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statistics

Women and men in science, engineering and technology: the UK statistics guide 2010

Women and men in science, engineering and technology: the UK statistics guide 2010

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Foreword by Annette Williams

Welcome to the first edition of the UKRC's Statistics Guide: a unique, wide-ranging and detailed account of women's participation in science, engineering and technology (SET) in the UK.

The Guide provides data on a number of indicators from the areas of education, employment, pay, leadership and public engagement. It reflects our commitment to providing the evidence needed to inform policy and bring about change.

The Guide is published at a time of particular need. The under-representation of women in SET is increasingly seen as an issue affecting economic growth and productivity. In addition, research suggests that diverse teams that include men and women are important to innovation and economic development. Women have a vital role to play alongside their male colleagues in generating new solutions, opportunities, products and services.

At the same time, employers report skills gaps in many areas of SET. Thousands of skilled scientists, engineers, ICT professionals and technical personnel are needed to build a more sustainable economic future. The failure to include and promote women represents a loss of talent and lack of fairness across our society.

The under-representation of women in SET stands out starkly in our Guide. Another area of concern is also illustrated clearly: the continuing 'leaky pipeline', where women in SET education and employment leave their careers and struggle or fail to return. Alongside these major challenges, the Guide presents a complex picture, detailing a multilayered interplay between gender and other factors such as ethnicity and disability, types of occupations and industries, and educational and employment career stages.

At the UKRC we work closely with employers, policy makers, professional bodies, academics and women themselves to bring about gender equality in SET. We therefore know there is a growing demand for evidence-based solutions – strengthened, in recent years, by gender equality legislation that has increased awareness of equality issues and widespread commitment to change. Reliable statistical information about occupational gender segregation in the UK is essential. It enables practitioners, policy makers, employers, researchers and activists to review the current situation, measure progress and identify where the strengths, gaps and challenges lie. It is needed to underpin planning and prioritisation. And, importantly, it enables individuals and organisations to monitor and instigate change.

I hope this guide will provide you with the information you need to plan and introduce change, and to inform and inspire others. Please consult our website at www.theukrc.org for access to this and other UKRC statistics and research publications.

Annette Williams
Director, the UKRC

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The UKRC

The UKRC is the Government's lead organisation for the provision of advice, services and policy consultation regarding the under-representation of women in science, engineering, technology and the built environment (SET). We work with employers; professional bodies; education institutions; women's organisations and networks; policy institutes; sector skills councils; the government and many others to promote gender equality in SET. We offer tailored services and support for women at all career stages.

UKRC products and services include:

- CEO Charter
- SET Fair Standard
- Culture Analysis Tool (CAT)
- focus groups
- gender equality consultancy
- gender equality training
- workplace champion training
- mentoring schemes
- work placements and support for women returners
- Connect women's networks
- GetSET women
- professional development opportunities for women
- statistical enquiry service

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Executive Summary

The importance of women to SET, and SET to women in the UK

Science, engineering and technology are central to our lives, our economy and our future. But at the end of the first decade of the 21st century, the analysis in this Guide reveals that only 5.3 per cent (674 thousand women), or about one in twenty, of all working women are employed in any SET occupation, compared to 31.3 per cent for all working men (nearly one in three), in a total of 5.5 million women and men in SET occupations. This means that a man is six times more likely to work in a SET occupation[1] than a woman. Women make up only 12.3 per cent of all people working in all SET occupations. This is despite the fact that women account for 45.1 per cent of the whole workforce, with 12.7 million women at work in the UK. To achieve parity nearly four times as many women would need to take up work in a SET occupation.

The Guide shows how the number of girls and women studying STEM has improved. However STEM[2] graduates do not always work in SET occupations. Female STEM graduates of working age[3] in the UK (a total of 620 thousand women) are more likely to take up employment in non-SET than in SET occupations. Only 29.8 per cent (185 thousand) of all female STEM graduates of working age in the UK are employed in SET occupations compared to half (782 thousand) of all male STEM graduates of working age.

Nearly 100 thousand female STEM graduates are either unemployed or economically inactive. Occupational segregation linked to a stereotyped view of gender and the roles, interests and capabilities of women and men wastes talent. The UK economy loses billions of pounds when qualified women scientists, technologists and engineers work below their level of qualification, are unemployed or economically inactive. The UK limits its skill base if it cannot attract enough of the best into SET industries and occupations to work as technicians or professionals, whether degree-qualified or not.

Women are critical to businesses and organisations. There is increasing evidence that women and diversity in workplace teams and on company boards improve profitability and performance, and that flexible working arrangements result in benefits to the employer as well as to the individual. The key growth sectors of life sciences, digital media and technology, advanced manufacturing, engineering construction and low carbon energy rely on a good supply of scientists, engineers and technologists. These sectors need to enable women to contribute as professionals, technicians and in skilled trades. In engineering, for example, the predominantly male workforce is aging. Many are over 50 and due to retire in the next ten years. There are fewer school leavers coming into the workforce. Nations, economies and businesses that are gender inclusive will be better placed to respond to demographic and social trends.

[1] SET occupations = SET and health professions and associate professions and SET skilled trades.

[2] STEM (science, technology, engineering and mathematics) is the term used in an educational context, while SET (science, engineering and technology) is used in relation to occupations and industries, in the official data sources used here.

[3] Term 'working age' includes individuals who are in employment, unemployed and economically inactive.

Although girls and women are entering SET employment, education and training, sometimes in greater numbers or proportions than in the past, there is still a pronounced trend whereby the numbers and proportions drop at key stages or over time. This is known as attrition and it begins to be pronounced at A level (after the national curriculum stage) and continues through post compulsory education and training, into employment.

The UK has to do more to attract, retain and return more women to the SET 'education and employment pipeline'. Women need a choice of pathways to get in, establish their careers, return after a break, or get to the top, whether they follow an apprenticeship, technician level or a degree based route. Everyone involved in the career pipeline - government, education, business, and professional organisations - must build an 'integrated strategy'– seamless, systematic and coordinated, that takes account of modern realities: career paths are not necessarily linear or unbroken; education and employment must become more family friendly; gender stereotyping still influences subject and career choice especially for younger women; gender stereotyping throws up barriers in the workplace for employees of all ages.

Attracting more women scientists, engineers and technologists into the economy to boost economic growth and equality in the workplace is a public policy challenge. It demands public, private and third sector solutions because the problems are complex and interdependent.

Women's participation in SET

Women remain under-represented and under utilised in SET occupations including academia, as illustrated by further selections of analysis from the Guide:

- Women were only 12.3 per cent of the workforce in all SET occupations including health and skilled trades in 2008. However this is an increase of 2.0 percentage points since 2003.
- Women were only 15.5 per cent of SET professionals and associate professionals (excludes health) in 2008, an increase of 1.4 percentage points in the five years since 2003.
- Female representation varies greatly across different SET professions. For example, women are approaching gender balance in science, with women being nearly 40 per cent of science professionals and scientific researchers, but they make up only 6.9 per cent of engineering professionals.
- Men are more likely than women to take up SET management positions (37.7 per cent of all male SET professionals/associate professionals compared to 28.6 per cent of women in the same occupational group). But a larger proportion of women work in (lower level) SET associate professions: as technicians, draughtspersons and inspectors, and in IT service delivery (26.5 per cent among women compared to 16.5 per cent among men).
- Gender occupational segregation is particularly extreme in SET skilled trades, with women forming 1.1 per cent of these occupations in 2008, with a tiny growth of 0.1 per cent since 2003. In 2007 the lowest paying apprentice sectors such as hairdressing, early years, and health and social care had the highest proportions of women among all apprentices. The highest paid sectors were all SET related, and had the lowest proportions of women apprentices.
- Women working in most SET occupations are more likely to have STEM graduate level qualifications than their male colleagues. The exceptions to this are SET managers and ICT occupations where men are more likely to be STEM graduates.
- Women are a lower percentage of more senior full-time grades in STEM academic departments. In 2007/08, 5,375 women worked full-time as researchers, accounting for 30.3 per cent of

all full-time researchers. There were also 2,065 female lecturers (26.1 per cent), 1,790 female senior researchers/lecturers (18.3 per cent), and only 540 female professors (9.3 per cent) in STEM full-time employment.

- Disproportionate numbers of women are among all part-time grades in STEM academic departments, except professor. In 2007/08, the ratio of full-time to part-time female researchers was 5:1, but only 15:1 for male researchers. The ratio of full-time to part-time female lecturers was 3:2, but 3:1 for male lecturers. The ratio of full-time to part-time female senior researchers/lecturers was 5:1, but only 17:1 for their male counterparts. However, there were proportionately more male part-time professors (8:1) than female part-time professors (10:1). This may be an example of emergent high quality part-time work that is attractive to men in academia.
- Women with disabilities remain slightly less likely to work in SET occupations in the UK than women without disabilities. In 2008, 4.0 per cent of all working women with disabilities were in SET occupations, while the equivalent figure for women without disabilities was 5.5 per cent. Moreover, since 2003 there has been a slight proportional decline (of 0.7 percentage points) in the participation of women with disabilities in SET occupations at all levels.

So far we have been discussing the jobs people do (SET occupations – as listed in section 5.6) rather than the sector of the economy in which they work (SET/non SET industries). The under representation of women is also evident in SET industries.

Nearly 2 million women and 7.6 million men work in SET industries. These women and men work in a range of jobs some of which are not SET occupations, such as administration, human resources or finance.

- In 2008, 10.7 per cent of women of working age were employed in SET industries. Although this is small, it is three times larger than the numbers of women working in SET occupations (3.7 per cent of working age women).
- In comparison 38.5 per cent of working age men were working in SET industries and 24.6 per cent in SET occupations in 2008.
- The majority of women working in SET industries are in manufacturing (40.2 per cent).
- Four SET industries employ the majority of female STEM graduates who are working in SET industries. In 2008, 66.0 per cent of all female STEM graduates were clustered in manufacturing and professional science and technology industries, and a further 24.5 per cent were in construction and information and communication industries. Men are more evenly distributed across all 10 SET industries.

Women's and men's pay – the gender pay gap in SET

Women continue to earn less than men in the UK. This is partly related to occupational gender segregation, and the low proportion and numbers of women in some relatively better paying SET occupations. Equal pay is significant because it impacts on social justice but also on business success.

- The gender pay gap between the median hourly earnings of women and men working full-time (excluding overtime), in SET is generally less than the 2008 national median pay gap of 12.6 per cent and, in some cases, smaller than the gender pay gap in occupations with high proportions of women.

- In 2008, the gender pay gap was 11.0 per cent for SET professionals, 12.6 per cent for SET associate professionals, and 4.2 per cent for metal and electrical skilled workers.
- Between 2003 and 2008 the gender pay gap for science and technology professions failed to improve, but it narrowed in science and technology associate professions by 8.7 per cent.

There is a gender pay gap in SET, but it is less than the overall gender pay gap in the UK, though it does vary according to the specific employment area. The SET sectors need the skills and talents of more women and women can do better economically by working in SET, in professional and technical occupations and the skilled trades.

Tapping the full talents and potential of women to work as scientists, engineers and technologists - leadership

The UK still has a 'leaky pipeline'. This Guide illustrates how women leave their SET careers at each new stage, and are particularly badly represented at the top, in senior positions.

Better leadership, which includes women and also addresses gender equality, is part of the solution to the participation of women in SET. There is increasing evidence that women on boards and in workplace teams improve profitability and performance. The Guide covers Board, Public Body and Parliamentary representation.

- Women remain only a small proportion of Board members in SET FTSE 100 companies. In 2009, only 10.8 per cent of Board directorships were held by women (61 women across 53 companies in SET), albeit a slight increase of 2.4 percentage points in the five years since 2004.
- In 2009, exclusively male SET FTSE 100 Boards still existed in 28.3 per cent of companies. However, the proportion of SET FTSE 100 companies with women directors on Board increased by 8.7 percentage points since 2004.
- Women were only 23.7 per cent of all members of SET public bodies in the UK in 2008 (179 women); a decline of 2.0 percentage points (and a loss of 30 women) since 2006.
- In May 2010, women were 21.9 per cent of all MPs representing the three major UK parties (136 women MPs). Of the 604 MPs with known qualification/work backgrounds there were only 10 women (1.7 per cent of all MPs) and 77 men (12.7 per cent of all MPs) with a SET qualification and/or work experience.

Where is the UK getting better?

The Guide shows some evidence of positive change, particularly in education in schools, with take-up improvements and good performance by girls. There has also been a very small increase in the proportion of women taking STEM degrees and small increase in the proportion of women employed in SET occupations.

- Female participation in SET occupations at 12.3 per cent has been slowly increasing by 2 percentage points in the five years between 2003 and 2008 (based on the ONS).
- The proportion of women in SET occupations in the UK increased by 2.5 percentage points between 2003 and 2008, comparing favourably to the EU-27 average increase of 2.3 percentage points (based on Eurostat).

- Girls and boys enter exams in STEM GCSEs in almost equal numbers, with girls accounting for 48.8 per cent of all STEM exam entries in 2009. Moreover, the overall proportional representation of girls in these subjects has slightly improved in recent years, particularly in physics, chemistry and biology.
- In recent years the increase in the numbers of girls taking mathematics, further mathematics, technology subjects, physics, and science subjects at A level has been proportionately greater than that for boys.
- Girls perform as well and often better in GCSE and A Level STEM subjects. In 2009 girls outperformed boys in grades A* to C attainment (pass rate) in six out of twelve STEM GCSE subjects. They also outperformed boys in A grade attainment in all but two A level STEM subjects and had a slightly better pass rate (grades A – E) than boys in all A level STEM subjects.
- The numbers of undergraduates (but not postgraduates) in STEM disciplines were on the increase between 2003/04 and 2007/08, with a proportional increase in female undergraduates of 0.9 percentage points to 33.2 per cent in 2007/08.

We have also noted some differences between the experiences of White women and Black and Minority Ethnic (BME) women:

- In 2006/07, among UK domiciled students, similar proportions of White women and BME women obtained undergraduate qualifications (34.8 and 35.8 per cent respectively) and postgraduate qualifications (39.8 per cent and 38.5 per cent respectively) in STEM.
- In 2008, BME women were more likely to work in SET occupations than White women: 8.2 per cent of all BME working women compared to 5.1 per cent of all White working women. Contrary to findings for women, BME working men were less likely to work in SET than White working men (22.6 per cent and 32.2 per cent respectively).
- In recent years the participation of BME women in SET occupations has been increasing at a faster rate than the participation of White women. Between 2003 and 2008 the proportion of BME women in all SET occupations increased by 3.7 percentage points, and by 5.0 percentage points among BME women professionals and associate professionals.

The challenges in training and education

Despite some improvements in the take up of STEM GCSE subjects across all levels, the impact of gender stereotyping and other factors is still demonstrated by the low proportions of girls and women in certain subjects, occupations and industries. There has been some negative change too. Education figures provide evidence of an early leak in the gender and SET 'pipeline':

- Girls accounted for 48.8 per cent of all STEM GCSE exam entries in 2009. However, in the same year girls made up only 42.2 per cent of GCE A level entries in STEM subjects. Women made up 33.2 per cent of all higher education undergraduate students in STEM.
- Girls are a smaller proportion of entrants to most STEM subjects at GCE A level. For example, girls were only 9.6 per cent of students in computing and 22.2 per cent in physics in 2009.

- Unlike GCSEs, NVQ/SVQs remain highly gender segregated by subject choice. In 2007/08, only a small minority of all NVQ/SVQ awards were given to women in engineering and manufacturing technologies (8.7 per cent) and construction, planning and the built environment (below a thousand compared to about 106 thousand awards given to men). ICT was the only SET NVQ/SVQ subject with a gender balance: women obtained about 52.5 per cent of all awards given in this subject area. It should be noted, however, that NVQ/SVQ awards are not only for ICT practitioner, but also ICT user skills.
- The participation of women in SET NVQ/SVQs has been declining in recent years with the exception of ICT.
- Apprenticeship programs are also highly gender segregated. In 2006/07, women were concentrated in the non-SET apprenticeship subjects, such as health, public services and care, while men predominated in engineering and manufacturing technologies and construction, planning and the built environment (96.2 per cent and 98.9 per cent of all leavers respectively).
- Women are under-represented in all HE undergraduate and postgraduate STEM subject groups, with the exception of 'subjects allied to medicine' and biological sciences. In 2007/08, female students accounted for 33.2 per cent of undergraduates and 34.0 per cent of postgraduates in STEM.
- In 2007/08, computer science and engineering and technology had the lowest proportions of female undergraduates (19.4 and 14.9 per cent respectively) and postgraduates (20.7 and 20.8 per cent).

The challenge of the leaky pipeline in SET – employment rates and "attrition"

The following selection from the Guide illustrates how the attrition, introduced in the opening section of this summary, continues into employment.

- In 2008, there were 620 thousand female STEM graduates of working age in the UK, but 70.2 per cent of these were not using their SET qualifications to work in SET occupations because they were working in non-SET occupations, inactive, or unemployed.
- In 2006/07, twice the proportion of men graduating with undergraduate qualifications in STEM entered SET professional or associate professional occupations (41.8 per cent) compared with women (21.0 per cent). Moreover, male graduates who enter SET occupations are much more likely to enter at higher levels than women – six months after graduation, the clear signs of a gendered labour market and of gendered choice amongst graduates.
- In 2008, only 35.3 per cent of STEM female graduates in employment were working in SET occupations, compared with 56.2 per cent of their male counterparts.
- In 2008, only 29.3 per cent of female STEM graduates in employment worked in SET industries compared with 54.8 per cent of their male counterparts.
- Women are severely under-represented in senior positions even in subjects/occupations/sectors where they have critical mass. This is illustrated in the figures on participation in the wider workforce above, including in academic settings. In biosciences, a discipline with a critical mass of female students, researchers and lecturers, women still account for only 15.0 per cent of professors.

The future for women in SET in the UK

The UK needs more scientists, engineers and technologists at every level - for economic recovery and to develop innovation capacity and impact the knowledge economy and the manufacturing sector.

The Guide shows that women are under-represented at every level in STEM education and SET employment, with particularly severe gender segregation in vocational training and skilled trades. The statistics confirm the need for more attention to culture change within SET organisations and businesses, and more opportunities for women to enter or return to SET training, education and employment throughout their lives. UK businesses and organisations must take up the challenge to attract, retain and promote women more actively. Individual women wanting to enter or return to SET who are outside of employment should be supported through targeted programmes and improved opportunities, advice and guidance.

The UKRC's core activities are designed to develop and identify improvements in gender equality practice in all sectors. The UKRC advises on and advocates for specific policies and organisational changes. Through the Guide, the UKRC presents its analysis of the numbers and proportions of women and men participating in SET. In terms of the participation of women, this examination of the last five years reveals a mixed picture with both negative and positive trends.

The UK has supported and invested in a range of initiatives for women in SET including the UKRC, and the improvements indicate some good practice. But the Guide also identifies where further interventions are needed. The UK's strategies and solutions to increase the participation of women in SET should take account of this complex picture of uneven development. The UKRC believes that these statistics and the analysis reinforce the case for an integrated and comprehensive strategy on women's participation in SET: one which encompasses action in education and in relation to research careers, as well as action by businesses and organisations to improve employment rates and opportunities for women in SET across the sectors.

Data sources:

Secondary education: Joint Council for Qualifications (JCQ).
Vocational training (NVQ/SVQ): National Information System for Vocational Qualification (NISVQ); Data Service.
Vocational training (apprenticeships): Learning and Skills Council (LSC).
Higher Education: Higher Education Statistics Agency (HESA).
Employment and pay gap in the UK: Office for National Statistics (ONS), LFS.
Employment - EU comparison: Eurostat.
Leadership and public engagement: multiple data sources. See section 7 of the Guide.

Introduction

Why is this Guide needed?

The UKRC is the Government's lead organisation for the provision of advice, services and policy consultation regarding the under-representation of women in science, engineering, technology and the built environment (SET). We aim to improve the involvement, profile and progression of women.

To make progress, we need to know where we stand, and where the gaps, challenges and success stories can be found, and we need to share this information with the wide range of organisations and individuals. Information is needed to demonstrate issues, indicate scale of problems and prioritise actions. It can act as a catalyst for change. An important part of our work is therefore the provision of useful and reliable information about women's participation in SET.

The UKRC has a specialist Research Team, which analyses data about women in SET as they become available from sources such as the UK Office for National Statistics and the UK Higher Education Statistics Agency.

This analysis is then published via the UKRC website and printed documents so that it can be easily accessed by all who need it. The Research Team also responds to requests for detailed data analysis from a variety of enquirers, some of whom have found un-sourced data from elsewhere and want to trace their origins and check their accuracy.

This Guide aims to illustrate as clearly as possible what the data from large reliable national data sources tell us about the participation of women in SET in the UK, often in comparison with men. It highlights potential issues or problems with data interpretation or classification. It does not attempt to relate the data in any detailed way to the immense amount of theory and other research publications that exist in the field of gender and SET, but it does provide a statistical backdrop to support and elucidate this important topic.

Who is this Guide for?

The guide is for two main kinds of reader:

- The general reader: wanting a good overview of the participation of women in SET education and employment
- The experts: researchers, educators, students, policy makers, journalists and others wanting specific information to support or inform their work

It is very difficult to produce a document discussing statistical data that satisfies both the general reader who wants to understand what message if any they can take away from the data, and the expert who is concerned to interrogate the accuracy and validity of any data and their analysis.

We have taken care to meet both levels of need. Each chapter is set out so that the reader can identify headline trends and areas of concern. There are also detailed discussions of the sources of data and their analysis. Experts will be able to explore relevant data in some depth, gaining a more nuanced and sophisticated understanding of the relationship between gender and SET in the UK. The Guide identifies some new and surprising trends as well as the disappointing continuance of others.

What this Guide covers:

This Guide begins with four sections on education. Section One deals with secondary education and the performance of girls and boys at GCSE and A Level GCE examinations and Section Two covers vocational training. Sections Three and Four analyse students and staff in higher education.

Section Five, which is the longest section in the Guide, deals with the UK SET labour force, both in employment and not in employment. Within this are different sub-sections which examine the UK labour force both through occupational categories as well as industry sector categories. It also re-analyses gender data through other criteria of diversity such as ethnicity and disability. Section Five ends by using Eurostat data to compare UK SET labour force statistics with those of other EU countries.

The final two sections deal with discrete issues of SET employment. Section Six examines the gender pay gap in SET occupations and compares it with the pay gap in other areas of work. Section Seven gives data about women in leadership positions in SET companies, in SET public bodies and lists those Members of Parliament who have a SET background.

How the sections are structured:
Each section has the following structure.

- A bullet point list of the 'headline' data from the section that follows.
- A main section with tables and charts designed to give a clear representation of trends in the data and of gender differences and similarities. These charts are embedded in a narrative text which explains what they show.
- A final sub-section which discusses the sources of data for that section, any data analysis that involves the creation or selection of categories (such as what is included in the category 'SET profession'), and any issues about the reliability of the data.

How to use this Guide:

This Guide is a reference document. We hope it will be of value to practitioners, policy makers and researchers.

While some people may read the Guide from beginning to end, the majority will have a particular focus of interest and are likely to read only those sections that interest them. We have developed the Guide with both approaches in mind.

We actively encourage readers to make use of the data. The tables and charts in each section have been designed so that they can be easily copied and re-used from a pdf or our website, without losing the original source information. When re-using any material from the guide please cite both the UKRC and the authors.

The sub-sections on terminology and data sources make it possible for researchers who want to do more work with the data to go back to the original data sets and do their own analysis, or comparable analysis with other data sets.

However you use this Guide, the UKRC would like to have feedback from you that can be used in the design of the next version.

