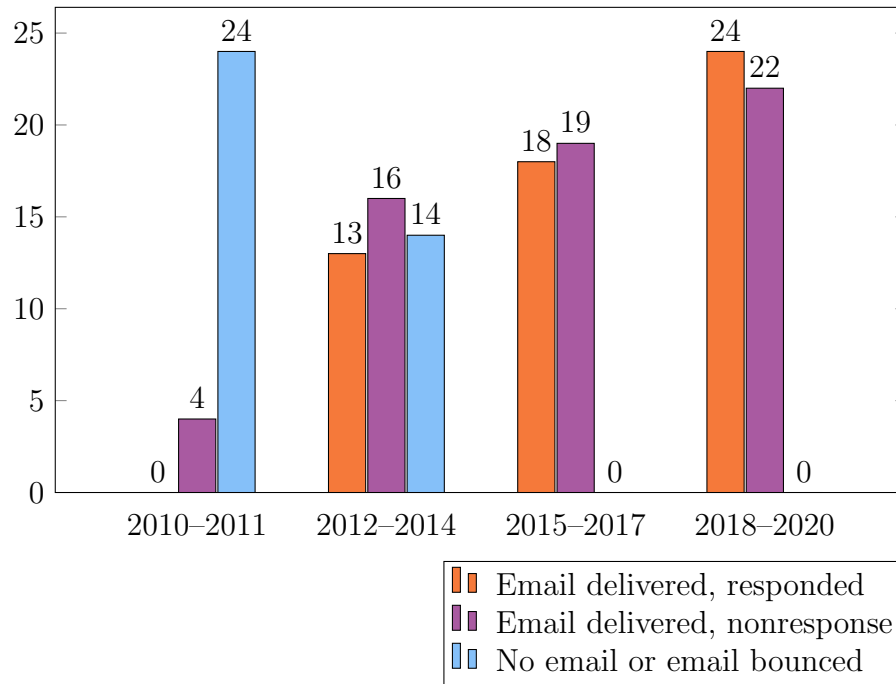
Figure 1: Survey responses, by graduation year

Note: The figure shows the number of responsents, number of nonrespondents (email was delivered but no response to the survey) and number of cases where no email was available in NyA, or where the email sent bounced.
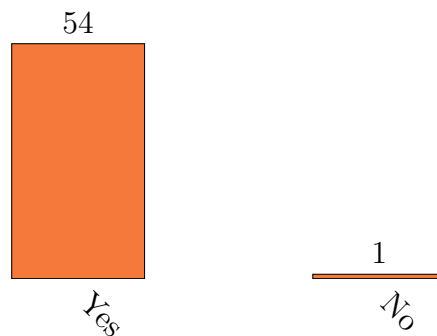
Figure 2: Happy to have studied on the programme

Note: Respondents were asked "Overall, are you happy that you studied on the master's programme?" to which they could answer "Yes" or "No".

(a) Oral presentations

(b) Written presentations

(c) Programming

(d) Statistical theory

(e) Applied statistics
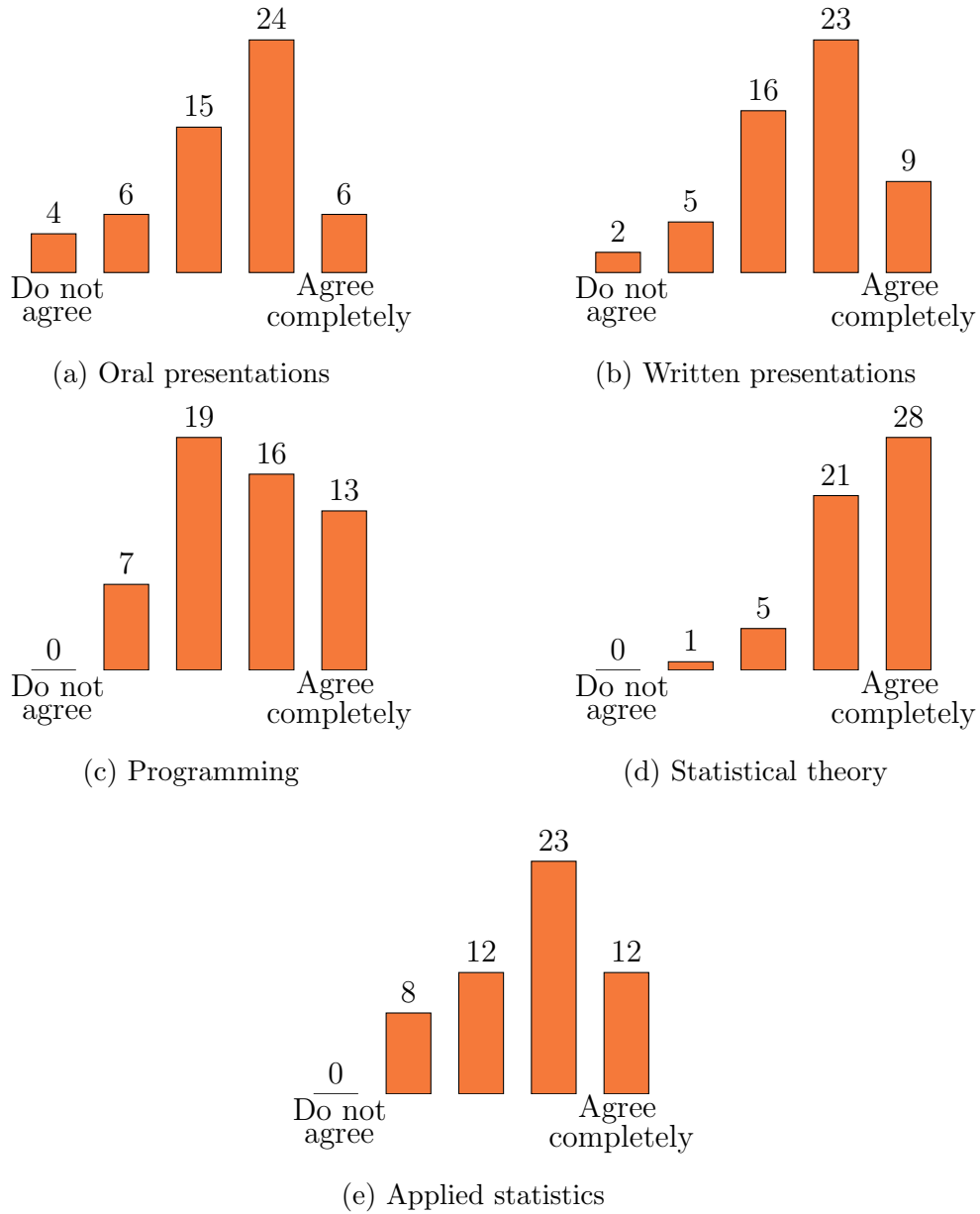
Figure 3: Skills acquired at the Master's programme

Note: Respondents were asked "To what extent do you agree that you learned the following skills at the Master's programme", to which they could answer on a five-point scale from "Do not agree" to "Agree completely". Assigning values from 1 to 5 to the answers, the averages for each question are (a) 3.4, (b) 3.6, (c) 3.6, (d) 4.4 and (e) 3.7.
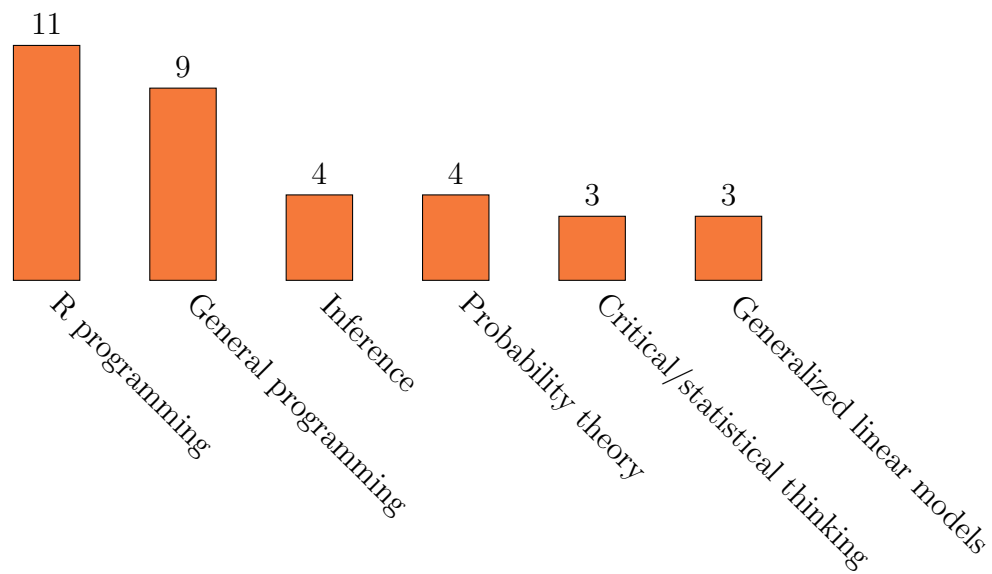
Figure 4: Useful from program