1. Secondary Education Qualification

1.1 Girls' participation in GCSE examinations in Science, Technology, Engineering and Mathematics (STEM[1]) in the UK

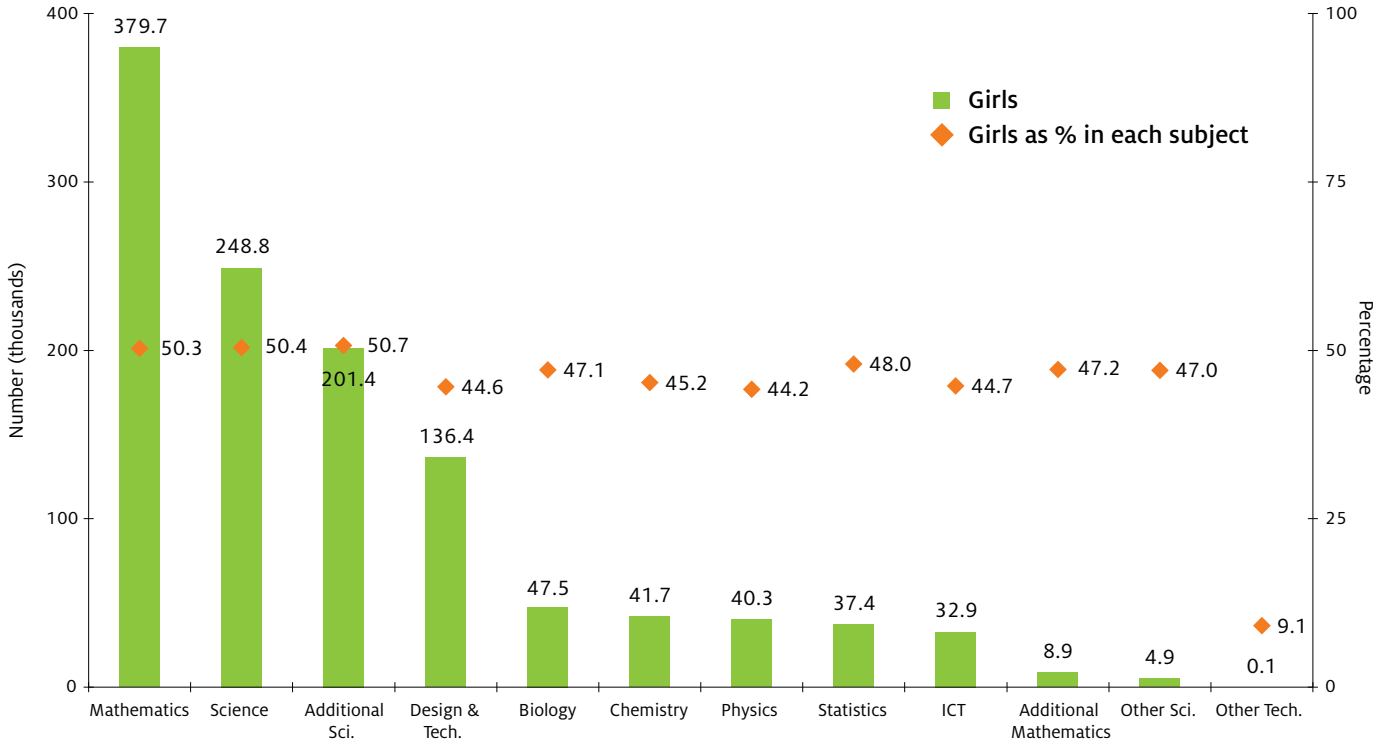
Key statistics on STEM GCSEs in 2009

- Girls do well in STEM GCSEs. In 2009, girls outperformed boys in grades A* to C (pass rate) in six out of twelve STEM GCSE subjects.
- Girls and boys enter exams in STEM GCSEs in almost equal numbers, with girls accounting for 48.8 per cent of all STEM exam entries.
- The overall proportional representation of girls in STEM GCSE subjects has slightly improved in the recent years, particularly in physics, chemistry and biology.

Slightly more girls than boys enter exams in GCSE subjects in the UK. In 2009, nearly 2.8 million exam entries for all GCSE subjects were made by girls compared to 2.7 million entries by boys. Girls therefore accounted for 50.7 per cent of all entries. This section presents information on the participation and performance of girls and boys in the General Certificate of Secondary Education (GCSE) in STEM subjects for England, Wales and Northern Ireland in 2009, as well as reporting changes over the previous five years. The data for this section are taken from the Joint Council for Qualifications (JCQ) website. Note that the majority of students in Scotland are are not counted in the JCQ reports, as Scotland has a different education system from the rest of the UK. Section 1.3 provides further explanations of the terminology and more information on the data source used here.

In 2009, girls were almost as likely as boys to enter for exams in STEM GCSEs. In 2009, nearly 1.2 million exam entries in STEM subjects were made by girls and just over 1.2 million by boys, with girls accounting for 48.8 per cent of all STEM subject entries. Figure 1.1.1 shows both the actual numbers of female exam entrants and these numbers as a percentage of all entrants for each of the 12 GCSE subjects that we have classified as STEM.

[1] Note that in sections which refer to education data the term STEM is used rather than SET. This is a common usage and reflects the fact that mathematics appears as a subject category in exams, while it does not appear as an occupation.



Secondary analysis by the UKRC
Data Source:
JCQ (2009) GCSE, Applied GCSE and Entry Level Certificate Results Summer 2009. London, JCQ.
Available from: http://www.jcq.org.uk/national_results/gcses/. Accessed 27 August 2009.

Figure 1.1.1
The number and proportion of girls who attempted exams in STEM GCSE subjects in the UK, June 2009 (provisional data)

Figure 1.1.1 shows that girls always provided at least 44.2 per cent of entrants for any STEM GCSE subject in 2009, with the exception of other technology (a subject taken by very few students overall). Girls are particularly well represented in additional science (50.7 per cent), science (50.4 per cent) and mathematics (50.3 per cent), but they are slightly less likely to study physics than boys, accounting for only 44.2 per cent of entrants, the lowest percentage of all major STEM subjects.

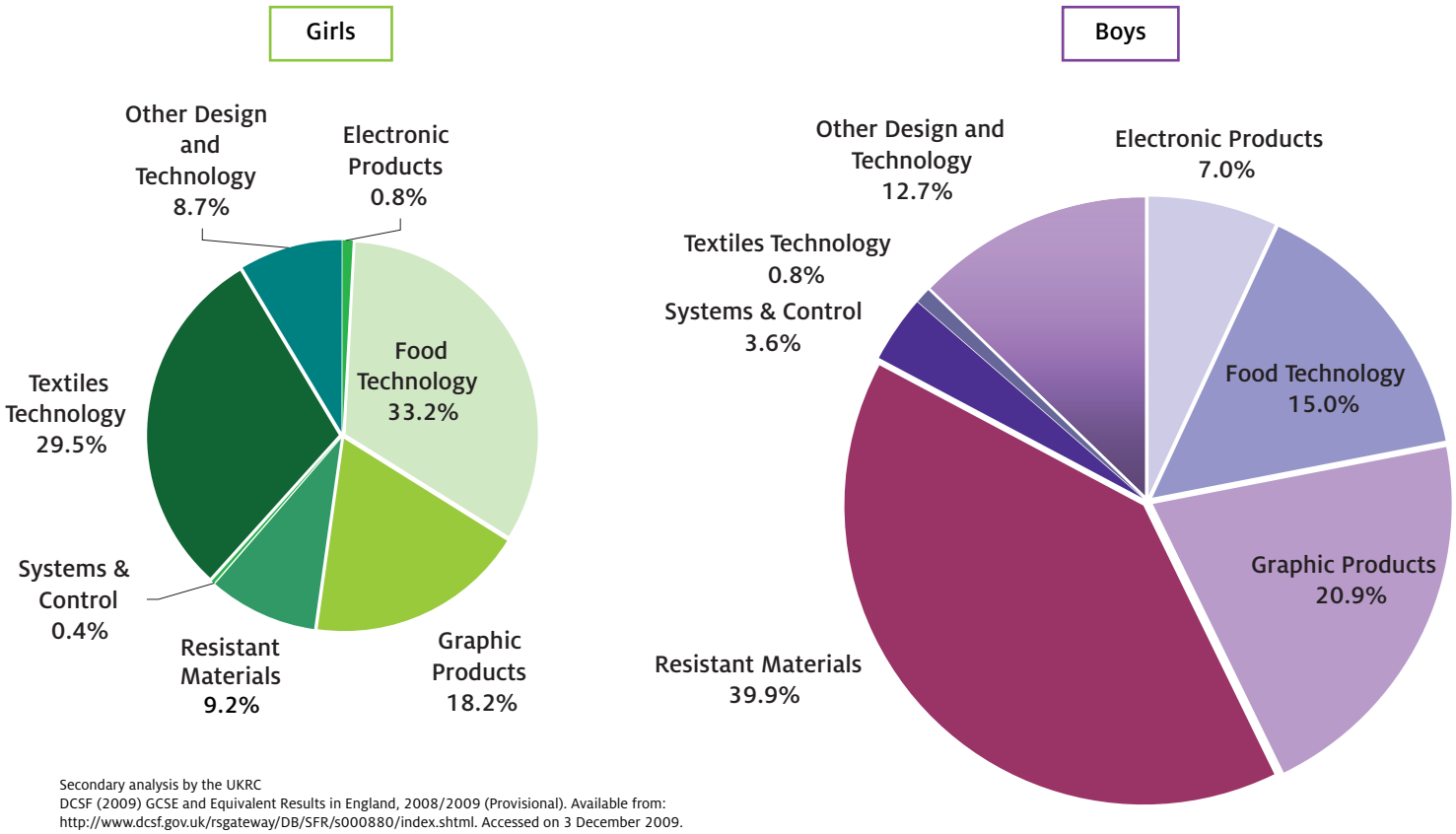
Although design and technology is included here as a STEM GCSE subject, this might not be how it is perceived or how it functions for girls. There are several subject options in the design and technology exam, and these are differentially attractive to girls and boys. Grouping all the subject areas together under the umbrella label design and technology disguises the strong gendering of subject choices.

Figure 1.1.2 shows the percentages of boys and girls choosing different subject areas for their design and technology exam in England[1]. Note that throughout this Guide the size of the pie charts indicates the relative size of the populations.

As illustrated in Figure 1.1.2, 80.9 per cent of girls taking this exam were studying either textiles, food technology or graphic products. Textiles would appear to be a subject that is overwhelmingly studied by girls with less than 1 per cent of boys participating. Boys on the other hand are studying what would be considered more traditional technology subjects: resistant materials, electronic products and systems along with graphics. The subjects taken by boys are more likely to lead to further study in the STEM area whereas those taken by girls are unlikely to do so.

It is worth noting here that the number of girls and boys taking single discipline STEM subjects remains low in 2009. For example, there were only 92.2 thousand chemistry exam entries, compared with 754.7 thousand entries in mathematics. This suggests that single subject STEM examinations appear to be taken by a select minority of GCSE students. This is of concern since success in these examinations at GCSE level is often a prerequisite for entry to single subject STEM A level courses. Although the gender balance in these single subject GCSE exams is quite good, girls are still in minority.

Figure 1.1.2
The distribution of girls and boys taking subjects in the Design and Technology GCSE in England, 2009 (provisional data)



Secondary analysis by the UKRC
DCSF (2009) GCSE and Equivalent Results in England, 2008/2009 (Provisional). Available from: http://www.dcsf.gov.uk/rsgateway/DB/SFR/s000880/index.shtml. Accessed on 3 December 2009.
Other Design and Technology includes all other combined syllabus of which Design and Technology is the major part.

[1] Breakdown of the design and technology GCSE is only available for the England data supplied by the DCSF.

In order to see if there have been any changes over time in the participation of girls in STEM GCSE subjects, 2009 data have been compared with data from 2005. Table 1.1.1 shows the actual number of girls and boys who entered for STEM GCSE exams and girls as the percentage of entrants for each subject, for 2005 and for 2009. Only subjects that could be directly compared between 2005 and 2009 were used.

As illustrated in Table 1.1.1, in recent years the general move has been toward gender equity in participation at this level of secondary education. The overall numbers of girls and boys sitting exams in STEM subjects have increased since 2005. In particular girls' participation in single subjects, physics, chemistry and biology, has increased by 3.5, 3.2 and 3.3 percentage points respectively.

Only in four subjects has the proportion of girls declined: design and technology, mathematics, other sciences and other technology. In other technologies the number of girls was the same in 2005 and 2009, but the number of boys increased. In other sciences and in design and technology there was a reduction in the number of girls, although the reduction was very small (about 300 girls for other sciences). The numbers of both genders taking other sciences and other technology are very small.

Table 1.1.1
The number of exam entries in STEM GCSE subjects by gender, and the percentage of entrants for each subject who were girls in the UK, June 2005 and 2009 (provisional data)

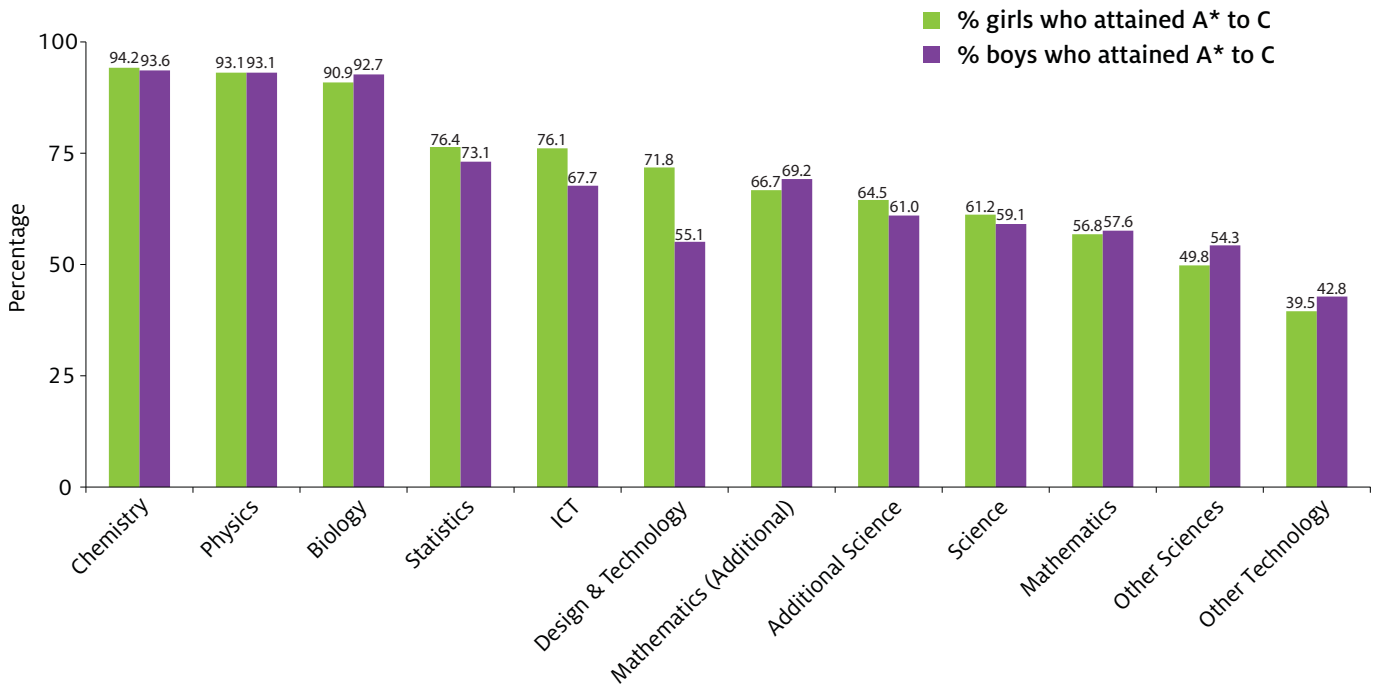
	2005			2009		
STEM Subjects	Girls (thousands)	Boys (thousands)	Girls (%)	Girls (thousands)	Boys (thousands)	Girls (%)
Design & Technology	184.6	212.1	46.5	136.4	169.4	44.6
ICT	44.7	58.7	43.2	32.9	40.6	44.7
Mathematics	374.9	366.5	50.6	379.7	375.1	50.3
Mathematics (additional)	1.5	1.7	46.8	8.9	9.9	47.2
Science	45.1	44.3	50.4	248.8	244.7	50.4
Biology	24.8	31.8	43.8	47.5	53.4	47.1
Chemistry	22.5	31.0	42.0	41.7	50.6	45.2
Physics	21.4	31.2	40.7	40.3	50.9	44.2
Statistics	24.3	27.2	47.2	37.4	40.6	48.0
Other Sciences	5.2	4.6	53.0	4.9	5.5	47.0
Other Technology	0.1	1.0	10.3	0.1	1.2	9.1

Secondary analysis by the UKRC
Data Source:
For the 2009 data - JCQ (2009) GCSE, Applied GCSE and Entry Level Certificate Results Summer 2009.
For the 2005 data - JCQ (2005) GCSE, Entry Level Certificate, GNVQ Results Summer 2005.
Available from: http://www.jcq.org.uk/national_results/gcses/. Accessed 27 August 2009.

Despite a small decline in the proportional representation of girls sitting exams in mathematics, they remain slightly better represented than boys in 2009, at 50.3 per cent. There was also a significant reduction in the number of girls taking ICT (about 12 thousand), however, because the reduction in the number of boys was even greater (about 18 thousand), the proportion of girls increased.

Figure 1.1.3 shows the proportion of girls and boys obtaining grades A* to C in the 12 GCSE subjects that we have classified as STEM (GCSE attainment at grades A* to C is a Level 2 qualification). Performance (attainment), was measured by the number of those who obtained grades A* to C as a percentage of the total entrants for each gender.

Figure 1.1.3
Grades A* to C attainment by gender and by STEM GCSE subjects in the UK, June 2009 (provisional data)



Secondary analysis by the UKRC
Data Source:
JCQ (2009) GCSE, Applied GCSE and Entry Level Certificate Results Summer 2009. London, JCQ.
Available from: http://www.jcq.org.uk/national_results/gcses/. Accessed 27 August 2009.

This figure shows that girls do at least as well as boys in STEM GCSE subjects, with proportionally more girls than boys obtaining grades A* to C in six out of twelve subjects in 2009. Girls did particularly well in design and technology (however, we have not examined performance for each subject area coming under this label) and ICT, outperforming boys by 16.7 percentage points and by 8.4 percentage points respectively. Girls also performed slightly better in additional science by 3.5 percentage points, in statistics by 3.3 percentage points, in science by 2.1 percentage points, and chemistry by 0.6 percentage points. In physics girls performed as well as boys, with 93.1 per cent obtaining grades A* to C.

Within the other subjects category boys slightly outperformed girls. The greatest difference in favour of boys of 4.5 percentage points was in other sciences, but this subject was taken by a small number of students.

While girls were half or nearly half of all students in most STEM GCSE subjects in 2009, this proportion declines when they reach A level. This decline is particularly large for physics and combined sciences (science subjects). The proportions of girls in these subjects taking A levels roughly halved in comparison to GCSEs. It is an illustration of the first and biggest leak in the gender and SET 'leaky pipeline'. The next section looks at the participation and performance of girls and boys at A level, and discusses this in more detail.

1.2 Girls' participation in Advanced (A) level GCE examinations in Science, Technology, Engineering and Mathematics (STEM) subjects in the UK

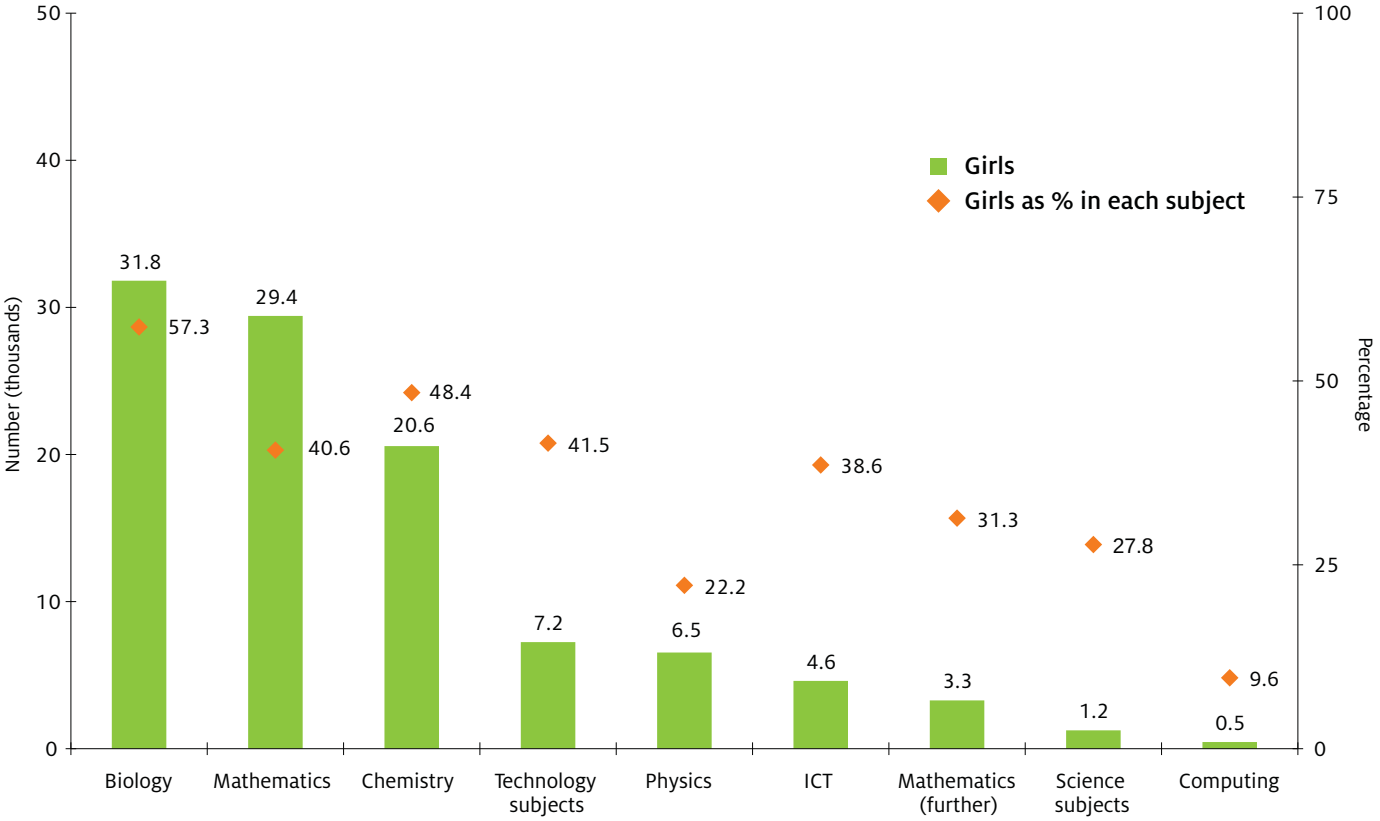
Key statistics on A level STEM subjects in 2009

- Fewer girls than boys take STEM subjects at A level. Girls accounted for 42.2 per cent of all A level STEM exam entries in 2009. They were only 9.6 per cent of students in computing and 22.2 per cent in physics.
- Girls are a smaller proportion of entrants to most STEM subjects at A level than they are in STEM GCSE exams.
- In recent years the increase in the numbers of girls taking mathematics, further mathematics, technology, physics, and science subjects at A level has been propotionately greater than that for boys.
- Girls perform well in A level STEM subjects. In 2009, girls outperformed boys in A grade attainment in all but two A level STEM subjects.
- Girls also had a slightly better pass rate (grades A – E) than boys in all A level STEM subjects.

More girls than boys enter exams in A level subjects. In 2009, 457 thousand exam entries for all A level subjects were made by girls and 390 thousand entries by boys, with girls accounting for 53.9 per cent of all entries.

This section discusses UK data on the participation and performance of girls and boys in Advanced Level General Certificate of Education (A level) STEM subjects in 2009 (using provisional data released in the summer of 2009), as well as giving an indication of change over the previous five years. The data for this section are taken from the Joint Council for Qualifications (JCQ) website. See section 1.3 for more information about the terminology and the data sources used.

Fewer girls than boys study A level STEM subjects. In 2009, 105 thousand A level STEM exam entries were made by girls and 144 thousand by boys, with girls accounting for 42.2 per cent of all entrants. Figure 1.2.1 shows both the actual numbers of female exam entrants and these numbers as a percentage of total entrants for each of the nine A level STEM subjects in 2009.



Secondary analysis by the UKRC
Data Source:
JCQ (2009) A, AS and AEA Results Summer 2009. London, JCQ. Available from: http://www.jcq.org.uk/national_results/alevels/. Accessed 20 August 2009.

Figure 1.2.1
The number and proportion of girls who attempted exams in A level STEM subjects in the UK, June 2009 (provisional data)

Figure 1.2.1 shows that only in biology did girls comprise over 50 per cent of all A level exam entrants and they reached almost equal participation with boys in chemistry. Computing had the lowest proportion of female entrants among all STEM A levels: 9.6 per cent. This subject also had the lowest actual number of female entrants. Low proportions of girls entered for physics (22.2 per cent), science subjects (27.8 per cent) and further mathematics (31.3 per cent) at A level.

When these figures are compared with those for GCSE, we get an indication of the scale of the 'leaky' pipeline. Large numbers of girls who were successful in STEM subjects at GCSE level do not enter for A level exams in these subjects. This effect is much greater for girls than it is for boys.

Table 1.2.1 shows a comparison between the percentage of female entrants to selected STEM subjects at GCSE and A level in 2009. Only subjects which could be directly compared were included. The right hand column in the table gives the difference between these two percentages and to emphasise the point, those subjects where the difference is negative i.e. the proportion of girls decreased, are highlighted in bold.

This table is only an indication of the leaky pipeline because it compares two cohorts rather than following one cohort at different points in its educational career. However, as an indication it is a useful one.

It is also useful to look at changes over time in A level STEM participation by girls, by comparing 2009 with 2005 A level results data. Table 1.2.2 shows the number of girls and boys, and girls as a percentage of all entrants, to each STEM A level subject for 2005 and for 2009. Only subjects that could be directly compared between 2005 and 2009 were used.