Note: Respondents were asked "Is there anything you learned in the programme that has been particularly useful in your current or previous work?" to which there was an open-ended question where the respondents could write in as many answers as they wished. The figure collects the answers that were mentioned at least three times, but different other individual answers were mentioned.
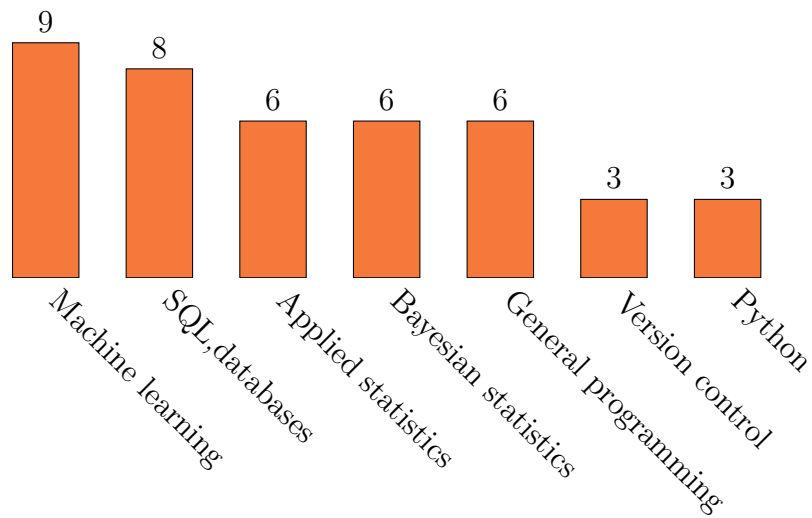
Figure 5: Wished the program included

Note: Respondents were asked "Is there anything you wish you learned more of in the programme that would have been useful in your current or previous work? (could be specific methods or general skills)?" to which there was an open-ended question where the respondents could write in as many answers as they wished. The figure collects the answers that were mentioned at least three times, but many different other individual answers were mentioned.
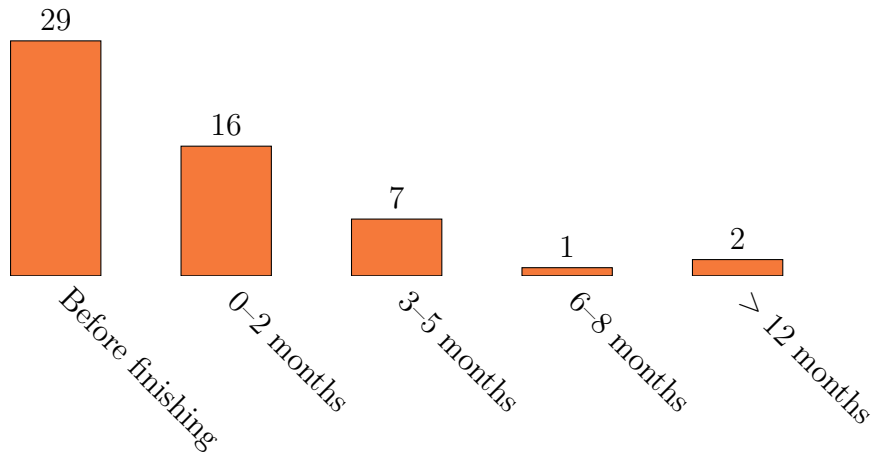
Figure 6: Time to first job after graduation