Table 1.2.1
The difference in proportions of exam attempts made by girls in comparative STEM GCSE and GCE A level subjects in the UK, June 2009 (provisional data)

Subject	GCSE (%)	GCE A level (%)	Difference (%) (GCE A level - GCSE)
Biology	47.1	57.3	10.3
Chemistry	45.2	48.4	3.2
Technology subjects (Design & Technology)	44.6	41.5	**-3.0**
ICT	44.7	38.6	**-6.2**
Mathematics	50.3	40.6	**-9.7**
Further Mathematics (Mathematics - additional)	47.2	31.3	**-15.8**
Physics	44.2	22.2	**-22.0**
Science subjects (Science)	50.4	27.8	**-22.7**

Secondary analysis by the UKRC
Data source:
For the GCSE data - JCQ (2009) GCSE, Applied GCSE and Entry Level Certificate Results Summer 2009.
Available from: http://www.jcq.org.uk/national_results/gcses/. Accessed 27 August 2009.
For the GCE A level data - JCQ (2009) A, AS and AEA Results Summer 2009. London, JCQ.
Available from: http://www.jcq.org.uk/national_results/alevels/. Accessed 20 August 2009.

Table 1.2.2

The number of exam entries in STEM A level subjects by gender, and the percentage of entrants for each subject who were girls in the UK, June 2005 and 2009 (provisional data)

Table 1.2.2 shows that there has been an increase in the last five years in the numbers of girls and boys taking most STEM A level subjects. The numbers of girls have declined in only three subjects: biology, ICT and computing. There has been a slight reduction in the number of girls taking biology (of about 100) while the number of boys has increased by about 1,700. There have been much larger reductions in the numbers of girls and boys taking ICT and computing, with the reduction in the number of girls proportionately greatest in computing.
In chemistry the number of girls increased, but the number of boys increased even more. The other six subjects show an increase in girls as a proportion of entrants.

	2005			2009		
STEM Subjects	Girls (thousands)	Boys (thousands)	Girls (%)	Girls (thousands)	Boys (thousands)	Girls (%)
Biology	31.9	22.0	59.1	31.8	23.7	57.3
Mathematics	20.2	32.7	38.1	29.4	43.1	40.6
Chemistry	19.2	19.7	49.4	20.6	21.9	48.4
Technology subjects	7.0	10.9	39.1	7.2	10.2	41.5
Physics	6.2	21.9	22.0	6.5	22.9	22.2
ICT	5.3	9.6	35.5	4.6	7.3	38.6
Mathematics (further)	1.7	4.2	28.6	3.3	7.2	31.3
Science subjects	1.2	3.2	26.9	1.2	3.2	27.8
Computing	0.8	6.4	11.3	0.5	4.3	9.6

Secondary analysis by the UKRC
Data source:
For the 2009 data - JCQ (2009) A, AS and AEA Results Summer 2009. London, JCQ.
For the 2005 data - JCQ (2005) A, AS, VCE, AEA Results Summer 2005. London, JCQ.
Available from: http://www.jcq.org.uk/national_results/alevels/. Accessed 20 August 2009.

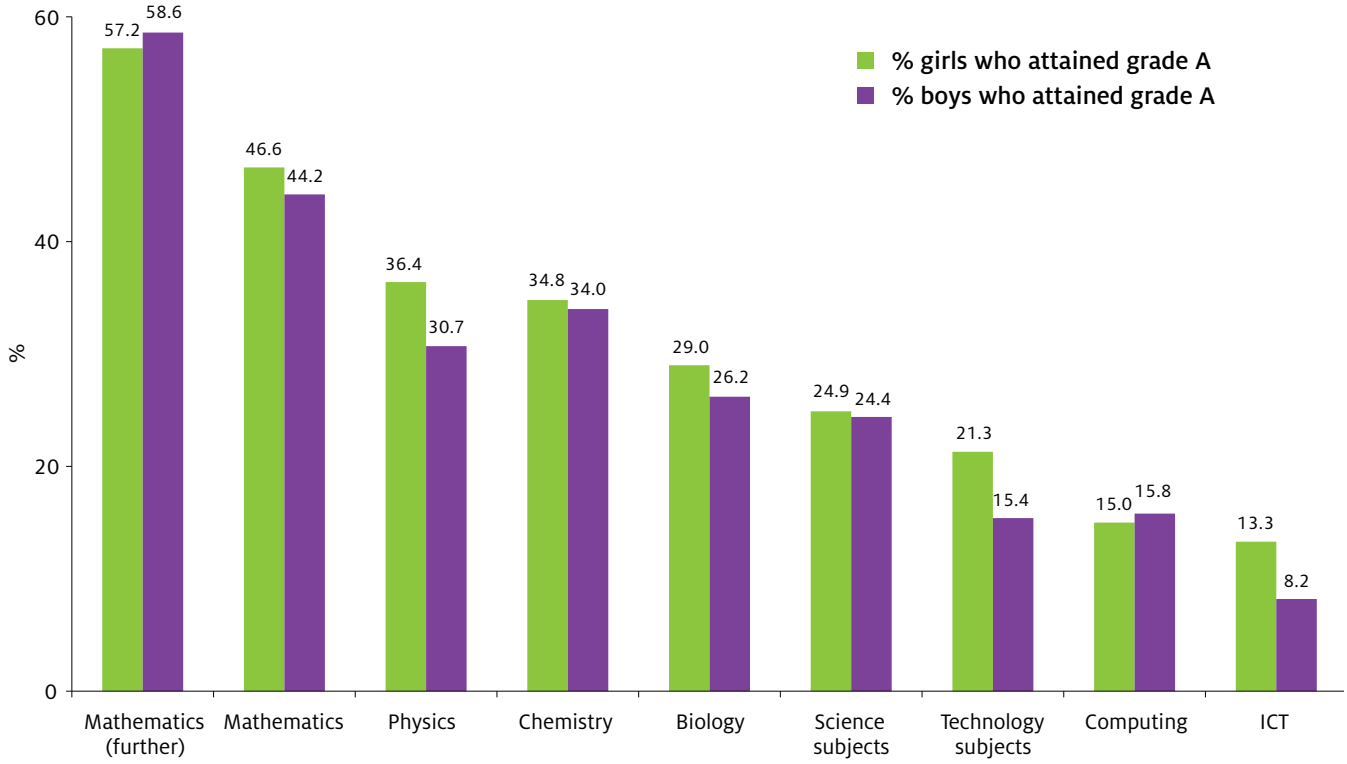
Table 1.2.3 shows the proportion of girls and boys obtaining grades A to E (pass rate) in the nine A level subjects that we have classified as STEM. The attainment of both girls and boys who take STEM A levels is very high in terms of the percentages of entrants who obtain pass rate in A level exams. In all subjects the percentage of girls obtaining grades A - E is slightly higher than that of boys.

Subject	Girls (%)	Boys (%)
Technology subjects	98.4	97.0
Mathematics (further)	98.5	98.1
Mathematics	97.8	97.0
Chemistry	97.0	96.0
Science subjects	97.8	96.4
Physics	97.1	95.1
Computing	96.7	94.1
ICT	96.6	94.0
Biology	96.3	95.5

Secondary analysis by the UKRC
Data source:
For the 2009 data - JCQ (2009) A, AS and AEA Results Summer 2009. London, JCQ.
Available from: http://www.jcq.org.uk/national_results/alevels/. Accessed 20 August 2009.

Table 1.2.3
The Attainment of Grades A – E in STEM A levels in the UK, June 2009 (provisional data)

Figure 1.2.2 shows the proportion of girls and boys obtaining an A grade in STEM A level subjects. Performance was measured by the number of those who obtained an A grade as a percentage of the total entrants for each gender.



Secondary analysis by the UKRC
Data Source:
For the 2009 data - JCQ (2009) A, AS and AEA Results Summer 2009. London, JCQ.
Available from: http://www.jcq.org.uk/national_results/alevels/. Accessed 20 August 2009.

Figure 1.2.2
Grade A attainment by gender and by STEM A level subjects in the UK, June 2009 (provisional data)

Figure 1.2.2. shows that girls performed better in achieving the highest grade in most STEM A level subjects in 2009. They did particularly well in technology, outperforming boys by 5.9 percentage points, in physics by 5.7 percentage points, and in ICT by 5.1 percentage points. Only in further mathematics and computing did boys perform slightly better than girls, by 1.4 and 0.8 percentage points respectively.

The data from 2009 show that popular STEM subjects are no longer predominantly 'masculine' at A level. The steady move towards a gender balance of students in most of these subjects, and the high pass rates of the girls who attempt the exams, demonstrates both girls' capacities to succeed in SET as well as the success over the years of the many initiatives that have encouraged and supported girls to engage with STEM subjects.

1.3 Terminology and data sources

Definition of GCSE: The General Certificate of Secondary Education (GCSE) is an academic qualification awarded in a specified subject, generally taken in a number of subjects by students aged 15–16 in secondary education in England, Wales, and Northern Ireland. At the end of the two-year GCSE course, candidates receive a grade for each subject that they have attempted. The pass grades, from highest to lowest, are: A*, A, B, C, D, E, F and G. A GCSE at grades D–G is a Level 1 qualification, while a GCSE at grades A*–C is a Level 2 qualification. Those who fail a course are given a U (unclassified) and the subject is not included on their certificates.

Definition of A level: The Advanced Level General Certificate of Education, universally referred to as an A level, is a qualification offered by education institutions in England, Northern Ireland and Wales and by a small minority of institutions, typically private, in Scotland. (In Scotland, students usually take Highers and Advanced Highers of the Scottish Qualifications Certificate instead). Most students study for the qualification from age 16 to 18. While an A level is a qualification in its own right, A levels are often the prerequisite for university-level study as well. In the current system, A levels are graded from A* to E (pass rate).

Source: Wikipedia (http://en.wikipedia.org).

Data for sections 1.1 and 1.2 are from the Joint Council for Qualifications (JCQ). JCQ collects and reports statistics of the number of students who attempted GCSE and GCE A level exams and their grades annually. The data are available from the JCQ website: http://www.jcq.org.uk/national_results/. Provisional data are provided here to show the latest available statistics on the GCSE and A level exam results at the time of writing.

2. Vocational Training in Science, Engineering and Technology (SET)

Key statistics on SET vocational training

- In 2007/08, only 8.7 per cent of all NVQ/SVQ awards given in engineering and manufacturing technologies were to women.
- In construction, planning and the built environment, the number of female NVQ/SVQ awards stayed below a thousand in 2007/08, compared to 106 thousand awards given to men.
- ICT was the only SET NVQ/SVQ subject with a gender balance: women obtained about 52.5 per cent of all awards given in this subject area in 2007/08.
- The participation of women in SET NVQ/SVQs has been declining in recent years with the exception of ICT.
- In 2006/07, women were concentrated in the non-SET apprentice subjects such as health, public services and care, while men predominated in engineering and manufacturing technologies and construction, planning and the built environment (96.2 per cent and 98.9 per cent of all leavers respectively).
- The most extreme gender differences were in construction, planning and the built environment and in engineering and manufacturing technologies, with a female proportion of apprentices and advanced apprentices at roughly 1 per cent.
- In 2007, the lowest paying apprentice sectors such as hairdressing, early years and health and social care had the highest proportions of women among all apprentices. Overall, the highest paid sectors are all SET related: electrotechnical, engineering and manufacturing, construction and the motor industry, and have the lowest proportions of women apprentices.

This section analyses the participation of women within SET vocational education, in particular in National Vocational Qualifications (NVQs), or the Scottish equivalent known as Scottish Vocational Qualifications (SVQs), at apprenticeship (level 2), and advanced apprenticeship (level 3). Further detail about the nature of these awards is given in section 2.4.

These qualifications are marketed to 16-18 year olds and young adults and also to older people who want a vocational qualification. Because they are competency based and the competencies they embody are vocational rather than academic skills, they are marketed to appeal to less academic students, many of whom take these awards as an alternative to GCSEs. However, higher level NVQ/SVQs are accepted as entry qualifications for higher education.

In 2007/08, 773 thousand NVQ/SVQ awards were given in the UK; this is an increase of almost two hundred thousand since 2004/05. More than half of the total NVQ/SVQ awards were given to women in 2007/08 (52.8 per cent), however this percentage had declined by 3.3 percentage points since 2004/05. The previous section on GCSEs has shown that educational qualifications are more popular with young women than young men and this is also the case with NVQ/SVQs. Unlike GCSEs, NVQ/SVQs remain highly gender segregated in subject take-up.

NVQs and SVQs are work-based awards achieved through assessment and training. The data on NVQ/SVQs were published by the Data Service. Three NVQ/SVQ subject areas were identified as belonging to the SET sector: engineering and manufacturing technologies, construction, planning and the built environment, and information and communication technologies (ICT). Three selected non-SET subject sector areas which account for over half of the total awards and have good representation of women are shown for comparison. These are: health, public services and care, retail and commercial enterprise, and business, administration and law.

In 2006/07, there were 60.6 thousand female and 62.7 thousand male 'leavers' at the apprenticeship level, with 61.8 per cent of women and 60.7 per cent of men successfully completing their training. 'Leavers' are defined as people who have left the training, whether successfully completing their programme, or not. At advanced apprenticeship level there were 21.7 thousand female and 33.7 thousand male leavers, with 55.0 per cent of women and 59.5 per cent of men successfully completing their training.

Section 2.2 examines successful completions in apprenticeships and advanced apprenticeships and the number of leavers by gender and SET sector subject area.

A similar selection of subject areas was used for both NVQ/SVQ awards and apprenticeships and advanced apprenticeships. One exception was business, administration and law which was replaced by leisure, travel and tourism in the apprentice and advanced apprentice data, as the third most popular subject sector area among women. The data for this section were collected by the Learning and Skills Council (LSC). Information on terminology, data sources, the rounding procedures used by LSC and calculations used to extrapolate successful completion rates can be found in section 2.4.

The pay patterns within apprenticeships and advanced apprenticeships are explored in section 2.3. All data in this section are from the report "Apprenticeship Pay: 2007 Survey of Earnings by Sector" published by DIUS and written by Fong and Phelps (2008).

2.1 NVQ/SVQ awards

Figure 2.1.1 shows both the actual numbers of women who achieved NVQ/SVQ awards and these numbers as a percentage of all those who achieved awards in three non-SET and three SET subject areas.

Figure 2.1.1 indicates that gender differences in subject choice are particularly strong in these vocational awards. In 2007/08, the number of awards to women in engineering and manufacturing technologies was 9.1 thousand or only 8.7 per cent of all the awards given in this subject area. In construction, planning and the built environment, the number of women gaining awards was below one thousand in 2007/08 and as such was not reported, while the number of men was 105.6 thousand. ICT was the only SET subject area with a gender balance. The number of women gaining awards in ICT at 15.1 thousand represented 52.5 per cent of all awards given in this subject area in 2007/08.

This is surprising when compared with A level participation (see section 1.2 of this Guide). Young women represent 39 per cent of those attempting ICT at A level, and only 9.6 per cent of those attempting computing. It should be noted, however, that NVQ/SVQ awards are not only for ICT practitioners but also for rewarding ICT user skills.

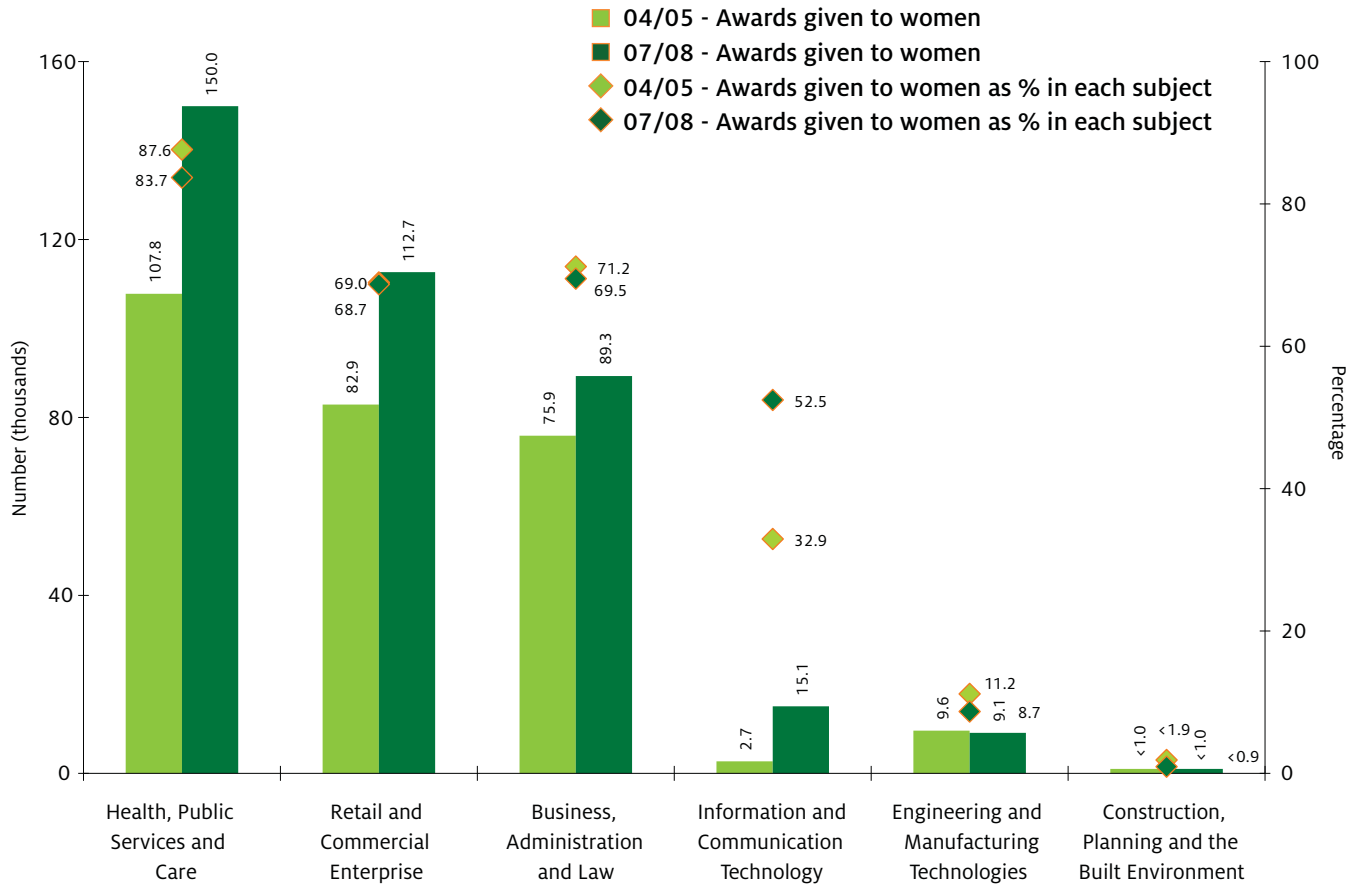
ICT is the only SET NVQ/SVQ showing an increase in women's participation between 2004/5 and 2007/8. In the three year period to 2007/08 the total number of ICT awards increased more than three fold from 8.2 to 28.7 thousand. During this time the number of awards obtained by women increased from 2.7 thousand to 15.1 thousand. With respect to ICT this is very encouraging. However, the declining interest among girls in vocational qualifications in the other SET areas is an issue of concern.

The non-SET subject areas shown in Figure 2.1.1 illustrate that in these vocational qualifications there are subject groups that look stereotypically 'female' and where men are in a minority. For example in 2007/08, about 150 thousand (or 84.0 per cent) of all NVQ/SVQ awards in health, public services and care were given to women.

Although the overall numbers of NVQ/SVQ awards given in the UK are on the increase, the participation of women in those vocational areas with a traditionally low number of women has further declined in recent years (with the exception of ICT).

In engineering and manufacturing technologies the total number of awards increased from 86 thousand to 104.8 thousand between 2004/05 and 2007/08, but the number of awards granted to women declined from 9.6 to 9.1 thousand. In construction, planning and the built environment, the number of awards doubled from 53.2 to 106.6 thousand during the three year period, but the number of awards given to women remained below a thousand.

In SET GCSE and A level subjects the proportion of girls has increased and at GCSE level is now almost equal to that of boys. Vocational qualifications are not showing a similar trend and there is some suggestion – although over a short time period - that the move may be in an opposite direction.



Secondary analysis by the UKRC
Data source:
2007/08 - The Data Service (2009) Vocational Qualifications in the UK 2007/08 Supplementary Release.
Available from: http://www.thedataservice.org.uk/statistics/sfrjun09. Accessed 14 October 2009.
2004/05 - DfES (2006) Vocational Qualifications in the UK: 2004/05. Available from: http://www.dcsf.gov.uk/rsgateway/DB/SFR/s000638/index.shtml. Accessed 14 October 2009.

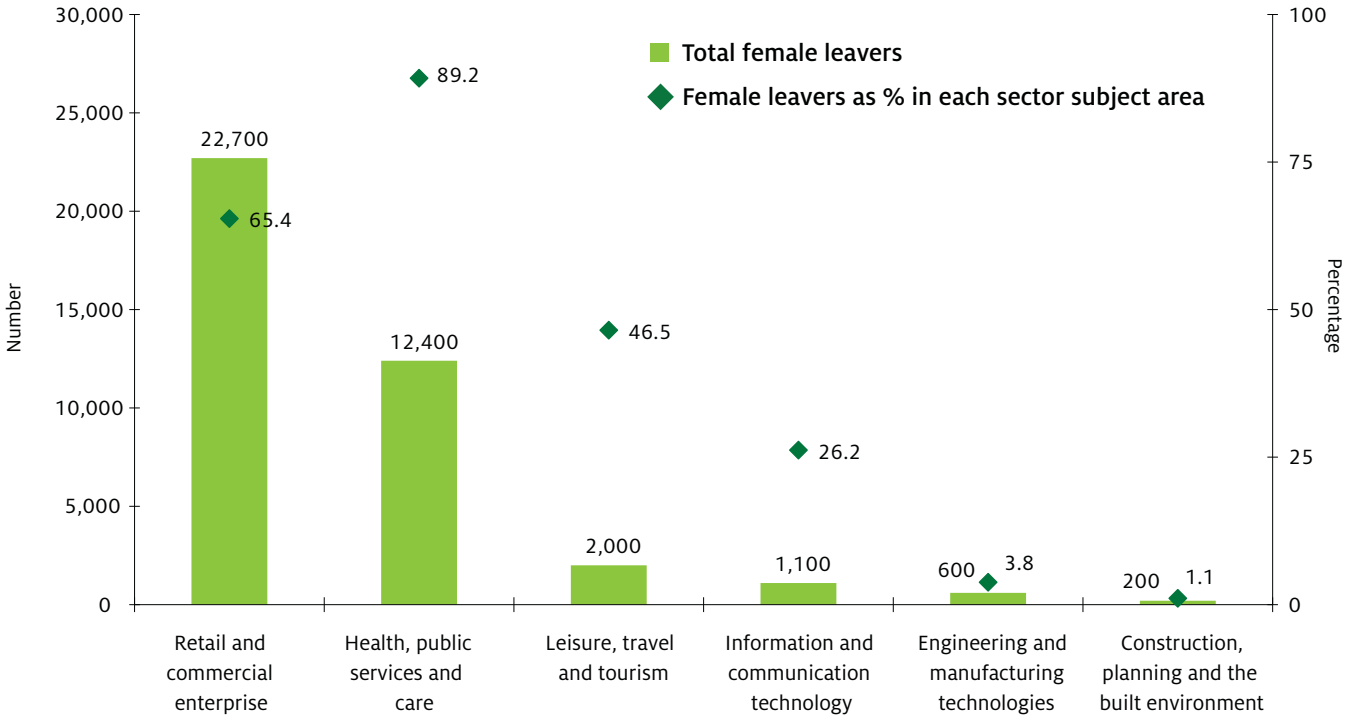
Figure 2.1.1
NVQ/SVQ awards achieved by women in three non-SET and three SET subject areas in the UK, 2004/05 and 2007/ 08

2.2 Apprenticeships (level 2) and advanced apprenticeships (level 3)

This section discusses the number of female leavers and successful programme completions, first for apprenticeships and then for advanced apprenticeships. As we noted in the introduction to section 2, leavers are defined as people who have left training, whether successfully completing their programme, or not. Successful completions are defined as leavers who are recorded as meeting all of the performance requirements of their apprenticeship programme. It should be noted here that the numbers are rounded to the nearest hundred, thus we cannot provide the exact numbers (and percentages), of women and men who left training/completed their programme. As a result only rough approximations can be made when discussing the small numbers and percentages of women in most SET subject areas.

Information on the rounding procedures used by the LSC and calculations used to extrapolate successful completion rates can be found in section 2.4. Figure 2.2.1 shows the numbers of female leavers and these numbers as a percentage of all leavers in each subject group for apprenticeships in England for three non-SET and three SET subject groups in 2006/07. Rather than present separate figures for women and men we hope that the size of the male cohort for each subject area can be easily deduced from the data about the size of the female cohort.

Figure 2.2.1 shows the extreme gender imbalance of women and men leaving apprenticeship training. In 2006/07, women were concentrated in non-SET subject groups, such as health, public services and care, while men predominated in the subject sectors in which apprenticeships have traditionally been found, such as engineering and manufacturing technologies, as well as construction, planning and the built environment. Only in ICT were women slightly better represented at 26.2 per cent, nevertheless they were in a minority. Data on leavers shows the magnitude of gender segregation in apprentice training, but it should not be seen as an accurate representation of the prospective workforce in the related sectors, because people who left their training may enter a different sector of the workforce.