Note: Respondents were asked "Approximately how long did it take you to get your first job after you finished your Master studies", to which they could answer "Got a job before finishing the programme", "0–2 months", "3–5 months", "6–8 months", "9–11 months", "more than 12 months" and "Never worked after graduation". Only alternatives that was marked by at least one respondent are shown above.
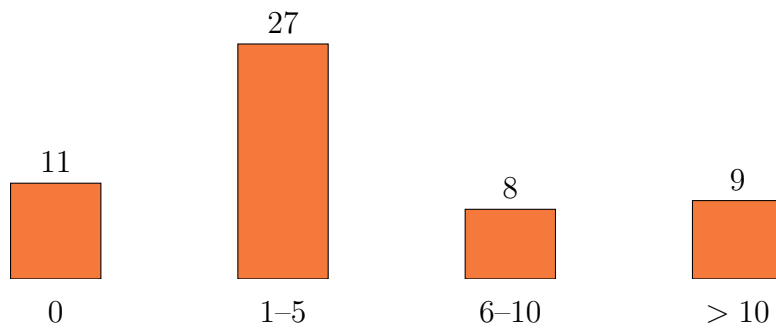
Figure 7: Number of jobbs applied before first job

Note: Respondents were asked "How many jobs did you apply for before you got your first job?"
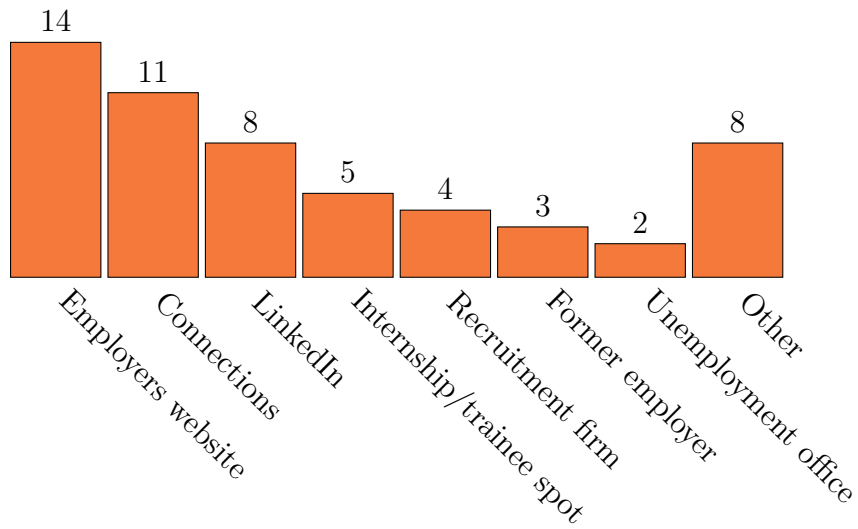
Figure 8: How the respondents got their first job

Note: The respondents were asked "How did you get your first job", with a large number of different alternatives offered. Options which only one respondent marked have been bundled together in "Other".
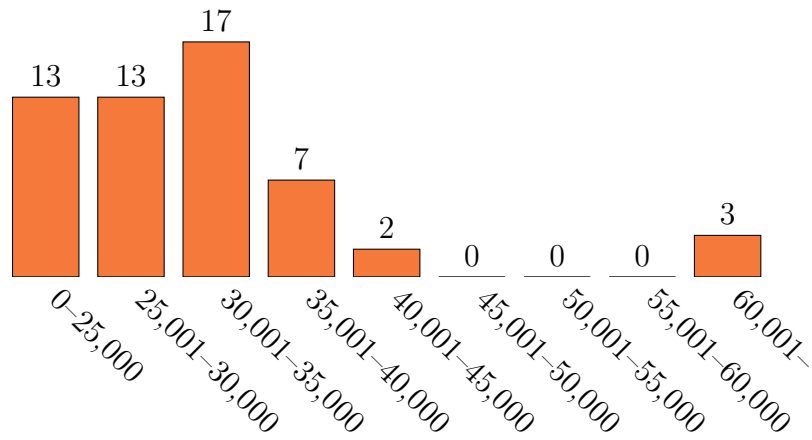

Figure 9: Salary, first job

Note: The respondents were asked "What was the salary at your first job before tax? If you were working part-time, convert it to a full-time salary. If you worked abroad, convert the salary to SEK by using 1 USD = 8 SEK or 1 EUR = 10 SEK"
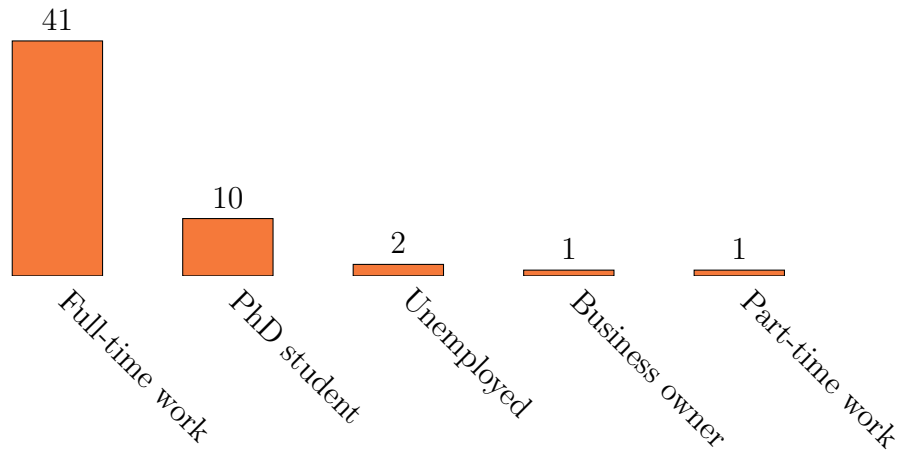
Figure 10: Current occupation

Note: Respondents were asked "What is your current occupation? (If you are on parental leave or sick leave - please state your regular job.)"
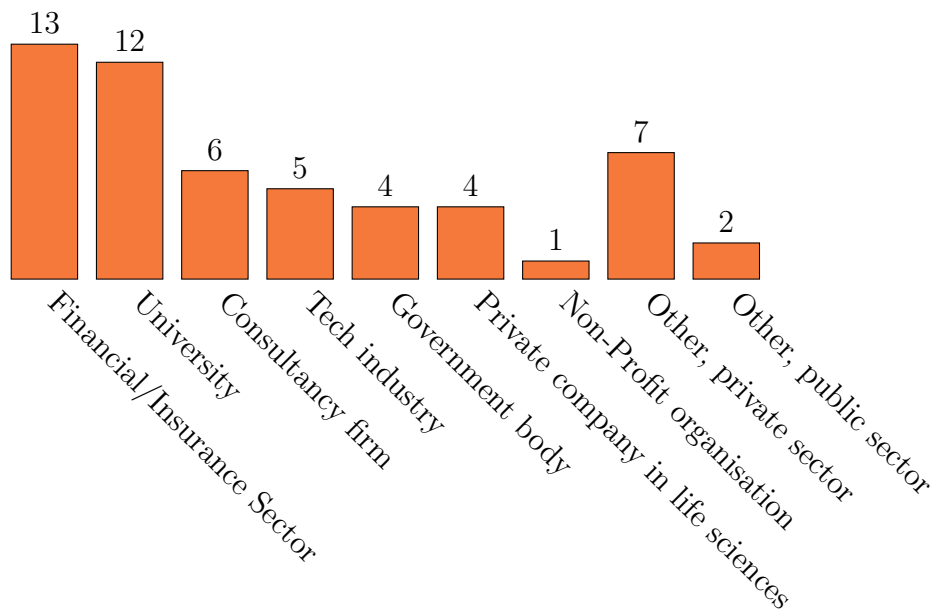