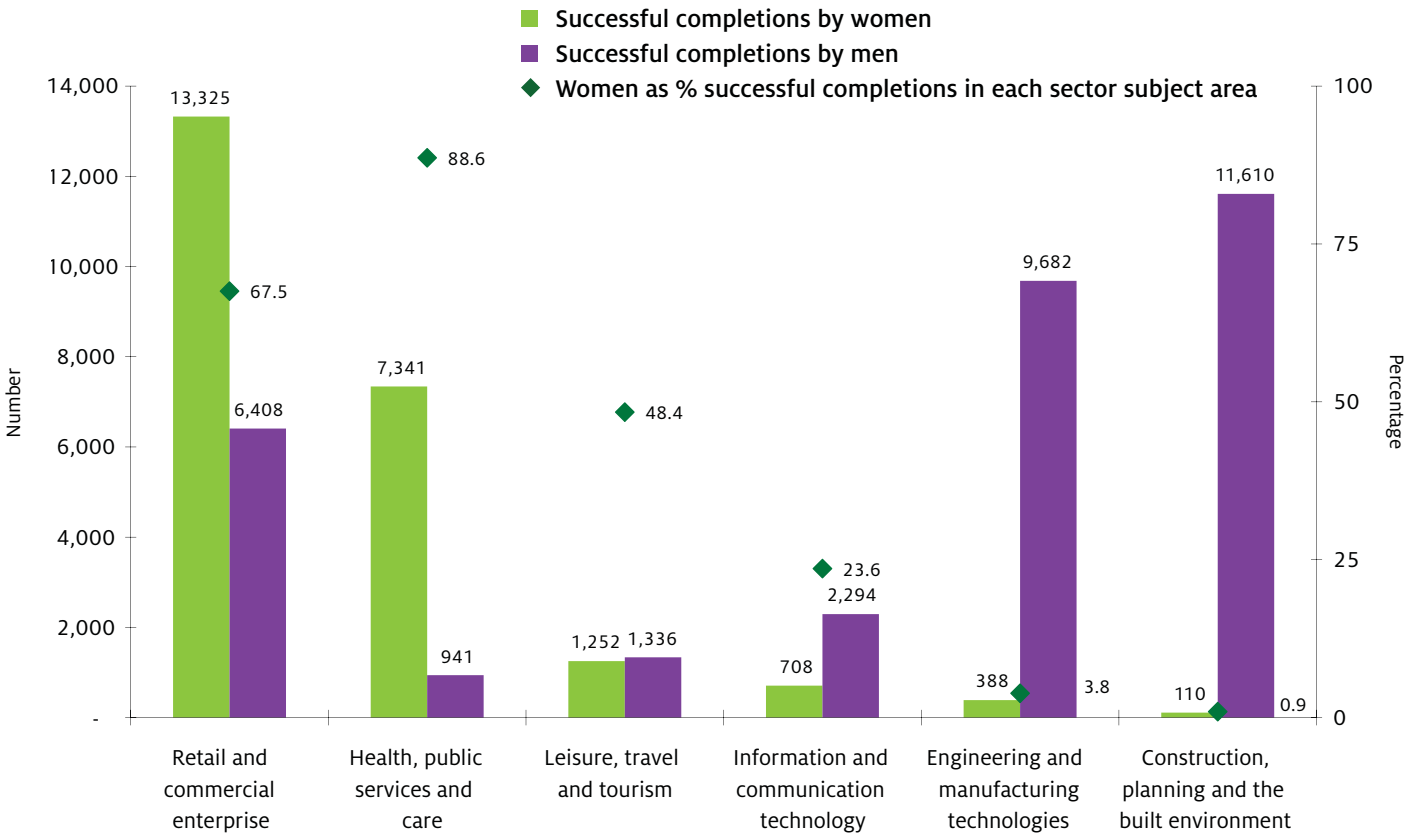
Secondary analysis by the UKRC
Data source:
LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07.
Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009.
The number of leavers are rounded to nearest 100, and proportions were calculated based on the rounded figures. For this reason, statistics are approximate.

Figure 2.2.1
Apprenticeships - female leavers in England, 2006/07

Figure 2.2.2 shows the numbers of female successful completions for apprenticeships, and these numbers as a percentage of all successful completions for each of three non-SET and three SET subject areas. The numbers and percentages of women and men successfully completing were extrapolated and are not exact (see section 2.4 for more information on the extrapolation used).

Figure 2.2.2
The number of successful completions of apprenticeships by women and men, and women as a percentage of all successful completions, for three SET and three non-SET subject areas in England, 2006/07

Figure 2.2.2 illustrates successful completions and mirrors the extreme gender imbalance of women and men who left training at apprenticeship level in many SET and non-SET subject areas. In 2006/07, successful female completions in nearly monolithic male SET subject sector areas were 0.9 per cent of the total in construction, planning and the built environment, 3.8 per cent in engineering and manufacturing technologies and 23.6 per cent in ICT. In comparison most non-SET subject areas are stereotypically female, with men being a minority.



Secondary analysis by the UKRC
Data source
LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07.
Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009.

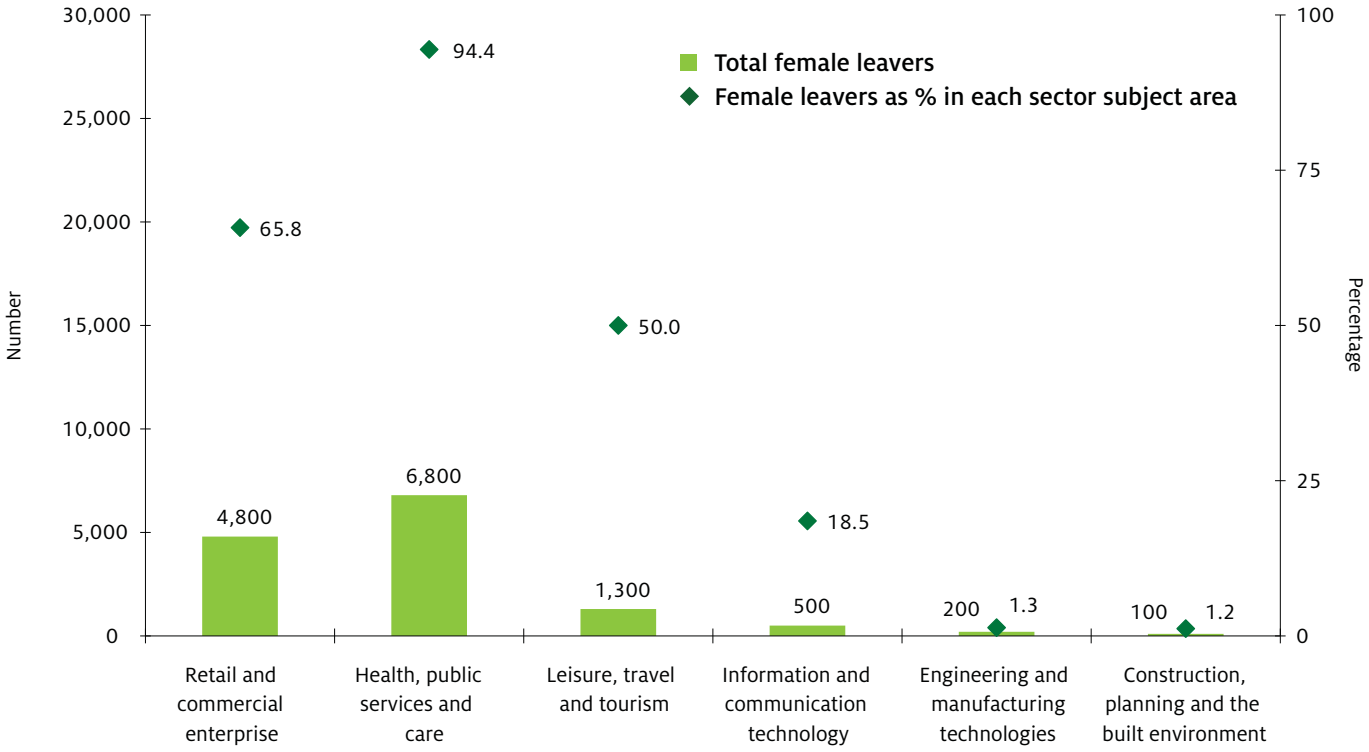
Sector subject areas	% of successful completions among female leavers	% of successful completions among male leavers
Construction, planning and the built environment	55.1	63.1
Engineering and manufacturing technologies	64.6	63.7
Information and communication technology	64.4	74.0
Health, public services and care	59.2	62.7
Leisure, travel and tourism	62.6	58.1
Retail and commercial enterprise	58.7	53.4

Secondary analysis by the UKRC
Data source
LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07.
Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009.

Table 2.2.1
The proportion of successful completions among female and male leavers at apprentice level, 2006/07

Table 2.2.1 shows the proportion of successful completions among female and male leavers at apprentice level. As presented in the table, the overall rate of successful completions was relatively low in both SET and non-SET subject sectors. An issue of concern is that male successful completion rates are generally better than female successful completion rates in the SET subject areas. This is particularly worrying in construction, planning and the built environment, where only about half of a very small number of women leaving the apprentice training in this subject group successfully completed their training. The data suggest lack of success in recruiting women into apprenticeships, then accentuated by very low graduation rates.

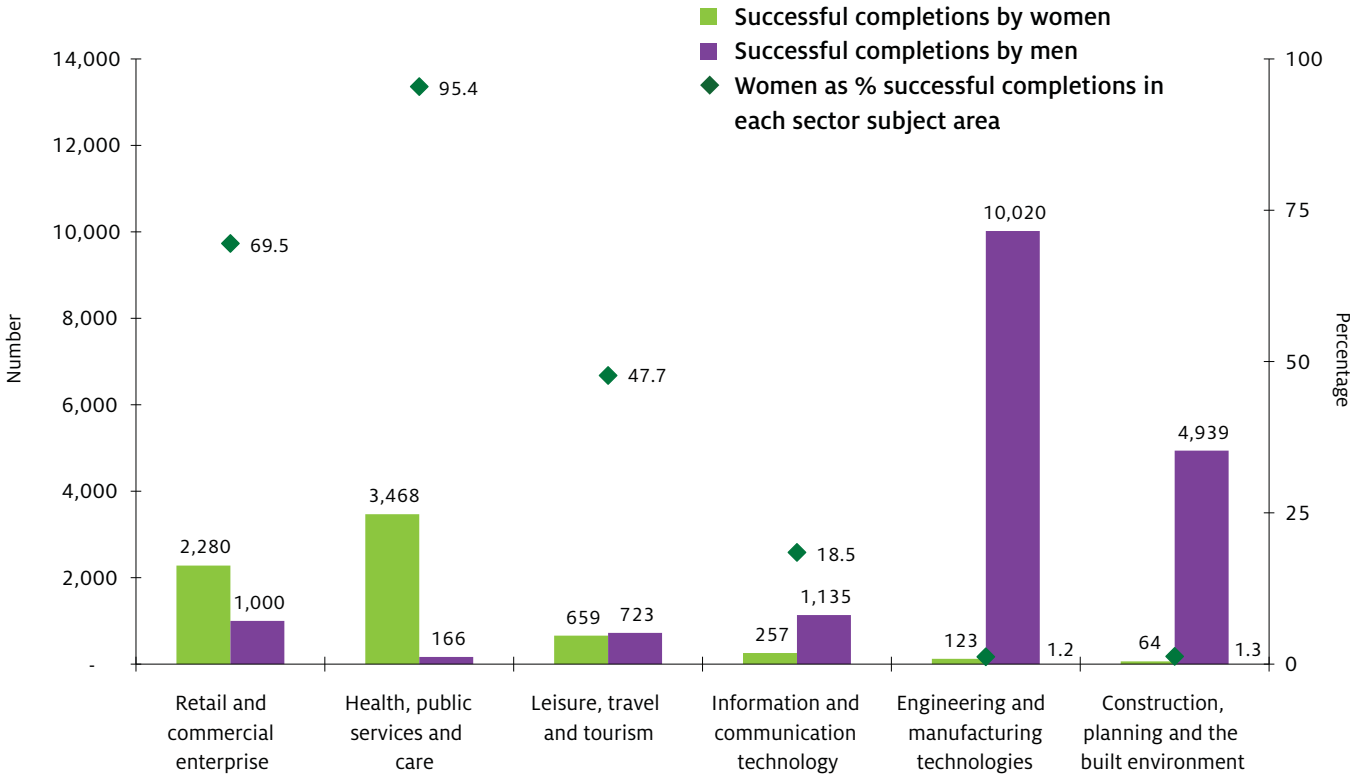
The next two figures show the same data but for advanced apprenticeships. Figure 2.2.3 shows the numbers of female leavers and these numbers as a percentage of all leavers in each subject group for advanced apprenticeships in England in 2006/07.



Secondary analysis by the UKRC
Data source:
LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07.
Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009.
The number of leavers are rounded to nearest 100, and proportions were calculated based on the rounded figures. For this reason, statistics are approximate.

Figure 2.2.3
Advanced apprenticeships - female leavers in England, 2006/07

Extreme gender imbalances exist among women and men leaving their advanced apprentice training. The representation of women in SET subject areas is so small that it is impossible from the published data to discuss their exact numbers or proportions. The most extreme gender differences are in construction, planning and the built environment and in engineering and manufacturing technologies, where female proportions are roughly 1 per cent. Similar to lower level apprenticeships, in advance apprenticeships women predominated in non-SET subject sectors, such as health, public services and care, where the female proportion of total leavers was 94.4 per cent in 2006/07.



Secondary analysis by the UKRC
Data source:
LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07.
Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009.

Figure 2.2.4
The number of successful completions of advanced apprenticeships by women and men, and women as a percentage of all successful completions for three SET and three non-SET subject areas in England, 2006/07

Figure 2.2.4 shows the numbers of successful female completions at advanced apprenticeship level, and these numbers as a percentage of all successful completions for each of three non-SET and three SET subject areas. The numbers and percentages were extrapolated and are not exact (see section 2.4 for more information on the extrapolation used).

Successful completions of advanced apprenticeships among women in SET subject areas are so small, that they can only be approximately discussed in terms of numbers or percentages. In 2006/07, the percentage of female successful completions of all successful completions in nearly monolithic male SET subject areas was roughly 1 per cent in construction, planning and the built environment, and in engineering, manufacturing technologies, and it was 18.5 per cent in ICT. In comparison, most non-SET subject areas, which are stereotypically female, had high female successful completions, ranging between 47.7 per cent in leisure, travel and tourism to 95.4 per cent in health, public services and care.

Table 2.2.2 shows the proportion of successful completions among female and male leavers at advanced apprenticeship level. The overall rate of successful completions in advanced apprenticeships was relatively low in both SET and non-SET subject sectors. At this level, although women had lower successful completion rates than men in engineering and manufacturing technologies, they were more successful in completing their training in construction, planning and the built environment.

The patterns of gender imbalances seen in apprenticeships and advanced apprenticeships across England are related to the occupational segregation that exists in these SET employment sectors. Workplace gender segregation remains a key factor contributing to the gender gap in UK earnings, as well as contributing to continuing skills shortages in the UK. The data presented in this section have illustrated both a lack of success in recruiting women into vocational training programmes in the SET subject sectors and problems with women students' progress, as evidenced by generally lower female successful completion rates. Much more needs to be done to challenge gender differences in apprenticeships and advanced apprenticeships. At the current rates of recruitment and graduation, these vocational programmes will remain monolithically male.

Table 2.2.2
The proportion of successful completions among female and male leavers at advanced apprentice level, 2006/07

Sector subject areas	% of successful completions among female leavers	% of successful completions among male leavers
Construction, planning and the built environment	63.8	58.8
Engineering and manufacturing technologies	61.4	67.7
Information and communication technology	51.4	51.6
Health, public services and care	51.0	41.5
Leisure, travel and tourism	50.7	55.6
Retail and commercial enterprise	47.5	40.0

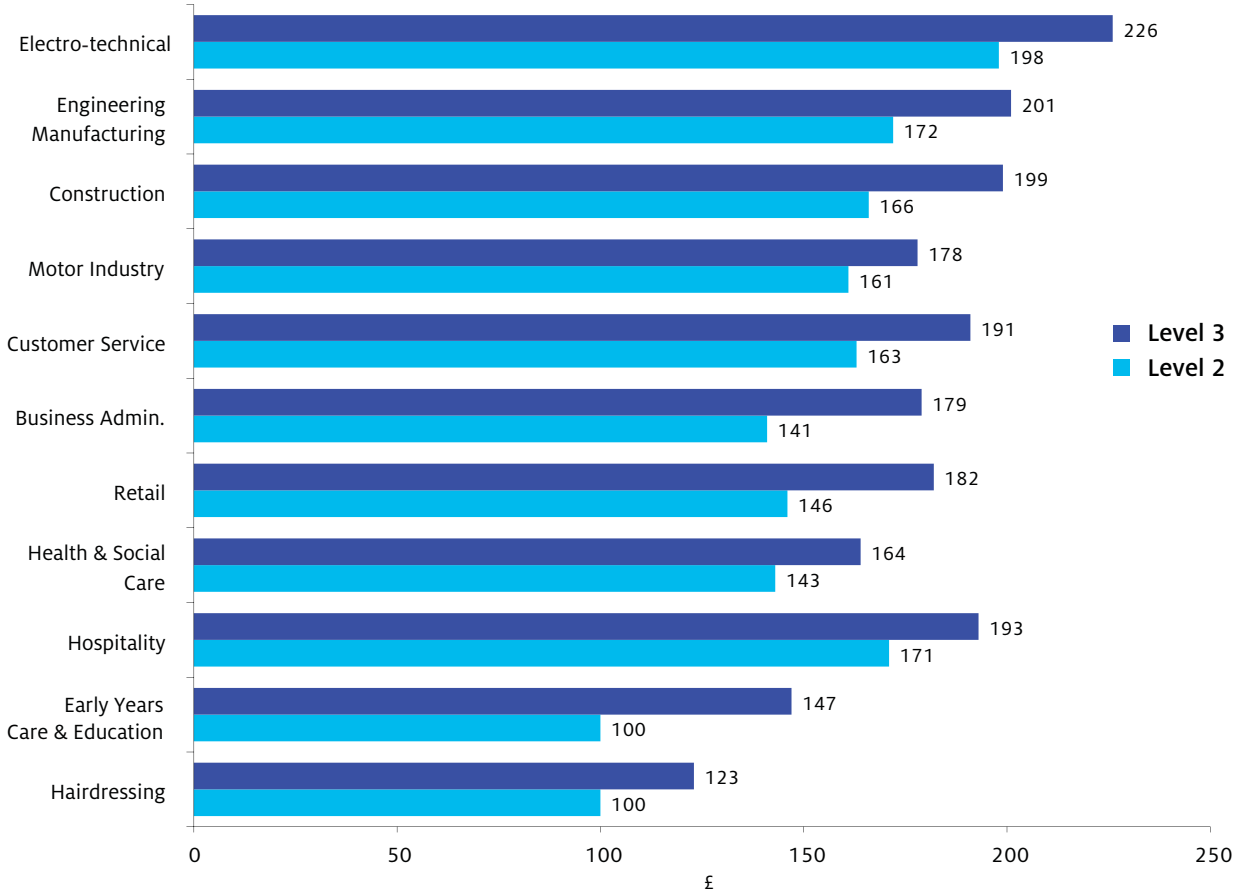
Secondary analysis by the UKRC
Data source
LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07.
Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009.

2.3 Apprenticeship and advanced apprenticeship pay

As shown in section 2.2 there are extreme gender imbalances within apprentice and advanced apprentice training, with the majority of women in non-SET subject sector areas, such as health, public services and care, while men predominate in the subject areas in which apprenticeships have traditionally been found, such as engineering and manufacturing technologies and construction, planning and the built environment. In the first part of section 2.3 we look into pay patterns within apprenticeships and advanced apprenticeships that have both high and low proportions of women. In the second part, we examine those apprenticeships which fall below a minimum level of pay of £80 per week.

All data in this section are from the report "Apprenticeship Pay: 2007 Survey of Earnings by Sector" published by DIUS and written by Fong and Phelps (2008).

Figure 2.3.1 shows the 2007 average weekly net pay (£) for apprenticeships (level 2) and advanced apprenticeships (level 3) by sector for England. The data come from respondents on apprentice and advanced apprentice programmes who received pay from their work as an apprentice or an allowance (N = 3,945), and are not disaggregated by gender.

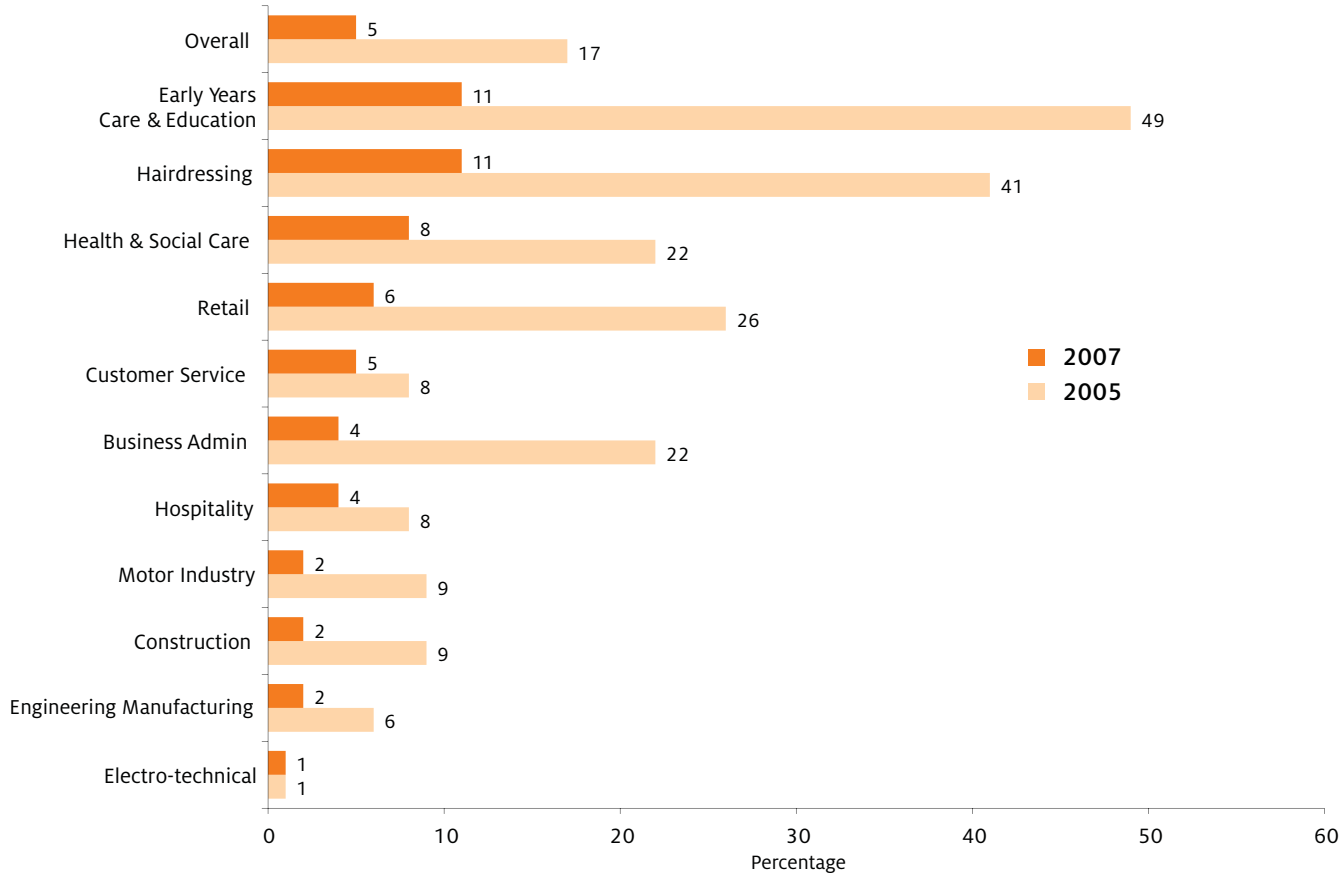


Data source:
Fong, B. and Phelps, A (2008) Apprenticeship Pay:2007 Survey of Earnings by Sector. Available from:
http://www.dius.gov.uk/news_and_speeches/press_releases/~/media/publications/D/DIUSRR0805. Accessed on 23 November 2009.
The chart was modified by the UKRC

Figure 2.3.1
Average weekly net pay (£) by sector subject and apprenticeship level in England, 2007

What is clear from Figure 2.3.1 is that there are considerable differences in pay between the different sector subjects. For example, the average net pay per week for the highest paid sector (electro-technical), was almost double that paid to the lowest paid sector (hairdressing). The lowest paying sectors such as hairdressing, early years and health and social care also had the highest proportions of women apprentices. Overall, the highest paid sectors were all SET related: electro-technical, engineering and manufacturing, construction and motor industry. These sectors have the lowest proportions of women apprentices. Apprentice pay was always lower than advanced apprentice pay within each subject sector, but the best paid (SET) apprenticeships were better paid than the lowest paid advanced apprenticeships. Finally, the general trend for lower pay in apprenticeships with high female representation held across most subject sectors, irrespective of the apprentice level.