Figure 11: Sector of occupation

Note: Respondents were asked "Within what industry is your current job? (Please, mark just one alternative)"
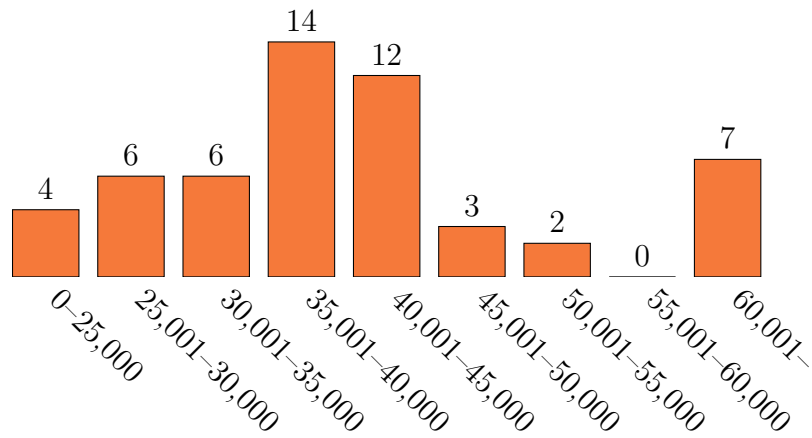
14

Figure 12: Salary, current job

Note: The respondents were asked "What is your current salary before tax? If you are working part-time, convert it to a full-time salary. If you work abroad, convert your current salary to SEK by using 1 USD = 8 SEK or 1 EUR = 10 SEK."
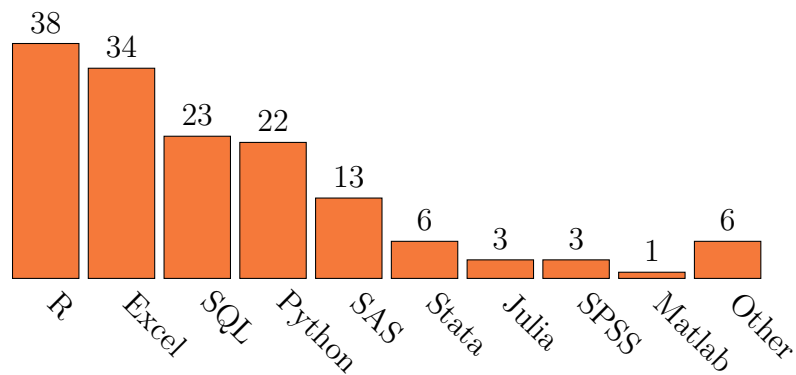

Figure 13: Use of programming languages and statistical softwares

Note: The respondents were asked "Which of the following statistical softwares/programming languages (if any) do you use regularly in your current work? You can mark several options"
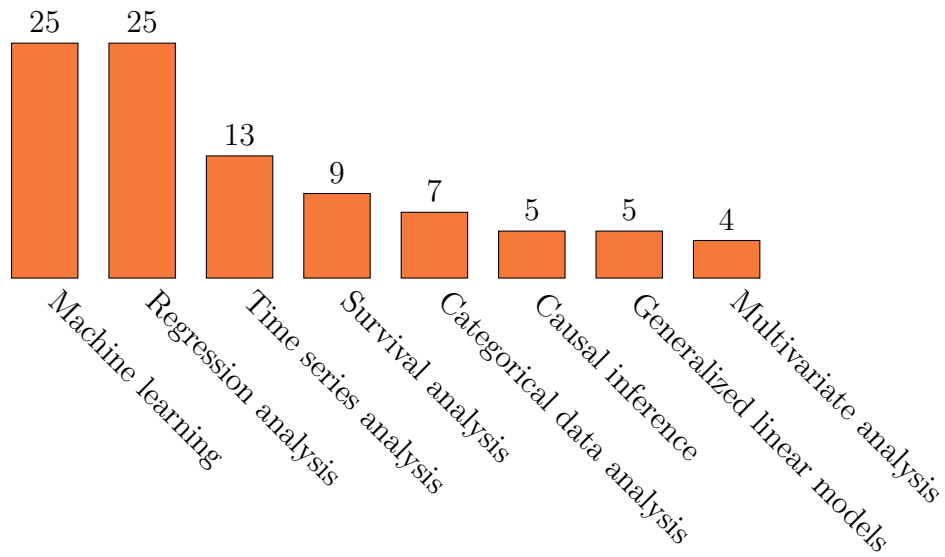
Figure 14: Statistical methods relevant at work

Note: The respondents were asked "What topics within statistics are of relevance for you in your current work? (e.g., regression analysis, machine learning, time-series analysis, categorical data analysis, survival analysis, structural equation modeling, causal inference, etc)," to which there was an open-ended question where the respondents could write in as many answers as they wished. The figure collects the answers that were mentioned at least four times, but different other individual answers were mentioned.