As reported in Fong and Phelps (2008), since August 2005 the Learning and Skills Council (LSC) has required its apprenticeship providers to ensure that waged apprentices received a minimum level pay of at least £80 per week (excluding bonuses, tips and overtime). Figure 2.3.2 shows the proportion of apprentices receiving £80 or less per week in 2005 and in 2008 by apprentice sector subjects. The 2005 baseline survey was conducted just before the introduction of the new minimum requirement. The data are from all respondents who received pay from their work as an apprentice or an allowance (2005: N = 4,599; 2007: N = 3,945).



Data source:
Fong, B. and Phelps, A (2008) Apprenticeship Pay:2007 Survey of Earnings by Sector.
Available from: http://www.dius.gov.uk/news_and_speeches/press_releases/~/media/publications/D/DIUSRR0805. Accessed on 23 November 2009.
The chart was modified by the UKRC

Figure 2.3.2
The proportion of apprentices who earned less than £80 average net pay per week by sector in England, 2005 and 2007

Figure 2.3.2 shows that paying below the minimum pay prescribed by the LSC has declined substantially since 2005, but it has not been eliminated. In 2008, five per cent of apprentices continued to earn less than £80 per week in take-home pay. Sector analysis shows that the areas with the highest proportion of underpaid apprenticeships tended to be those with high proportions of women apprentices. All four SET sector subjects had the lowest proportion of underpaid apprenticeships (2 per cent or less). Fong and Phelps also report that in 2008 8 per cent of female apprentices were being paid less than £80 per week compared with only 2 per cent of male apprentices.

Data in this section show that apprentices in the predominately male SET sectors earn more, and are less likely to earn below the minimum pay prescribed by the LSC, than apprentices in the traditionally female sectors, such as hairdressing and health and social care. Unfortunately it would seem that apprentices are learning early to accept gender differences in pay.

2.4 Terminology and data sources

National Vocational Qualifications (NVQs): NVQs are work based awards in England, Wales and Northern Ireland that are achieved through assessment and training. In Scotland they are known as Scottish Vocational Qualifications (SVQ). To achieve an NVQ, candidates must prove that they have the ability (competence), to carry out their job to the required standard. NVQs are based on National Occupational Standards that describe the 'competencies' expected in any given job role. Typically, candidates will work towards an NVQ that reflects their role in a paid or voluntary position. For example someone working in an office administrative role may take an NVQ in Business and Administration. There are five levels of NVQ ranging from Level 1, (basic work activities) to Level 5 (senior management).

Source: Wikipedia (http://en.wikipedia.org)

Data source (NVQs): National Information System for Vocational Qualification (NISVQ) collects NVQ/SVQ data from three of the largest awarding bodies (City and Guilds, EDEXCEL Ltd and OCR), plus information from a further 50 awarding bodies on NVQ, SVQ or VRQ awards at candidate level. The Data Service publishes statistics based on the raw data collected by NISVQ. The data were accessed on 14 October 2009 from: http://www.thedataservice.org.uk/statistics/sfrjun09.

Apprentice (level 2) and advance apprentice (level 3) framework: All apprentice frameworks must comprise of:

- A competence based element (NVQs)
- A knowledge based element (typically Technical Certificates)
- Transferable, or 'key' skills
- Employment rights and responsibilities

LSC (2005) Blueprint for Apprenticeships.
Available from: http://www.apprenticeships.org.uk. Accessed on 30 November 2009.

Data source (apprenticeships and advanced apprenticeships): Learning and Skills Council (LSC). The link to the archive of the LSC data is: http://www.thedataservice.org.uk/statistics/statisticalfirstrelease/sfr_archive/lscsfr20022008/.

Data on apprenticeships and advanced apprenticeships are provided by the Learning and Skills Council (LSC). The LSC derives data from the Individualised Learner Record (ILR). The ILR is a collection of data about learners and their learning that is requested from learning providers in the FE system. The data collected are used by organisations in the FE system to ensure that public money is being spent in line with government targets for quality and value-for-money, for future planning, and to make the case for the sector in seeking further funding.

Successful completion rate (or complete framework rate) is calculated as the number of leavers who meet all of the requirements of their apprenticeship framework, divided by the number of learners who have either left training or successfully completed their programme within the cohort.

(Source: LSC (2008) Further Education, work-based learning and Train to Gain –LSC-funded learner outcomes in England 2006/07. Available from: http://www.lsc.gov.uk/providers/Data/statistics/sfr/. Accessed 27 November 2009).

Rounding procedure: LSC rounded the number of total leavers to the nearest 100, and data were compressed where there were less than 50 leavers. For example, if there were 340 female leavers in one sector subject area, the figure was rounded to 300.

The number of successful women and men who completed an NVQ/SVQ framework was calculated by using the number of leavers (rounded) and completion rate, which was published by LSC. Because the number of leavers was rounded, all figures of successful women and men are only approximate.

References

Fong, B. and Phelps, A (2008) Apprenticeship Pay:2007 Survey of Earnings by Sector. Available from: http://www.dius.gov.uk/news_and_speeches/press_releases/~/media/publications/D/DIUSRR0805.

3. Students in Higher Education

3.1 Science, Technology, Engineering and Mathematics (STEM) students in Higher Education (HE)

Key statistics on HE students in STEM in 2007/08

- 33.2 per cent of undergraduates and 34.0 per cent of postgraduates in STEM disciplines were female.
- Women were under-represented in all undergraduate and postgraduate STEM subject groups, with the exception of subjects allied to medicine and biological sciences.
- Computer science and engineering and technology had the lowest proportions of women undergraduates (19.4 and 14.9 per cent respectively) and postgraduates (20.7 and 20.8 per cent respectively).
- More than half of all women undergraduates in STEM were in biological sciences, physical sciences and subjects allied to medicine, while just over half of all male undergraduates in STEM were in engineering and technology and computer science.
- Women postgraduates tend to be evenly distributed across most STEM subject groups, while 70.4 per cent of all male postgraduates were in engineering and technology, computer science and physical sciences.
- The numbers of undergraduates (but not postgraduates) in STEM disciplines were on the increase between 2003/04 and 2007/08 (by about 8,675 women and 6,590 men overall), with a proportional increase in female students among all undergraduates of 0.9 percentage points.
- Contrary to the data for undergraduates, the numbers of postgraduates in STEM had fallen since 2003/04, with the proportional decline being slightly larger for men than for women. As a result, the female proportion of STEM postgraduate students increased by 0.4 percentage points to 34.0 per cent in 2007/08.

This section examines the participation of women and men studying STEM subjects at the higher education institutions (HEIs) in the UK, and gives an indication of change between 2003/04 and 2007/08. The data presented are for full-time and part-time students combined. Both British resident students (UK domiciled) and overseas students (non-domiciled) are included in the analysis.

Data on undergraduate (first degree) and postgraduate students are discussed separately. Postgraduate courses, which usually require a first degree (or equivalent qualification or experience) as an entry qualification, lead to the following degrees:

- higher degrees (research) including doctorate and masters degrees studied primarily through research,
- higher degrees (taught) including doctorate and masters degrees not studied primarily through research,
- other postgraduate degrees including postgraduate diplomas, certificates and professional qualifications and Postgraduate Certificate in Education.

We present combined data for all postgraduate degrees, as it was not possible in this publication to extract data separately for each of the three types of degrees.

The data for this section are taken from the Higher Education Statistics Agency (HESA) annual report. HESA use the Joint Academic Coding System (JACS) by which all subjects are classified. For this section we have created a subset of seven subject groups which are classified as STEM. Each subject group contains a number of separate subjects. For example, the computer science group consists of computer science, information systems, software engineering, artificial intelligence and others in computing sciences.

The STEM subject list used in this Guide excludes some STEM-related subject groups with a high proportion of women: medicine and dentistry, veterinary science, and agriculture and related subjects. In addition, botany and psychology were excluded from the biological sciences group. However, a group called STEM subjects allied to medicine is included; this is made up of anatomy, physiology and pathology, pharmacology, toxicology and pharmacy and medical technology, but it excludes: broadly-based programmes within subjects allied to medicine, complementary medicine, nutrition, ophthalmics, aural and oral sciences and nursing. This selection of subjects follows historic practice in the UKRC, but might be different from a STEM subject classification used elsewhere, and readers should be aware of this when comparing figures quoted by different sources. More information on the data source used for this section and a link to a list of all subjects (STEM and non-STEM) can be found in section 3.4.

In 2007/08, there were just over one million female and 757 thousand male undergraduate students in universities in the UK, with women making up 58.1 per cent of all undergraduates. Amongst all postgraduate students (this includes both taught and research courses, at both masters and doctorate level) there were about 270 thousand women and 232 thousand men. Women were 53.8 per cent of all postgraduates in the UK. This is the context for the following discussion of data on students studying STEM subjects.

3.1.1 Undergraduate students in HE STEM disciplines

Section 1 of this Guide showed that while girls and young women are now half or nearly half of all students in most GCSE STEM subjects, this proportion declines at A level, with girls accounting for 42.2 per cent of all A level exam entrants in STEM subjects in 2009. Gender segmentation is even greater than this for higher education students. In 2007/08, about twice as many men (288 thousand) as women (143 thousand) undergraduates were studying STEM subjects. Figure 3.1.1 shows both the actual numbers of female undergraduates and women as a proportion of all students for each of the seven subject groups in STEM in 2007/08. For comparison, Figure 3.1.2 presents the same information for 2003/04.

Figure 3.1.1 shows that in 2007/08, the one STEM subject group with significantly more women students than men was subjects allied to medicine (65.6 per cent). Both genders were almost equally represented in biological sciences, however, women were under-represented in all other STEM subject groups. Computer science and engineering and technology had the lowest proportions of women, 19.4 per cent and 14.9 per cent respectively. (Rather than present separate figures for male students we hope that the size of the male cohort for each subject can be easily deduced from the data about the size of the female cohort).

There were also differences within the individual subjects within in each group, which we do not have the space to discuss in detail. However, for example, although women were relatively well represented in the physical science group overall (42.0 per cent), they were only 20.9 per cent of physics students and 25.1 per cent of astronomy students. The poorest representation of female students was in some engineering and technology subjects, with women comprising less than 10 per cent of students in aerospace, mechanical and naval engineering, and in minerals technology.

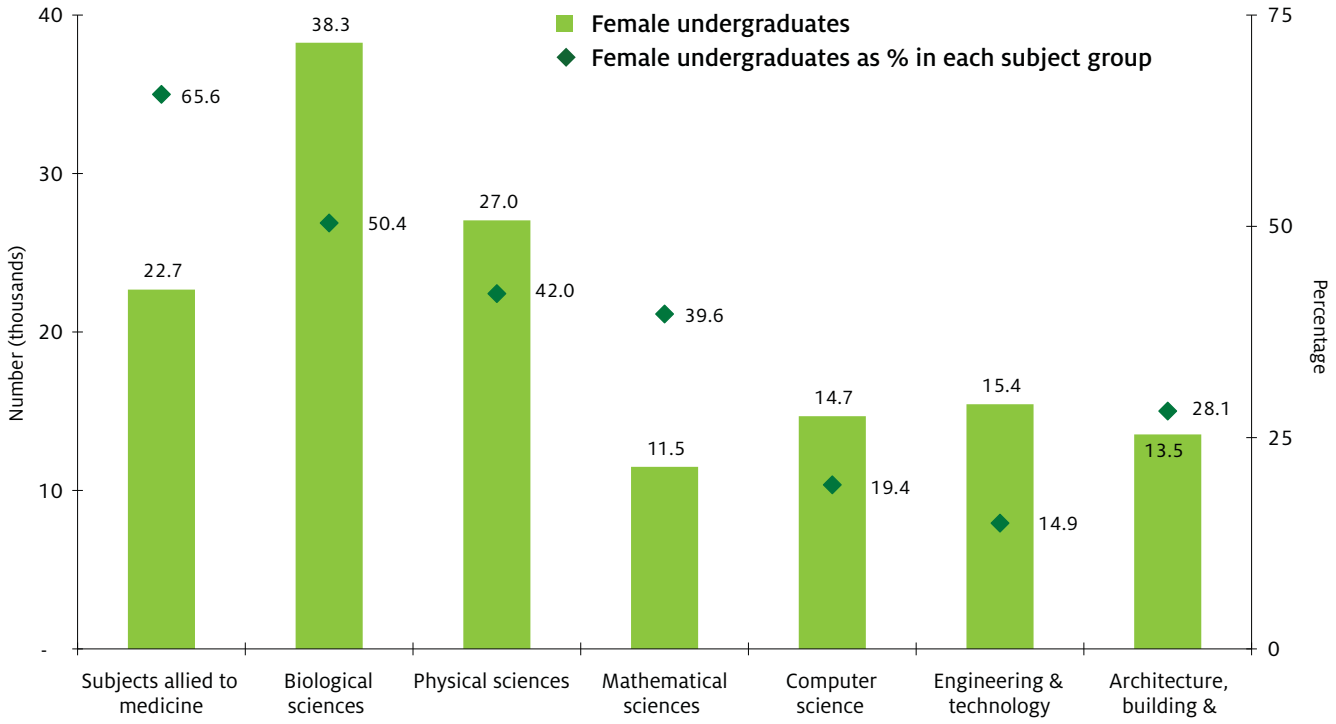
The distributions (Figure 3.1.1) of women and men across all STEM subjects differ in ways that are similar to A level subject choices. 42.6 per cent of all women undergraduates in STEM subject areas are in biological sciences and subjects allied to medicine, while just over half of all male undergraduates in STEM are in engineering and technology and computer science (not shown in Figure 3.1.1). Mathematical science is the least popular subject for women, while subjects allied to medicine attract the smallest number of men.

In order to see if there have been any changes over time in the participation of women in undergraduate STEM subject areas, data from 2003/04 are presented in Figure 3.1.2. The numbers of female and male undergraduates in STEM disciplines showed an overall small increase between 2003/04 and 2007/08 (of about 8,675 women and 6,590 men), with the proportional increase being larger for women. As a result, the overall female proportion of STEM undergraduate students increased by 0.9 percentage points to 33.2 per cent in 2007/08. However, in computer science the proportion of women among all students declined from 23.8 to 19.4 per cent. The decline was caused by a substantial decrease in numbers of women, from about 26.7 thousand in 2003/04 to only 14.7 thousand four years later. It is worth noting here that the numbers of men declined by almost 25 thousand in the same period, but because there are so many men studying computer science the decline was only a small percentage of the male total.

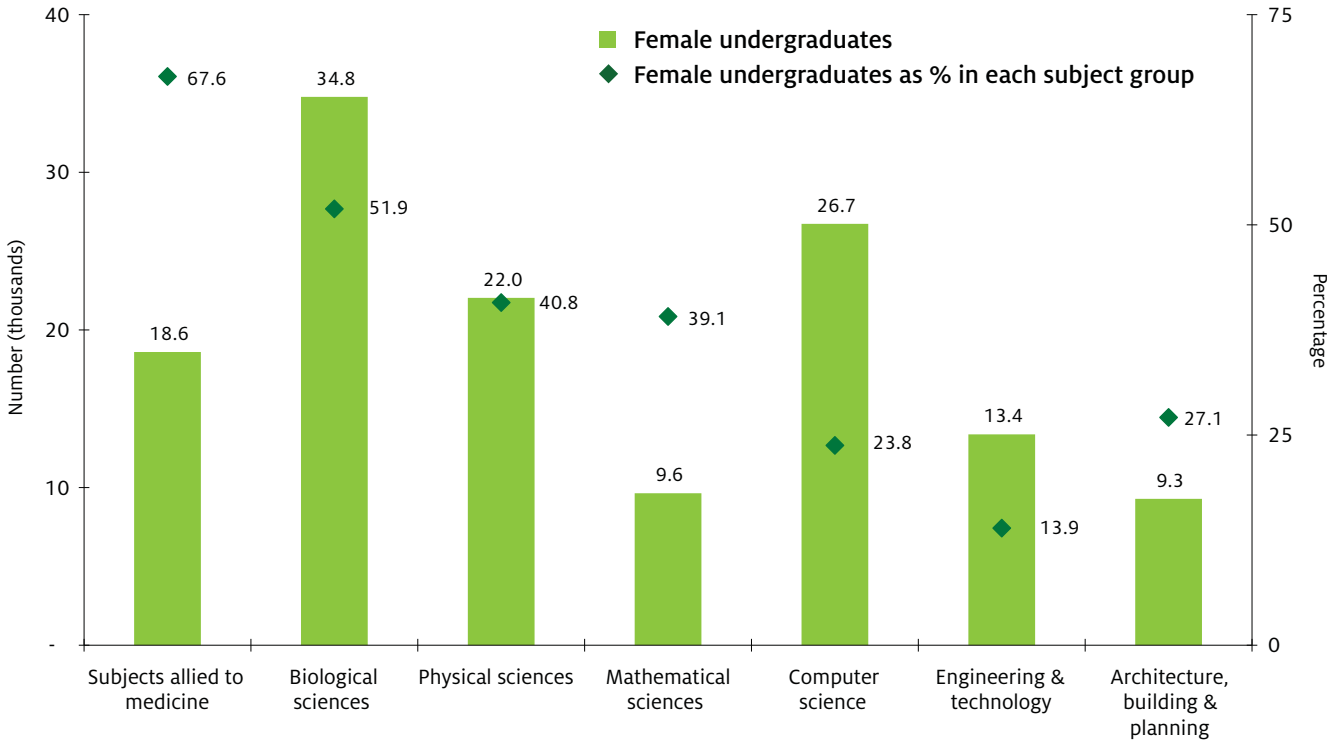
In the two subjects that are traditionally more popular among female students, biological sciences and subjects allied to medicine, the proportion of female students also decreased slightly in this period (by 1.5 and 2.0 percentage points respectively).

The data in this section suggest that women's overall participation in STEM undergraduate subjects increased in real numbers between 2003/04 and 2007/08 but that this increase has been during a period when men's participation has also increased, although proportionately slightly less than women's participation. Although the increase in women's participation is relatively small, it is encouraging. The next sub-section shows the participation of women in STEM postgraduate courses.

Figure 3.1.1
The number and proportion of female STEM undergraduates, 2007/08



Secondary analysis by the UKRC
Data source:
HESA (2009) Students in Higher Education Institutions 2007/08. Cheltenham, HESA.



Secondary analysis by the UKRC
Data source:
HESA (2005) Students in Higher Education Institutions 2003/04. Cheltenham, HESA.

Figure 3.1.2
The number and proportion of female STEM undergraduates, 2003/04

3.1.2 Postgraduate students in HE STEM disciplines

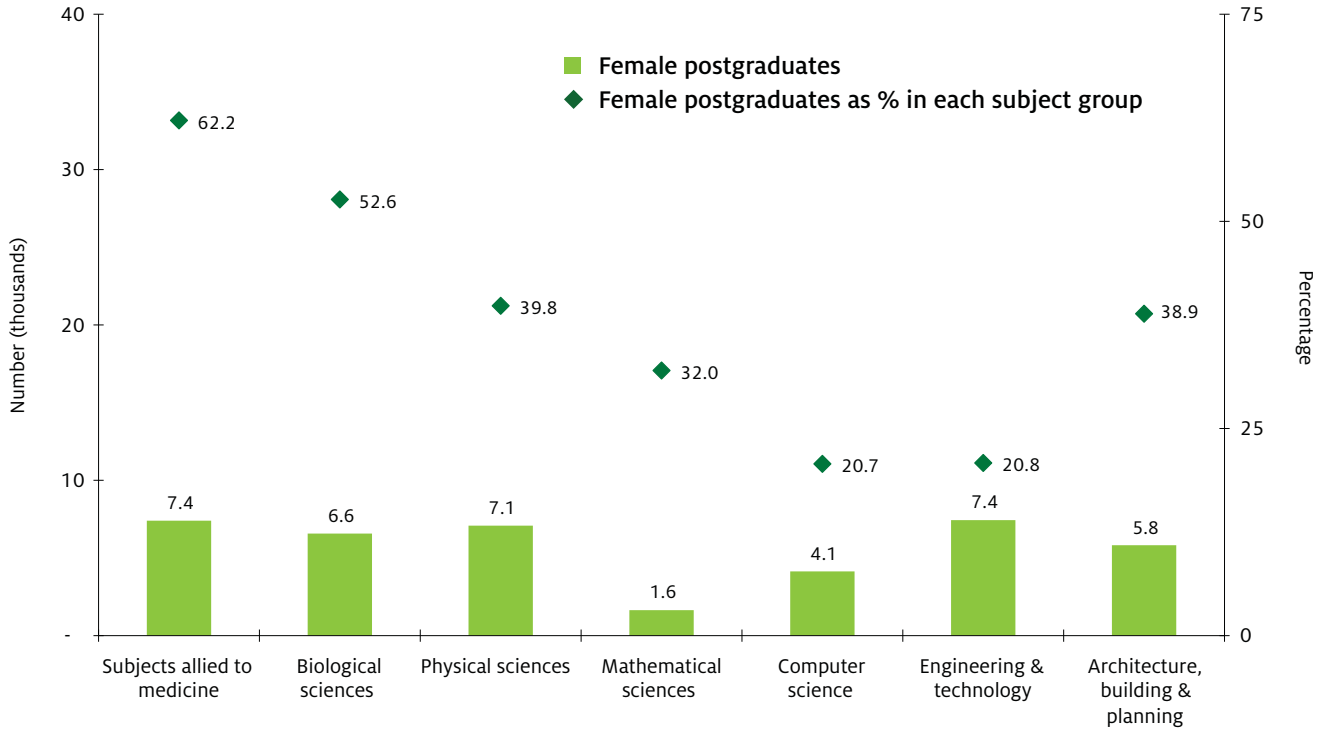
The gender distribution patterns for postgraduate courses are unsurprisingly similar to those of undergraduate courses. In 2007/08, almost twice as many men as women were studying STEM subjects at a postgraduate degree level: in total 77.8 thousand men compared to 40.1 thousand women. The data presented combine the different kinds of postgraduate courses as discussed in the introduction to section 3. It should be noted that most women (555 thousand or 51.2 per cent of all taught students) are enrolled in postgraduate taught degrees, followed by other postgraduate degrees, such as postgraduate diplomas, certificates and professional qualifications (261 thousand or 64.9 per cent of all other postgraduate degrees). The smallest numbers of women, 186 thousand, are studying for research degrees where they make up 45.8 per cent of all postgraduate research students.

Figure 3.1.3 shows both the actual numbers of female postgraduates and women as a proportion of all students in 2007/08 for each of the seven subject groups in STEM. For comparison, Figure 3.1.4 presents the same information for 2003/04.

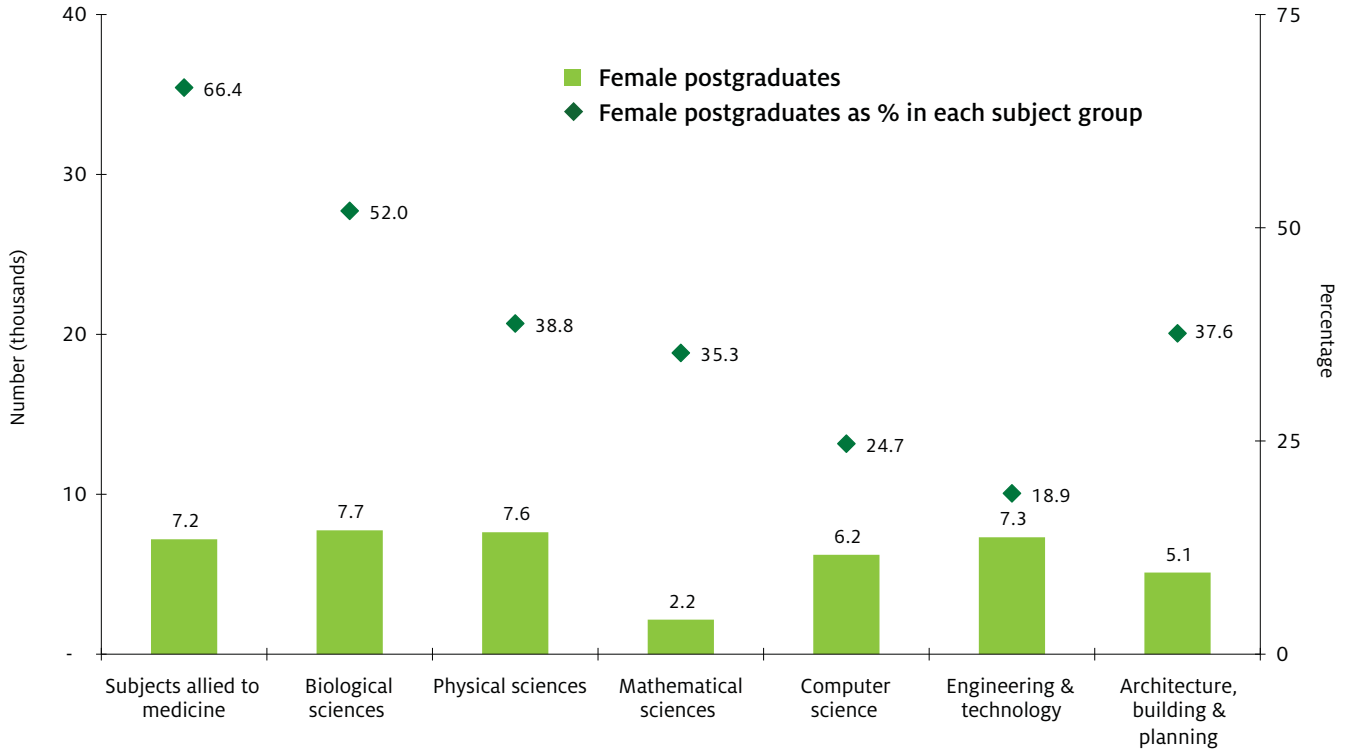
Women continue to be well represented in biological sciences and subjects allied to medicine at postgraduate level, but female postgraduate students are under-represented in all other STEM subject groups. Computer science and engineering and technology had the lowest proportions of women of all STEM students, 20.7 per cent and 20.8 per cent respectively (the latter being 5.9 percentage points greater than the proportion of women undergraduates which comprised 14.9 per cent of all engineering and technology undergraduates in the same year, as shown in Figure 3.1.1). In four of the subject groups women formed a larger proportion of students studying at postgraduate level than at undergraduate level. As well as engineering and technology this was also the case for biological sciences, computer science, and architecture, building and planning. In the remaining three subject groups women were a smaller proportion of postgraduate students than undergraduate students. The difference was particularly noticeable in mathematics where women were 32.0 per cent of all postgraduates compared with 39.6 per cent of undergraduates.

While more than half of all female undergraduates in STEM are in biological sciences, physical sciences and subjects allied to medicine, women postgraduates tend to be evenly distributed across STEM subject groups, with no one subject being significantly more popular (Figure 3.1.3). For comparison, 70.4 per cent of all male postgraduates are in engineering and technology, computer science and physical sciences (this is not shown in Figure 3.1.3).

Figure 3.1.3
The number and proportion of female STEM postgraduates, 2007/08



Secondary analysis by the UKRC
Data source:
HESA (2009) Students in Higher Education Institutions 2007/08. Cheltenham, HESA.



Secondary analysis by the UKRC
Data source:
HESA (2005) Students in Higher Education Institutions 2003/04. Cheltenham, HESA.

Figure 3.1.4
The number and proportion of female STEM postgraduates, 2003/04

In order to see if there have been any changes over time, data from 2003/04 (Figure 3.1.4) have been included. While the numbers of undergraduates in STEM are on the increase, the numbers of female and male postgraduates in STEM disciplines fell since 2003/04 (by about 7,855 men and 3,265 women), with the decline being slightly larger for men than for women (9.2 per cent compared to 7.5 per cent). As a result, the female proportion of all STEM postgraduate students increased by 0.4 percentage points to 34.0 per cent in 2007/08. Increases where they occurred, were small and the proportion of women decreased in subjects allied to medicine, mathematical sciences and computer science (4.2, 3.3 and 4.0 percentage points respectively).

The data suggest that there is no distinct leaky pipeline between undergraduate study and postgraduate study for women in STEM overall. In most subjects where women were a small proportion of undergraduate students and in biological sciences where they were in the majority, female students were a larger proportion at postgraduate level. Although on the one hand this can be seen as good news for women, the reasons for this might be less positive. It may be that female STEM graduates feel a greater need than their male counterparts to have postgraduate qualifications to get good jobs. It may be that a greater proportion of female STEM graduates are planning careers in research and teaching where postgraduate qualifications are expected. However, without further research this can be no more than speculation.

3.2 UK domiciled students in HE STEM disciplines by ethnicity

Key statistics on HE students in STEM by ethnicity in 2006/07

- Among UK domiciled students similar proportions of White and BME women obtained undergraduate qualifications in STEM (34.8 and 35.8 per cent respectively).
- Similar proportions of White women (39.8 per cent) and BME women (38.5 per cent) obtained postgraduate qualifications.

As we will see later in section 5 on employment, the UK has a substantial Black and Minority Ethnic (BME) population working in SET and studying for STEM qualifications. This guide examines data about ethnicity as well as gender to explore whether particular ethnic groups have different gender representation in STEM education and employment. This section examines the ethnic composition of UK domiciled STEM graduates.

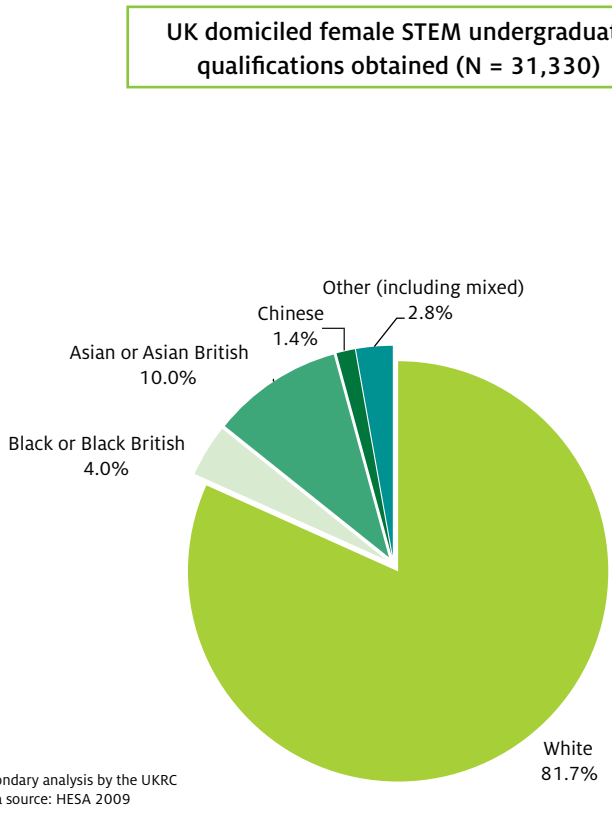
It was not possible to extract data on the ethnicity of undergraduates and postgraduates in higher education for this publication from the same source as the data presented in section 3.1. Instead ethnicity data have been obtained from data sets published on the qualifications gained by different ethnic groups. This section deals only with UK domiciled students – women and men whose normal residence is in the UK. We have used the same subject categories for STEM as in the section 3.1. Ethnic groups which come under White and BME are listed in section 3.4.

Among UK domiciled students 5.7 thousand undergraduate STEM qualifications were gained in 2006/07 by women who defined themselves as belonging to a BME group and 25.6 thousand by women who defined themselves as White. About 10.3 thousand undergraduate STEM qualifications were obtained by BME men and 47.9 thousand by White men. Among STEM postgraduates, BME women gained 1.3 thousand qualifications and White women 6.1 thousand. The number of postgraduate qualifications was 2.1 thousand for BME men and 9.3 thousand for White men.

The BME group can be further divided into different ethnic groups : Black or Black British, Asian or Asian British, Chinese, and other groups. The latter includes all ethnic minorities that are not part of the first three groups including mixed race groups.

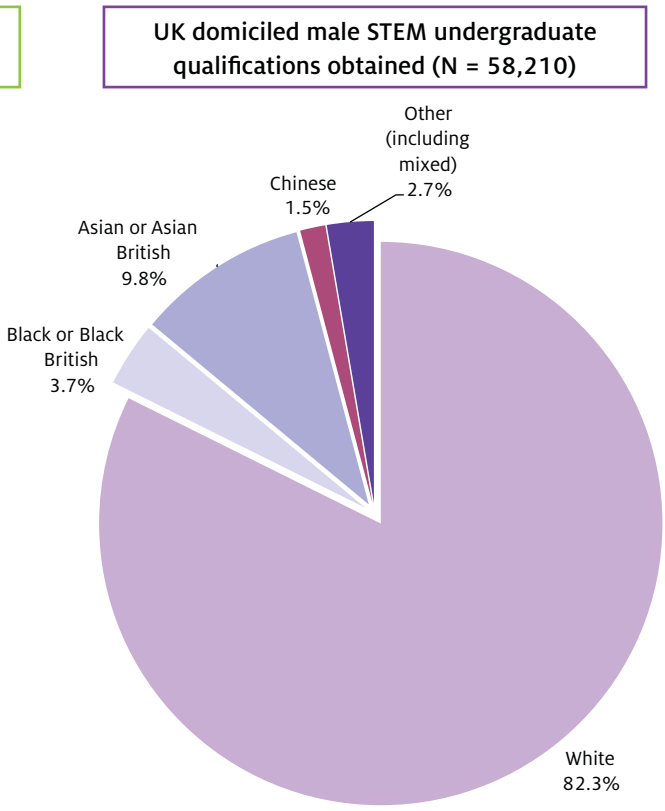
Figure 3.2.1 illustrates the ethnic composition of UK domiciled undergraduates gaining STEM qualifications, separately for women and men. Figure 3.2.2 shows the same type of information for postgraduates.

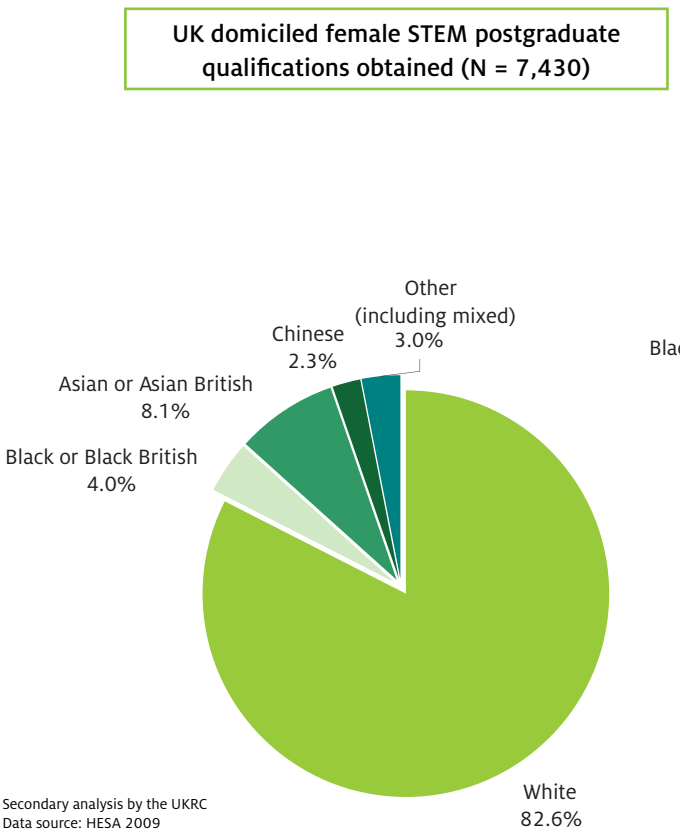
Figure 3.2.1 (top)
The distribution of UK domiciled STEM undergraduate qualifications gained by women and men in each ethnic group, 2006/07



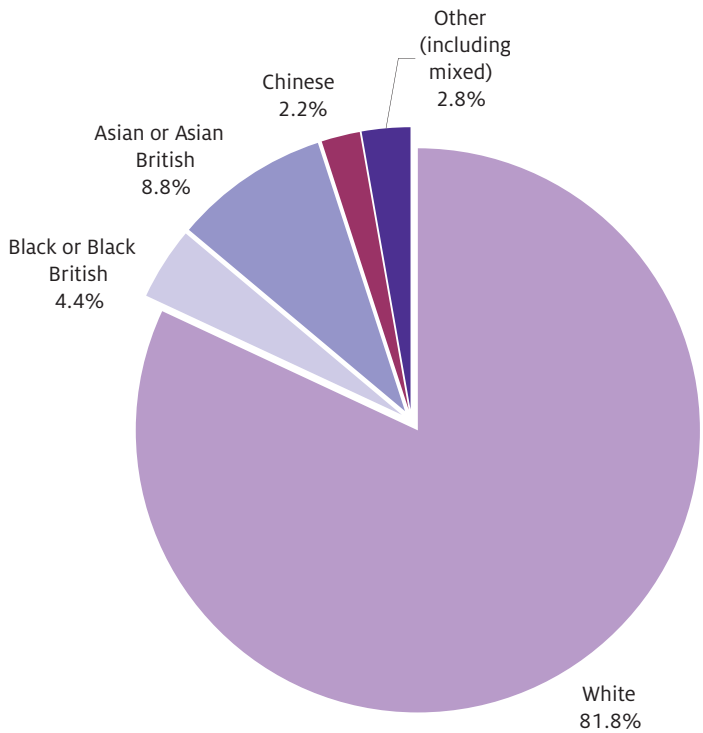
Secondary analysis by the UKRC
Data source: HESA 2009

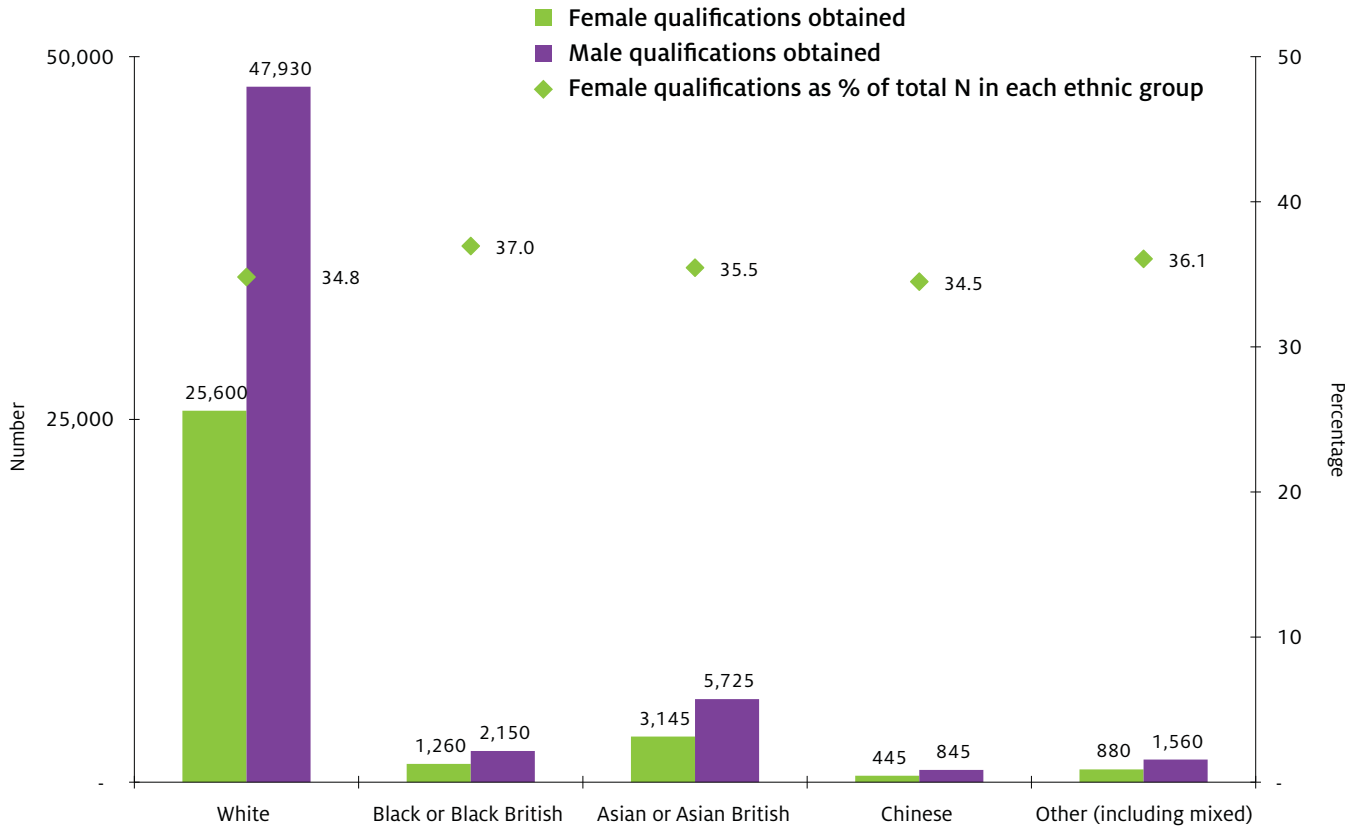
Figure 3.2.2 (bottom)
The distribution of UK domiciled STEM postgraduate qualifications gained by women and men in each ethnic group, 2006/07





Secondary analysis by the UKRC
Data source: HESA 2009



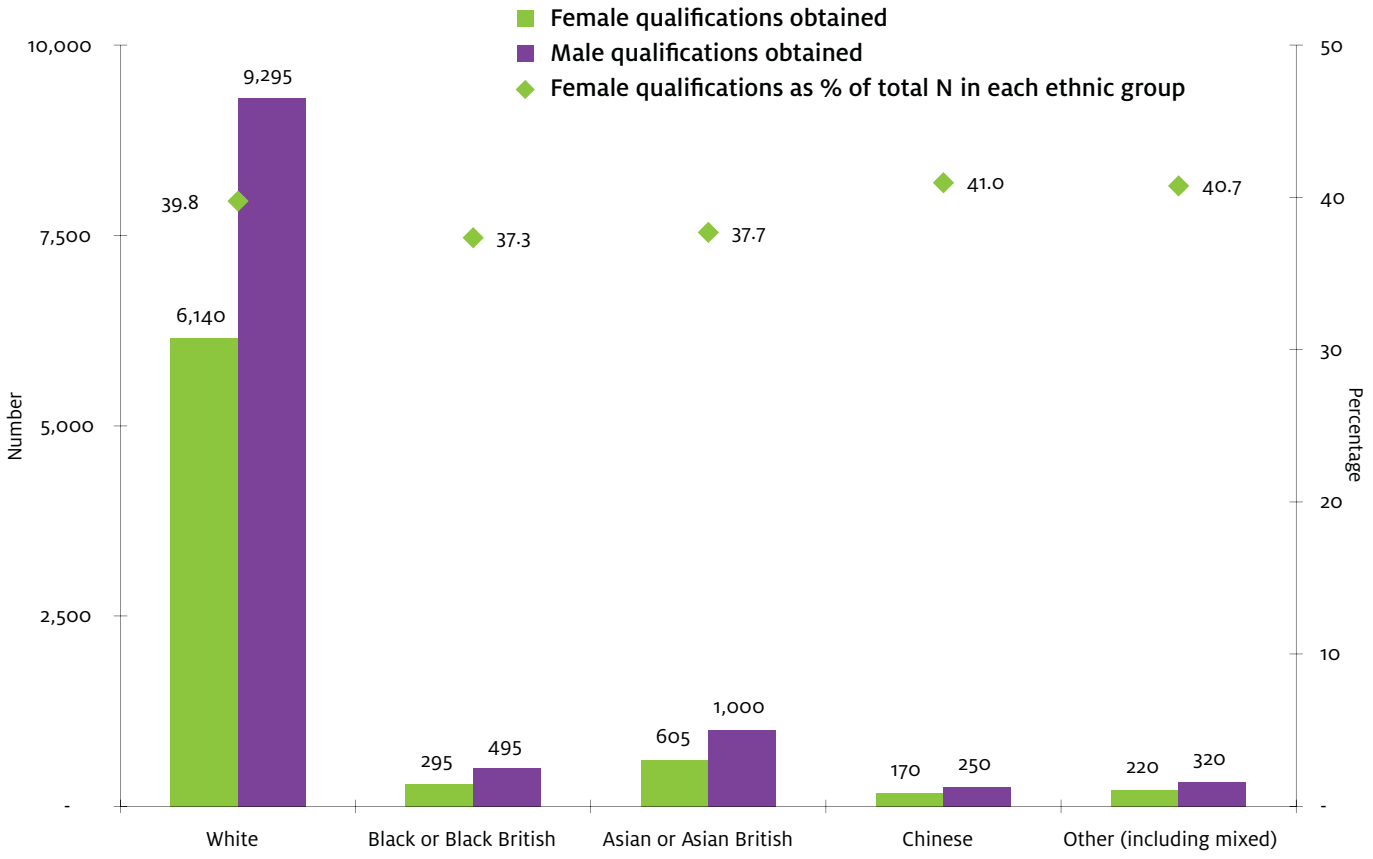


Secondary analysis by the UKRC
Data source: HESA 2009

Figure 3.2.3
STEM undergraduate qualifications by gender and ethnicity, 2006/07

As illustrated in Figure 3.2.1 the ethnic composition of the populations of women and men who gained SET undergraduate qualifications was almost identical in 2006/07. For example, the same proportions (about 82 per cent) of White female and male undergraduates gained qualifications in SET. Figure 3.2.2 shows similar findings for postgraduate qualifications.

The previous figures suggest similarities in the ethnic make up of female and male UK domiciled STEM students. Next, we compare the number of STEM qualifications gained by the UK domiciled female and male undergraduates within each ethnic group (Figure 3.2.3). The Figure also shows women as the proportion of the total in each ethnic group. Representing the data in this way allows us to compare the gender balance in STEM qualifications for each ethnic group.



Secondary analysis by the UKRC
Data source: HESA 2009

Figure 3.2.4
STEM postgraduate qualifications by gender and ethnicity, 2006/07

Figure 3.2.3 shows that for every ethnic group women were roughly a third of those gaining a qualification. In 2006/07 White women were 34.8 per cent of all White undergraduates who gained qualifications in STEM, compared to slightly higher 35.8 per cent of ethnic minority women of all ethnic minority undergraduates in STEM.

Figure 3.2.4 shows the STEM qualifications gained by the UK domiciled postgraduates from different ethnic backgrounds.

In 2006/07, the female proportion of UK domiciled students who gained postgraduate STEM qualifications at 39.5 per cent was higher than that for undergraduate qualifications. Again there are slight differences for different ethnic groups but the numbers are too small to make reliable comments about these differences.

Without engaging in further research the data suggest that there are no gender differences between different ethnic groups with respect to obtaining HE STEM qualifications. However, it should be noted that the ethnic groups discussed here are made up of other groups, and that gender differences might become more apparent if the groups were to be broken down further. For instance, other studies suggest that Black Caribbean and Bangladeshi females are under represented in STEM subjects (see for example, Elias, Jones and McWhinnie, 2006).

3.3 Employment destinations of STEM HE graduates dominciled in the UK

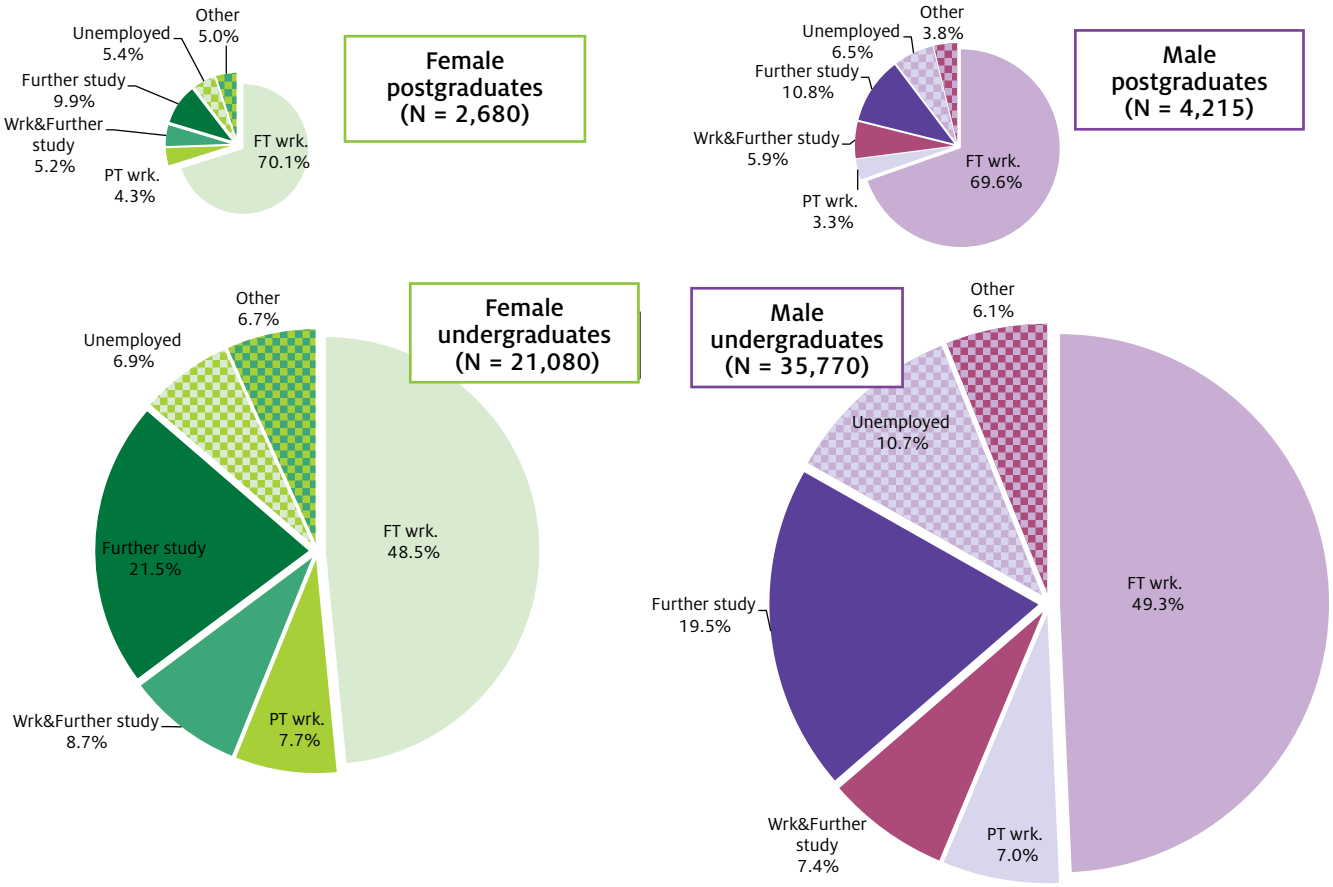
Key statistics on the first destination of STEM graduates in 2007/08

- On graduation almost the same proportions of male and female STEM graduates enter employment, or further study, or become unemployed, or inactive.
- Twice the proportion of men graduating with undergraduate degrees in STEM enter SET professional or associate professional occupations (41.8 per cent) compared with women (21.0 per cent).
- Twice the proportion of women with undergraduate degrees in STEM become 'other – non-SET - professionals' (16.3 per cent compared with 8.6 per cent of men).
- 43.4 per cent of women graduating with STEM undergraduate degrees go to work as non-SET professionals and associate professionals, and another 35.6 per cent are in 'other occupations'.
- Male graduates who enter SET occupations are much more likely to enter at higher levels than women.

The Higher Education Statistics Agency (HESA) collects data annually on the first destination of UK domiciled graduates with both undergraduate and postgraduate qualifications. This gives an indication of how well the flow of graduates is feeding into the labour market. These data provide only an indication of the first jobs or activities within six months of graduation. There is little research on how well this predicts final career trajectories. However the gender differences in the activities of STEM graduates immediately after graduation are surprisingly large and merit further research.

As with the previous sections we have extracted data for students who graduated with STEM degrees excluding medicine for 2007/08. The data do not include all graduates. They are first restricted to UK domiciled students and second only include those graduates who provided HESA with information about their activities.

Figure 3.3.1 shows the proportions of full-time STEM graduates who entered employment, further study, were unemployed or not in paid work. Comparing the charts for male and female graduates with undergraduate degrees (the two larger pie charts), it is clear that almost the same proportions of women and men (49 per cent) go into full-time work, and almost the same (7 - 8 per cent) into part-time work. The same proportions of men and women are engaged in 'other' activities; a combination of voluntary or unpaid work, 'inactive' and unclassified. However, a larger proportion of women STEM graduates go into further study or a combination of work and further study: 30.2 per cent compared with 26.9 per cent of male STEM graduates. And a larger proportion of male STEM graduates are classified as unemployed: 10.7 per cent compared with 6.9 per cent of women. This suggests that women STEM graduates with undergraduate degrees are more likely than men to have gone directly into work, or study, immediately after graduation.



Secondary analysis by the UKRC
Data source:
HESA (2009) Destinations of Leavers from Higher Education Institutions 2007/08. Cheltenham, HESA.

Figure 3.3.1
Destinations of UK domiciled leavers with full-time STEM qualifications by gender, 2007/08

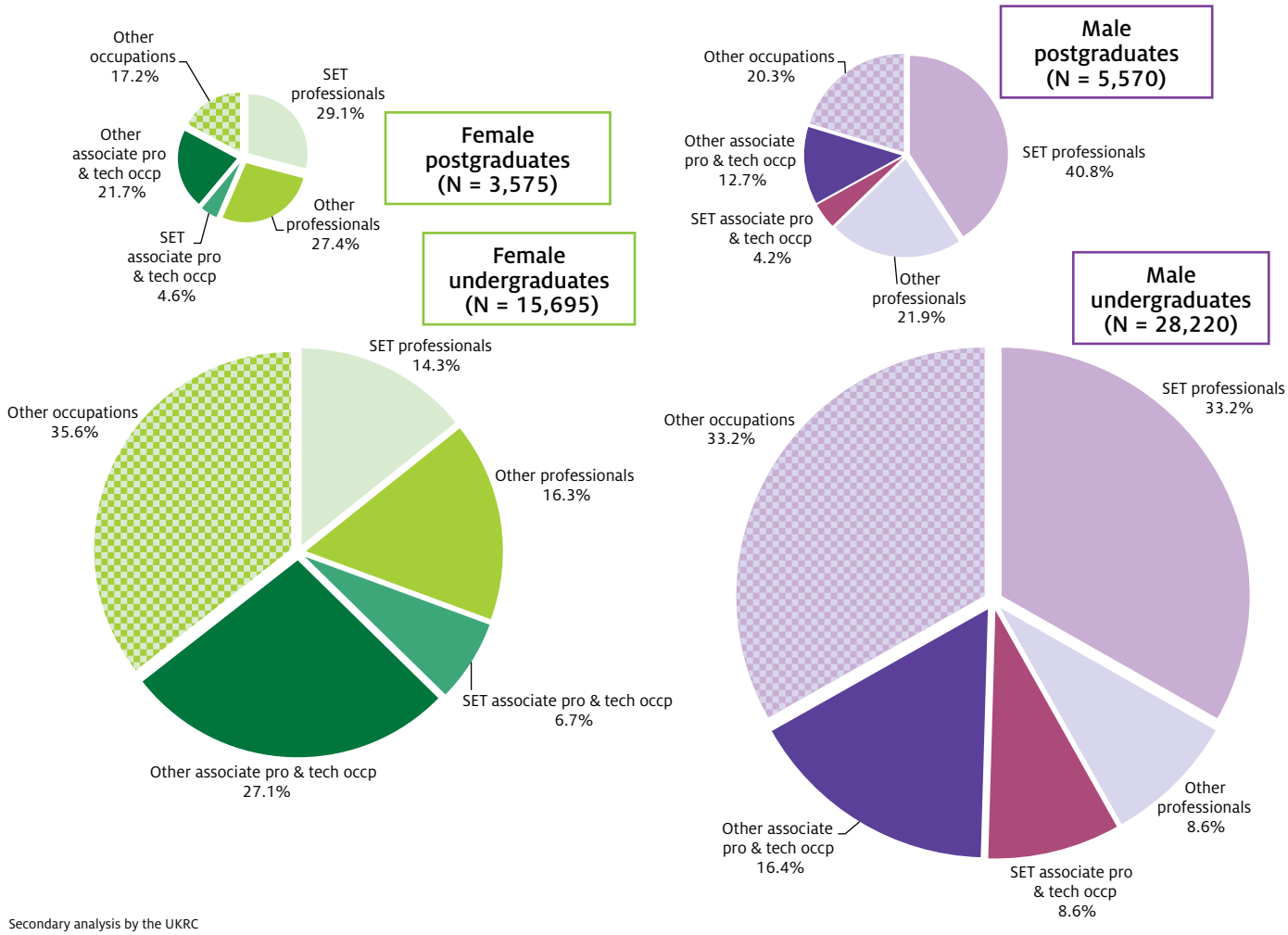
The smaller pie charts in Figure 3.3.1 show the same data for those graduating from full-time STEM postgraduate courses. The distribution of activity for both genders at this level is more similar than it is for graduates with undergraduate degrees. For both genders a larger percentage have gone into full-time employment (70 per cent), a slightly larger percentage of male graduates (6.5 per cent) were unemployed compared with women (5.4 per cent), and a slightly larger percentage of male graduates have gone to further study, or work combined with further study (16.7 per cent), compared with women (15.1 per cent). The trend we see later in life for women to be more engaged in part-time work is not significant at this point. There is only one percentage point difference between women (4.3 per cent) and men (3.3 per cent) who were working part-time.

These pie charts indicate that immediately after graduation there is little difference between the destinations of STEM qualified men and women with respect to whether they are employed, and that women graduates are less likely to be unemployed than men. However, very large gender differences exist in the occupations that male and female graduates enter. These are explored in the pie charts of Figure 3.3.2.

Figure 3.3.2 uses the data about those STEM graduates (both full-time and part-time) who entered employment and shows their distribution across different kinds of occupations. It indicates clearly that there are significant gender differences in the employment areas women and men enter.

The larger pies show data for graduates from undergraduate courses. Twice the proportion of male than female STEM graduates enter professional jobs in science, engineering and technology (33.2 per cent and 14.3 per cent respectively), and a slightly larger percentage enter SET associate professional occupations (8.6 per cent and 6.7 per cent). Twice the proportion of women than men become 'other – non-SET - professionals' (16.3 per cent and 8.6 per cent), and roughly one third more enter non-SET associate professional occupations (27.1 per cent and 16.4 per cent). In total 43.4 per cent of women graduating with STEM first degrees go to work as non-SET professionals and associate professionals, and another 35.6 per cent take roles classified as 'other occupations' (which we discuss later). On graduation a relatively small minority (21.0 per cent) of women STEM graduates enter STEM professional or associate professional occupations.

Figure 3.3.2
First employment occupations of UK domiciled STEM graduates (full-time and part-time combined) by gender, 2007/08

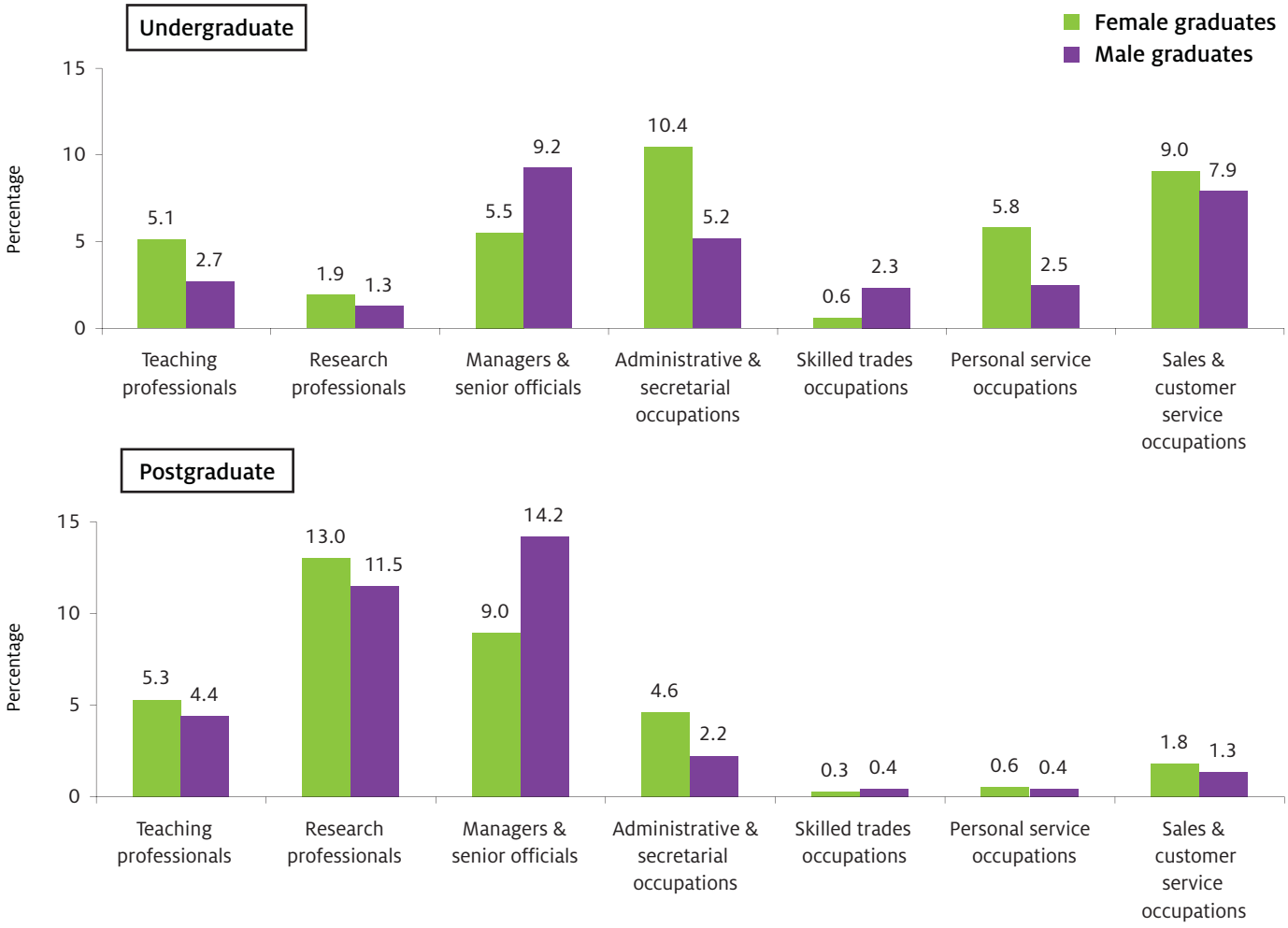


Secondary analysis by the UKRC
Data source: HESA (2009) Destinations of Leavers from Higher Education Institutions 2007/08. Cheltenham, HESA.

The postgraduate charts (smaller pies), show a similar gender pattern, but the gender differences are much less extreme. It is still curious that such large proportions of men and women at this level do not enter SET occupations. However, it should be noted that roles in higher education, such as post doctoral fellows, are often not classified as SET occupations, so it is difficult to conclude too much about whether or not postgraduates leave science without further research. In addition, a number of other roles, e.g. scientific publishing, will not be recorded as SET occupations although they require scientific knowledge. It is clearly not possible to conclude from these data the reasons why a significant proportion of STEM postgraduates do leave science. However, if the issue was simply that of a lack of demand for SET skills, we would not expect there to be such gender differences in occupational destinations. Some SET employers have been very public in voicing their keenness to recruit women. Either the recruitment practices are not working well, or women graduates have lost their interest in SET careers by the time they have graduated.

Because such large numbers of men as well as women were classified as working in non-SET professions/ associate professions and skilled trades we have disaggregated these groups, and extracted from them those occupations which were the destination for the largest numbers of male and female graduates.

Figure 3.3.3 shows the data for both graduates of undergraduate (top chart) and postgraduate (bottom chart) courses. The bars show all male or female graduates who entered the listed occupations as a percentage of all male or female graduates who went into employment. The pattern for STEM graduates with undergraduate degrees is that women are twice as likely as men to have entered teaching (5.1 per cent and 2.7 per cent respectively) administrative and secretarial jobs (10.4 per cent and 5.2 per cent respectively) and personal services (5.8 per cent and 2.5 per cent respectively). Men, on the other hand, are nearly twice as likely as women to have become managers or senior officials (9.2 per cent and 5.5 per cent respectively). The data for STEM graduates with postgraduate degrees show the same pattern, but with smaller differences.



Secondary analysis by the UKRC
Data source: HESA (2009) Destinations of Leavers from Higher Education Institutions 2007/08. Cheltenham, HESA.

Figure 3.3.3
The most popular first employment non-SET occupations of UK domiciled STEM graduates (full-time and part-time combined) by gender, 2007/08

The data presented in this section suggest that the destinations of STEM graduates up to six months after graduating demonstrate the first operation of a gendered labour market and of gendered choice amongst graduates. This in turn will have a long-term impact on the gendered nature of SET occupations and may affect the opportunities available to women who remain in SET careers.

Further, male graduates who enter SET occupations are much more likely to enter at higher levels than women. The ratio of male graduates (with undergraduate degrees) who entered SET professions to those who entered SET associate professions is 4:1, for women the ratio is 2:1. For those with postgraduate qualifications the ratio of men who entered SET professions to those who entered SET associate professions is 10:1, for women the ratio is 6:1. In each case women are disproportionately more likely to be entering the lower level SET occupations and men the higher level. It is safe to presume that women who enter SET as a career are as ambitious as men to get a 'good' job on graduation but the data would suggest that gender discrimination is in operation in the recruitment and selection process for graduates.

As noted earlier though, this picture is likely to be more complicated as the analysis does not investigate some roles which require scientific knowledge (e.g. scientific publishing) but are not classified as SET occupations. Clearly the whole area of the first employment destinations of male and female STEM graduates is worth of more detailed study.

3.4 Terminology and data sources

Data on students in higher education institutions presented in this Guide are taken from the annual report published by the Higher Education Statistics Agency (HESA). HESA's annual report provides detailed information about existing students at UK HE institutions, including analysis by subject of study, level of study, mode of study, age, gender, ethnicity and disability. When using this data the following facts should be noted:

- Samples are of UK and non-UK domiciled students studying at HE institutions in the UK. The data do therefore include students from other countries studying in the UK (except section 3.2 and 3.3). The 2007/08 report covers data supplied by 166 HEIs (132 in England, 11 in Wales, 19 in Scotland, 4 in Northern Ireland). HESA does not collect data from further education colleges (FECs).
- The published HESA report is based on data from student records for an academic year provided by HE institutions. For example, 2007/08 covers the period from 1 August 2007 to 31 July 2008.

HESA uses the Joint Academic Coding System (JACS) by which all subjects are classified. This list is too long to include in this section, but STEM subjects can be found on the UKRC website: http://www.theukrc.org/files/useruploads/resources/stem_subject_clarification.pdf. The list clearly shows which subject groups and which individual subjects in each group are classified as STEM.

Items to be treated with caution

HESA's rounding strategy: HESA applies a rule of rounding all numbers to the nearest multiple of 5. As a result the numbers quoted in this section will not be exact.

Comparing student data prior to 2002/03 and in/after 2002/03: It is not advisable to compare student data prior to 2002/03 and 2002/03 onwards due to the following two reasons:

- Change in subject classifications
- Change in the way students in 'Combined' subject areas are counted.

UK domiciled students are those whose normal residence is in the UK, and for the purposes of this publication include Guernsey, Jersey and the Isle of Man. HESA advises that the figures reported in analyses are derived from a subset which may not be representative of the total student population.

HESA uses the following categories to classify ethnic groups:
White = British, Irish, Scottish, Irish Traveller, Other - White background
Black or Black British = Caribbean, African, Other - Black background
Asian or Asian British = Indian, Pakistani, Bangladeshi, Other - Asian background
Chinese = Chinese
Other = Mixed (White and Black Caribbean, White and Black African, White and Asian, Other Mixed background), Other Ethnic background

Please note that in 2006/07 there were 3,135 STEM qualifications obtained by female students and 6,140 by male students who did not report their ethnicity.

Data about the destinations of leavers from higher education are also obtained from the Higher Education Statistics Agency (HESA). The data are from HESA's annual report based on an academic year (e.g. 2007/08) published by HESA with a number of cross-tabulated tables accompanied by a CD which contains all tables in the publication. The report is based on the Destinations of Leavers from Higher Education (DLHE) survey, which replaced the previous First Destinations Supplement (FDS) in 2002/03. Two reference dates are selected as two time points of an academic year. Respondents were asked to provide relevant information with reference to these dates. For example:

- 14 April 2008 for those leavers who graduated from HE institutions during the period from 1 August 2007 and 31 December 2007
- 12 January 2009 for the period from 1 January 2008 to 31 July 2008.

The purpose of splitting the collection in this way is to bring the gap between the date of qualification and the reference date closer to the six-month target.

The DLHE survey covers leavers from part-time as well as full-time HE programmes. However, it is limited to those of UK and other EU domicile. The leavers included in the survey are those who completed their programmes during the academic year. For example, for 2007/08, the academic year covers the period 1 August 2007 to 31 July 2008.

For the survey in 2007/08, in total there were 344,715 valid responses from 474,455 qualifiers, giving a survey-wide figure of 72.7 per cent. DLHE response rates vary greatly between institutions, and are dependent in part on the amount of resource committed by an institution to the various stages of the process.

References

Elias, P., Jones, P. and McWhinnie, S. (2006). **Representation of Ethnic Groups in Chemistry and Physics.** A report prepared for the Royal Society of Chemistry and the Institute of Physics.

4. Careers in Higher Education Science, Technology, Engineering and Mathematics (STEM) Departments

Key statistics on STEM HE career progression

- In 2007/08, 5,375 women worked full-time as researchers in STEM academic departments, accounting for 30.3 per cent of all full-time researchers. In addition about 1,045 women worked part-time as STEM researchers, accounting for 56.6 per cent of all part-time researchers.
- There were 2,065 female lecturers (26.1 per cent of all full-time lecturers) and 1,790 senior researchers/lecturers (18.3 per cent) in STEM full-time employment. Among part-time STEM academics there were 1,410 female lecturers (39.5 per cent), and 355 senior lecturers/researchers (43.3 per cent).
- There were only 540 women full-time professors, accounting for 9.3 per cent of all full-time professors in STEM departments. In addition, 55 women professors accounted for 8.0 per cent of all part-time professors in STEM.
- Women were between 11.0 per cent (EPSRC) and 22.8 per cent (BBSRC) of research grant principal applicants in STEM-related disciplines in 2008. Encouragingly, the proportion of women applying for grants from STEM-related Research Councils has been on the increase in the five years since 2003.
- In 2008, women were more successful (among all female applicants) than their male colleagues (among all men applicants) in securing research grants provided by EPSRC, but less successful applicants in the other three STEM-related Research Councils. However, because women were fewer applicants overall they still only secured a small proportion of all grants.

This section examines the participation of women in academia, looking first at the proportional representation of women at different career points in higher education STEM departments, and second at the proportional representation and success rates of women applying for grants from STEM-related Research Councils.

Data for this section are taken from the annual report entitled 'Resources of Higher Education Institutions', which is published by the Higher Education Statistics Agency (HESA). This report covers academic and non-academic staff, but the focus of this section is on 'Academic Professionals' working in four different roles: researchers, lecturers, senior lecturers/senior researchers and professors. The job titles which are covered in each of the four descriptors, as well as information on the limitations of the data, are presented in section 4.3.

A presumption is sometimes made that the four roles are grades along a career pipeline: from researcher to lecturer to senior lecturer to professor. However this over-simplifies the fact that there are mixed and parallel career paths in academia for researchers and teaching staff. Although the majority of academics do follow what is seen as the traditional path from post-doctoral fellow/contract researcher, to a permanent lecturing post with research and teaching duties and then through promotion to more senior grades, for many academics the career path of researcher or teacher is set much earlier. In departments with high levels of research activity, some staff view their career as being that of a researcher, moving from research fellow, to senior researcher to reader and professor, through their research activities and without ever having held a teaching post. In other departments, especially those which are more practice-based, staff may be recruited directly from industry without ever having held academic research posts and will expect to progress to senior levels through their teaching and management activities, with research and scholarship playing a minor role. It is probably wiser to understand the job titles of researcher and lecturer as of equal status in some cases, with movement possible both between these roles and from either of them directly to a more senior grade.

This section, in common with some earlier sections excludes medicine, dentistry and veterinary science. The departmental cost centres that are included are listed in section 4.3.

The data on the proportional representation and success rates of women applying for grants from STEM-related research councils were primarily obtained from the annual reports published by each council, and if not available, the data were procured directly from the respective research councils. Only information on primary investigators is provided.

The following Research Councils were classified as STEM-related: Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC), Natural Environment Research Council (NERC), and Science and Technology Facilities Council (STFC). The STFC was created on 1 April 2007, as a merger of two separate councils: Particle Physics and Astronomy Research Council (PPARC) and Council for the Central Laboratory of the Research Councils (CCLRC). Before 1 April 2007 only statistics for PPARC were available. To be consistent with the selection criteria used for including STEM departments, we have excluded the Medical Research Council (MRC).

4.1 Academics in STEM

As discussed in section 3.1, in 2007/08, 33.2 per cent (143.1 thousand) of undergraduates and 34.0 per cent (40.1 thousand) of postgraduates studying STEM subjects were female. This section examines whether these proportions are similar amongst academic staff.

Higher education is a significant employer of professional staff. In 2007/08 there were over 41 thousand full-time and 6.9 thousand part-time academic staff working in STEM departments. Table 4.1.1 below gives the numbers of men and women employed in the four grades we are interested in: researcher, lecturer, senior researcher/lecturer and professor.

Table 4.1.1 shows that in 2007/08, the largest proportion of men and women full-time staff were researchers, whereas for part-time staff the largest proportion were lecturers. Men were in the majority in each full-time grade but interestingly there were more women than men working as part-time researchers. When the full-time and part-time figures are compared as ratios, and for men and women separately, the significantly greater incidence of part-time academic work for women in comparison to men is highlighted.

- Researchers: ratio of full-time to part-time women is 5:1, for men 15:1
- Lecturers: ratio of full-time to part-time women is 3:2, for men 3:1
- Senior lecturers and senior researchers: ratio of full-time to part-time women is 5:1, for men 17:1
- Professors: ratio of full-time to part-time women is 10:1, for men 8:1

These data highlight the disproportionate numbers of women who are part-time researchers and senior researchers/senior lecturers, but that there are proportionately more part-time male professors than female. This may be an example of emergent high quality part-time work that is attractive to men.

Table 4.1.1
STEM academic staff by gender, grade and mode of employment at UK HE institutions, 2007/08

Full-time

	Researcher	Lecturer	Senior researcher/ lecturer	Professor
Women	5,375	2,065	1,790	540
Men	12,355	5,845	8,010	5,265
Total	17,730	7,910	9,800	5,805

Part-time

	Researcher	Lecturer	Senior researcher/ lecturer	Professor
Women	1,045	1,410	355	55
Men	800	2,160	465	630
Total	1,845	3,570	820	685

Secondary analysis by the UKRC
Data source:
HESA (2009) Resources of Higher Education Institutions 2007/08. Cheltenham, HESA.

	Full-time				Part-time				
	Researcher	Lecturer	Senior researcher/ lecturer	Professor		Researcher	Lecturer	Senior researcher/ lecturer	Professor
Women	4,855	2,295	1,155	345	Women	885	1,000	170	30
Men	10,840	7,740	6,805	4,565	Men	815	1,425	340	410
Total	15,695	10,035	7,960	4,910	Total	1,700	2,425	510	440

Secondary analysis by the UKRC
Data source:
HESA (2009) Resources of Higher Education Institutions 2007/08. Cheltenham, HESA.

Table 4.1.2
STEM academic staff by gender, grade and mode of employment at UK HE institutions, 2004/05

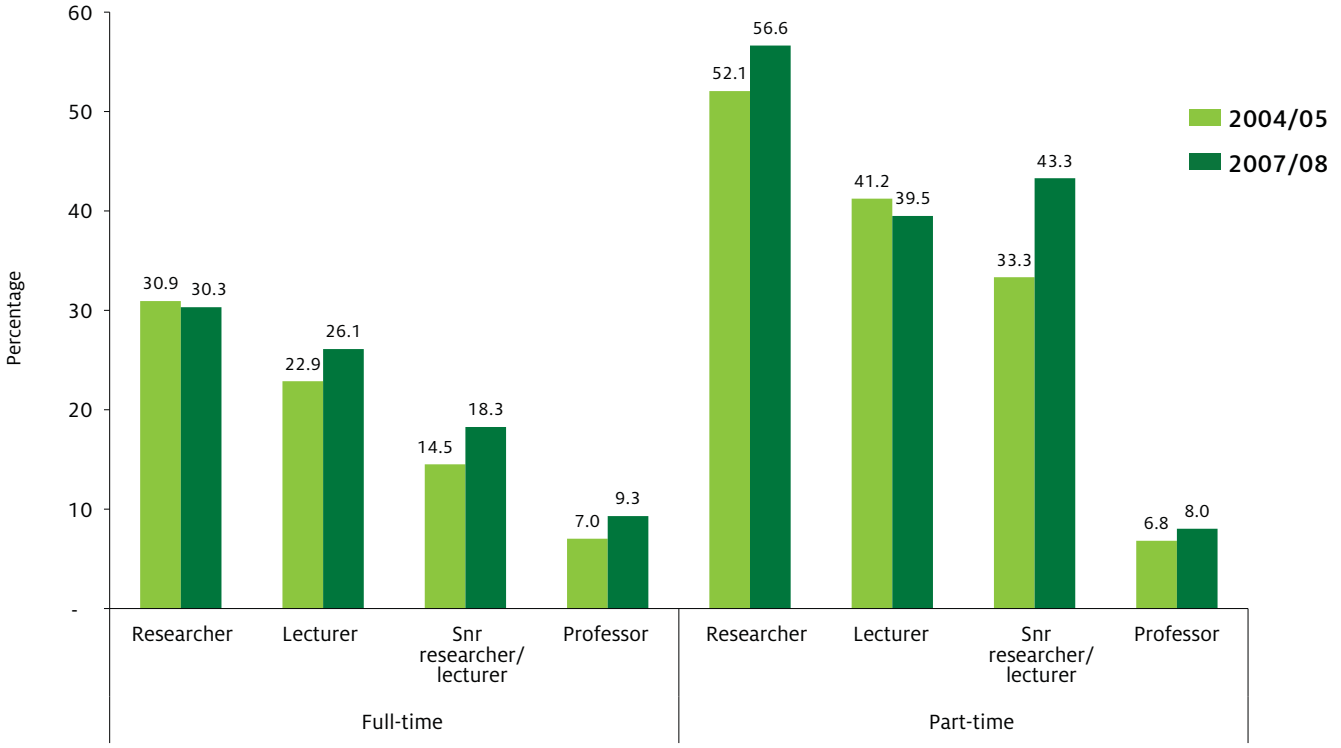
Table 4.1.2 shows the same data for 2004/05. A comparison of the two tables shows an increase in the number of staff in all full-time categories except lecturer, where numbers decreased for both men and women since 2004/05. For men there was a decrease in the number of part-time research posts, and an increase in the number in all other posts, while for women there were increases in all part-time academic posts since 2004/05.

When the figures for women from these tables are shown as a percentage of each category (Figure 4.1.1) a pattern emerges.

For full-time academic staff, women are in the minority at all grades and their proportion falls with each grade. The left hand side of the chart shows that, for both years, women were roughly 30 per cent of full-time researchers, between 23 and 26 per cent of full-time lecturers, between 14.5 and 18.5 per cent of full-time senior researchers and lecturers, and between 7 and 9 per cent of full-time professors. The proportion of women increased slightly among the permanent academic grades (lecturer to professor) between 2004/5 and 2007/8.

In contrast, women represent a higher proportion of part-time STEM academic staff at all grades except professor, although men are in the majority except at research level. The total number of researchers rose between 2004/5 and 2007/8 (from 17,395 to 19,575) but the number of men working part-time stayed about the same (about 800) leading to an increase in the proportion of women working part-time. It is interesting that the proportion of women at senior researcher/ lecturer level working part-time increased by 10 per cent.

It is also noteworthy that the total number of part-time academic staff is greater at the lecturer level than at the researcher level. This may reflect the fact that many research posts are temporary and therefore staff may be less willing to request part-time working.



Secondary analysis by the UKRC
Data source:
HESA (2006 and 2009) Resources of Higher Education Institutions 2004/05 and 2007/08 Cheltenham, HESA.

Figure 4.1.1
The proportion of women of all STEM academic staff at each grade for full-time and part-time staff separately, 2004/05 and 2007/08

Figure 4.1.1 suggests that there is some way to go before women will be proportionately well represented at all academic levels in full-time posts. There is evidence here that academic women remain disproportionately clustered in part-time posts. The leaky pipeline is particularly in evidence at the transition from senior lecturer posts (full and part-time) to professor with only 595 (or 9.2 per cent) female professors in STEM departments. Among full-time staff the decline in the percentage of women at each career stage holds irrespective of whether women are in a faculty with a 'critical mass' of women at early career stages such as biosciences, with 2,270 women accounting for 45.9 per cent of researchers and 435 women accounting for 35.4 per cent of lecturers, but only 15.0 per cent of professors (165 women), or disciplines where women remain under-represented at all stages of academia such as mathematics, with 135 women making up 20.3 per cent of researchers, and 160 women making up 21.6 per cent of lecturers, but a tiny 4.4 per cent of professors (30 women).

Figure 4.1.2 and 4.1.3 are different ways of representing the same data. These charts show the different proportional distribution of female full-time (4.1.2) and part-time (4.1.3) staff (green pie charts), while the purple charts show the same type of information for male staff.

Figure 4.1.2
The distribution of full-time academic women and men in STEM, 2007/08

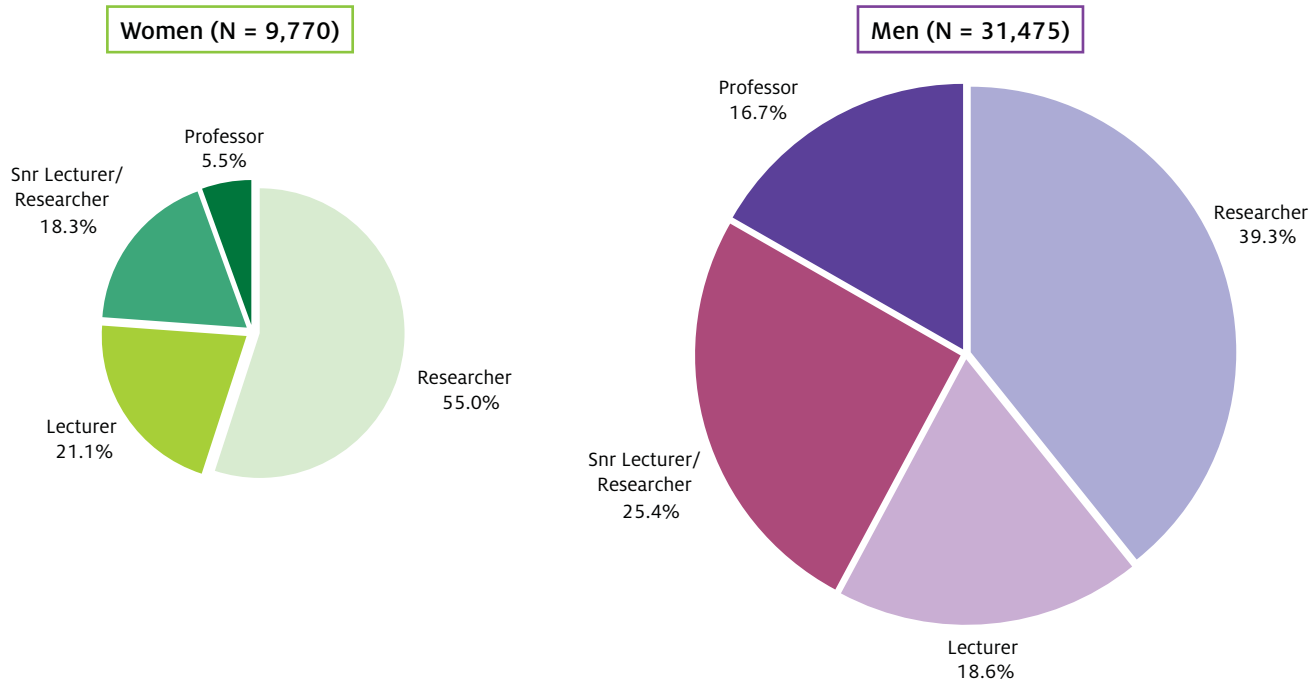
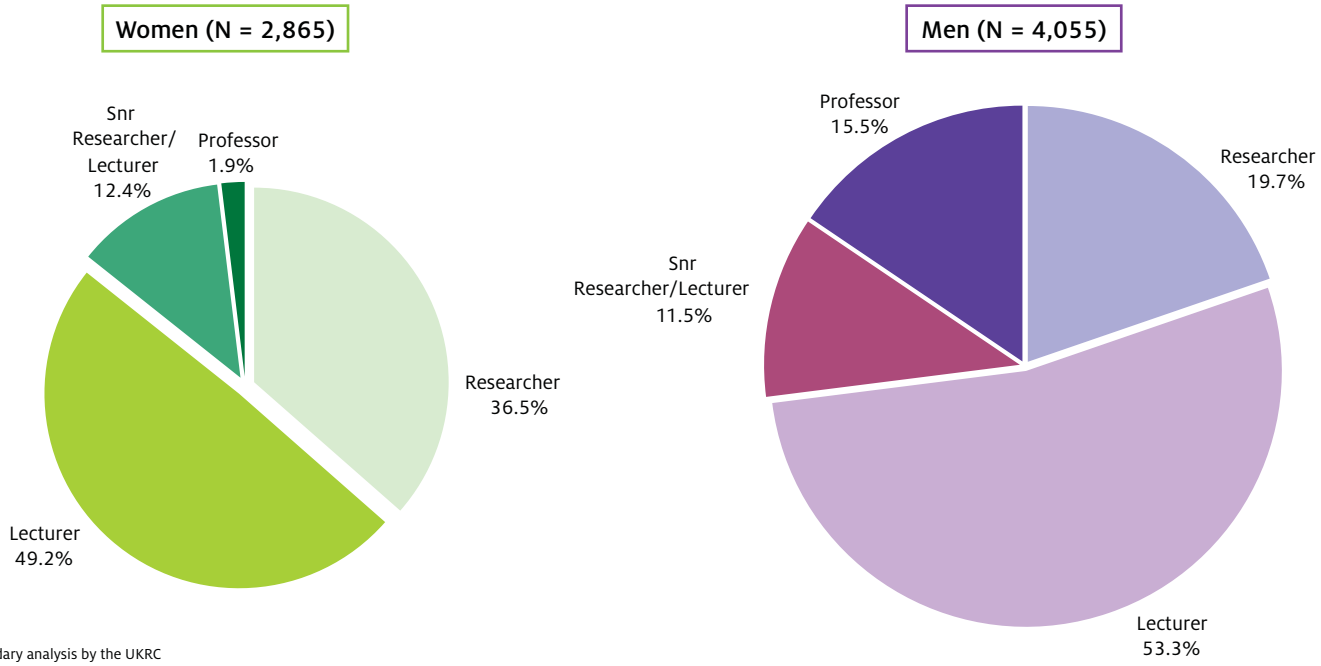


Figure 4.1.3
The distribution of part-time academic women and men in STEM, 2007/08



Secondary analysis by the UKRC
Data source:
HESA (2009) Resources of Higher Education Institutions 2007/08. Cheltenham, HESA.

These figures show the concentration of women in less senior research posts. These tend to be characterised by lower status, less pay and security, and poor promotion prospects. The insecurity of being on a fixed-term contract is one of the main barriers to successful academic careers faced by women researchers (Zalevski, 2009). Unfortunately, the percentage of women and men researchers on fixed-term contracts remains very high – over 80 per cent - in STEM disciplines, despite the introduction of the Fixed-term Working Regulations which came into effect in July 2006 (UK Research Base Funders' Forum, 2007). These statistics are not available disaggregated by gender.

HESA data are available on the source of funding for different posts, and this shows that funding for STEM researcher posts is split between wholly institutionally funded and 'other financial sources' in the ratio 1:4; and this ratio is the same for both men and women. For lecturer posts there is little external funding and the ratio reverses 18:1 (institution/other) for women and 15:1 for men. There is proportionately slightly more external funding for professorial posts 12:1 (institution/other), for women and 15:1 for men. We presume that external funding is more likely to be time limited and therefore provides more insecure employment, but there is no evidence that women are more or less likely to have been funded by the external sources.

4.2 Grants obtained from STEM-related Research Councils

This section looks at the proportional representation of women applying for grants from the STEM-related Research Councils (Table 4.2.1) and women's success rate compared to the success rate of their male colleagues (Table 4.2.2). Being a principal grant applicant and securing research grants is a good indication of participation at senior levels in STEM. The following Research Councils were classified as STEM-related: Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC), Natural Environment Research Council (NERC), and Science and Technology Facilities Council (STFC). The STFC was created on 1 April 2007, as a merger of two separate councils: Particle Physics and Astronomy Research Council (PPARC) and Council for the Central Laboratory of the Research Councils (CCLRC). Before 1 April 2007 we were provided with data for PPARC only.

As illustrated in Table 4.2.1 women were between 11.0 per cent (EPSRC) and 22.8 per cent (BBSRC) of research grant principal applicants in STEM-related disciplines in 2008. Encouragingly, the numbers of women applying for grants from STEM-related Research Councils and the proportion of applicants they represent increased in the five years since 2003. Although the biggest increase (3.9 percentage points) was that for the STFC, this should be considered with caution as the STFC was created in 2007, and data for 2003 were only available for one of the two constituent research councils.

Table 4.2.1
The number and proportion of female principal grant applicants of all applicants to STEM-related Research Councils, 2003 and 2008

Research Council	2003		2008	
	Women (N)	Women (%)	Women (N)	Women (%)
BBSRC	334	19.4	394	22.8
EPSRC	401	9.6	473	11.0
NERC	179	15.3	221	18.6
PPARC (until 2006) STFC (from 2007)	29	11.2	49	15.1

Secondary analysis by the UKRC
Data source:
BBSRC: Data were obtained directly from BBSRC.
EPSRC: Data were obtained directly from EPSRC.
NERC: http://www.nerc.ac.uk/publications/annualreport/
PPARC: https://www.pparc.ac.uk/Pbl/AnnualReport.asp
STFC: Data were obtained directly from STFC.

Table 4.2.1 shows the success rates of women and men principal applicants in obtaining grants from the STEM-related Research Councils. The table presents the proportions of successful women of all female applicants and the proportions of successful men of all male applicants. Data for STFC for 2008 are not available.

Table 4.2.2
Female success rates of all women applicants and male success rates of all men applicants for grants from STEM-related Research Councils, 2003 and 2008

Research Council	2003		2008	
	Women (% of total female applicants)	Men (% of total male applicants)	Women (% of total female applicants)	Men (% of total male applicants)
BBSRC	26.0	28.4	12.9	18.3
EPSRC	30.2	31.6	27.2	24.9
NERC	32.0	36.0	20.4	25.6
PPARC (untill 2006) STFC (from 2007)	65.5	82.1	n/a	n/a

Secondary analysis by the UKRC
Data source:
BBSRC: Data were obtained directly from BBSRC.
EPSRC: Data were obtained directly from EPSRC.
NERC: http://www.nerc.ac.uk/publications/annualreport/
PPARC: https://www.pparc.ac.uk/Pbl/AnnualReport.asp
STFC: Data were obtained directly from STFC.

Table 4.2.2 illustrates that in 2008, the overall success rates were relatively low, with roughly one in four or fewer applicants being successful in securing grants. Women were more successful than their male colleagues in securing research grants provided by EPSRC, but less successful applicants in the other three STEM-related Research Councils. Table 4.2.2 also shows that in 2008, success rates of both women and men in securing research grants decreased in comparison to 2003.

Although success rates do vary for men and women against a background of falling overall success rates, this is an area where closer monitoring would be appropriate. Research councils should encourage universities to examine the grant application patterns of their staff and ensure that both men and women are supported and encouraged equally to apply for funding.

4.3 Terminology and data sources

Data on university staff working in STEM in higher education come from the annual report entitled 'Resources of Higher Education Institutions'. Each of these HESA reports covers one academic year (e.g. 2007/08) and is published with a number of cross-tabulated tables accompanied by a CD. The CD contains detailed statistics on the finances and the staffing of HEIs during each academic year. For example, 2007/08 covers the period from 1 August 2007 to 31 July 2008. It provides data supplied by the HE institutions. For the 2007/08 report, 166 HEIs (131 in England, 12 in Wales, 19 in Scotland, 4 in Northern Ireland) supplied data.

The data cover all academic and non-academic staff, but in this section our focus is on 'Academic Professionals'. All staff are allocated to departmental cost centres. There are 34 in total and their classification is the one that we use to assign staff as STEM or non-STEM. The subject titles of academic cost centres do not map absolutely onto the subject titles for undergraduate and post-graduate courses. Many staff will teach across departments and be included in cross-discipline research groups. However they are the best estimate we have for the subject location of staff and their grade.

HESA's rounding strategy: HESA applies a rule of rounding all numbers to the nearest multiple of 5.

The academic departmental cost centres that we classified as belonging to STEM are as follows:

- Anatomy & physiology
- Pharmacy & pharmacology
- Biosciences
- Chemistry
- Physics
- Earth, marine & environmental sciences
- General engineering
- Chemical engineering
- Mineral, metallurgy & materials engineering
- Civil engineering
- Electrical, electronic & computer engineering
- Mechanical, aero & production engineering
- Architecture, built environment & planning
- Mathematics
- IT & systems sciences & computer software engineering
- Archaeology

Job titles included in each of the four academic job categories we have used:

Professors includes: heads of departments, professors, certain senior researchers (former scale grade IV), clinical professors, and those appointed professors on a locally determined scale.

Senior lecturers and researchers includes: principal lecturers, senior lecturers, certain senior researchers (former scale grade III), clinical senior lecturers and those appointed senior or principal lecturers on a locally determined scale.

Lecturers includes: lecturers, senior lecturers (former PCEF scale), clinical lecturers and those appointed lecturers on a locally determined scale.

Researchers includes: all research grades not listed above and those researchers appointed on a locally determined scale.

References

The UK Research Base Funders' Forum (2007). **First Annual Report on Research Staff Covering the period 2003/04 to 2006/07**. The report produced in response to the request from the UK Research Base Funders' Forum.

Zalevski, A. (2009). **Female Attrition, Retention and Barriers to Careers in SET Academic Research.** Unpublished UKRC research report, produced as part of the 2009 L'Oreal UK and Ireland Fellowships for Women in Science Programme.

5. Science, Engineering and Technology (SET) Workforce

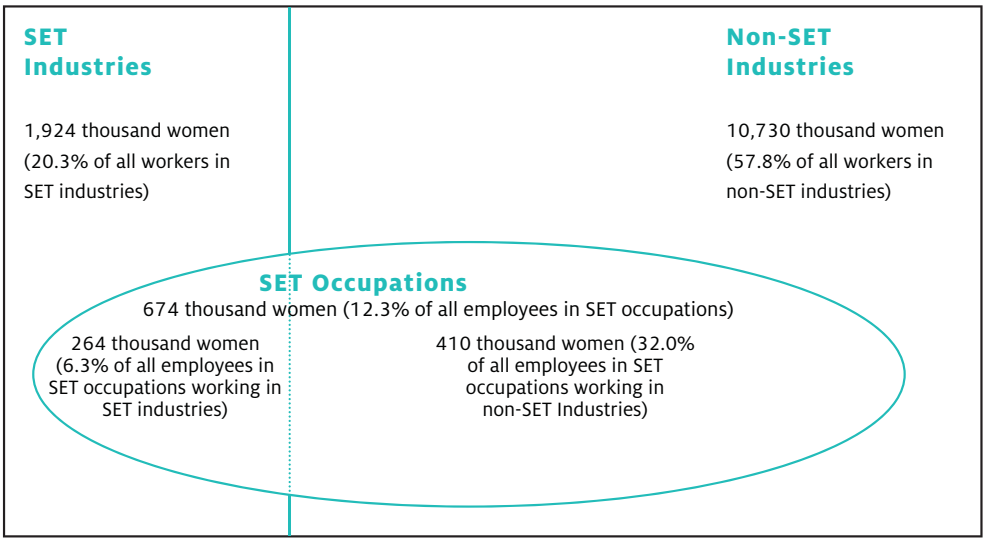
5.1 SET occupations in the UK

Key statistics on SET occupations in the UK in 2008

- Women remain under-represented in SET occupations in the UK. Women were only 12.3 per cent of all employees in SET occupations; this is an increase of 2.0 percentage points since 2003.
- Women made up 54.7 per cent of health professionals and associate professionals, but only 15.5 per cent of all other SET professionals and associate professionals.
- Gender segregation is particularly extreme in SET skilled trades, with women forming roughly 1 per cent of the workforce in these occupations.
- Only 5.3 per cent of all working women were employed in any SET occupation, compared to 31.3 per cent of all working men.
- Among SET professionals and associate professionals, men were more likely than women to take up SET management positions (37.7 per cent among men compared to 28.6 per cent among women). But a larger proportion of women worked in (lower level) SET associate professions: as technicians, draughtspersons and inspectors, and in IT service delivery (26.5 per cent among women compared to 16.5 per cent among men).
- Unlike SET professions, associate professions and skilled trades, SET unskilled jobs are becoming an increasingly male area of work, as female representation in these unskilled trades is on the decline.
- Female STEM graduates of working age in the UK (a total of 620 thousand women) are more likely to take up employment in non-SET than in SET occupations. Only 29.8 per cent (185 thousand) of all female STEM graduates of working age in the UK were employed in SET occupations compared to 50.3 per cent (782 thousand) of male STEM graduates of working age.
- Women working in most SET occupations are more likely to have STEM graduate level qualifications than their male colleagues. The exceptions to this are SET managers and ICT occupations where men are more likely to be STEM graduates.

In 2008, there were about 12.7 million women and 15.4 million men in employment in the UK, with women making up 45.1 per cent of the workforce.

The economic activity of this workforce can by analysed in two ways: by the occupation that a person carries out, or by the sector in which she works. For example, an engineer might be working in the retail sector, or a secretary might be working in a manufacturing company. In the former case the individual has a SET occupation but works in a non-SET sector, and in the latter case the individual has a non-SET occupation but works in a SET sector. Figure 5.1.1 shows the inter-relationship between industry and SET occupations and shows numbers of women and their proportional representation in SET and non-SET industries and in SET occupations.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included; those who did not report their occupations were excluded.

Not drawn to scale

Figure 5.1.1
The number and proportion of women in SET/ non-SET industries and SET occupations, 2008

Sections 5.1, 5.2, 5.3 and 5.5 of this Guide examine the participation of women in the SET workforce using occupational classification. They look at the jobs people do rather than the sector of the economy in which they work. Section 5.4 looks at the gender composition of the SET industrial sectors.

Section 5.1 uses data from the United Kingdom Labour Force Survey run by the Office for National Statistics (ONS). We have identified a subset of jobs which we classify as SET occupations using the Standard Occupational Classification 2000 (SOC2000). A list of SOC codes used to define SET occupations can be found in section 5.6, which also provides more information about the sources of the statistics we refer to here.

The first sub-section of 5.1 shows an 'economic activity' profile for the total workforce for each gender, followed by a focus on women and men in SET occupations, and a more detailed analysis of SET occupations grouped under separate headings which indicate to some extent the skill level (and status) of each group:

1. SET professionals and associate professionals

- SET professionals (including SET managers, researchers, as well as science, engineering, ICT and building professionals).
- Health professionals (examined separately because, unlike other SET occupations, health occupations have traditionally had high participation by women).
- SET associate professionals (including science and engineering technicians, draughtspersons and building inspectors and IT service delivery).
- Health associate professionals (examined separately).

2. SET skilled trades

- SET skilled trades (including metal and electrical trades and construction and building trades).

Sub-sections 5.1.3 and 5.1.4 discuss in more detail the employment of women and men in a range of SET occupations (SOC2000 codes used to define SET occupations more specifically are listed in section 5.6). Teaching professionals are excluded from the analysis because this standard classification includes both SET and non-SET sectors. STEM academic careers are, however, examined in section 4 of this Guide.

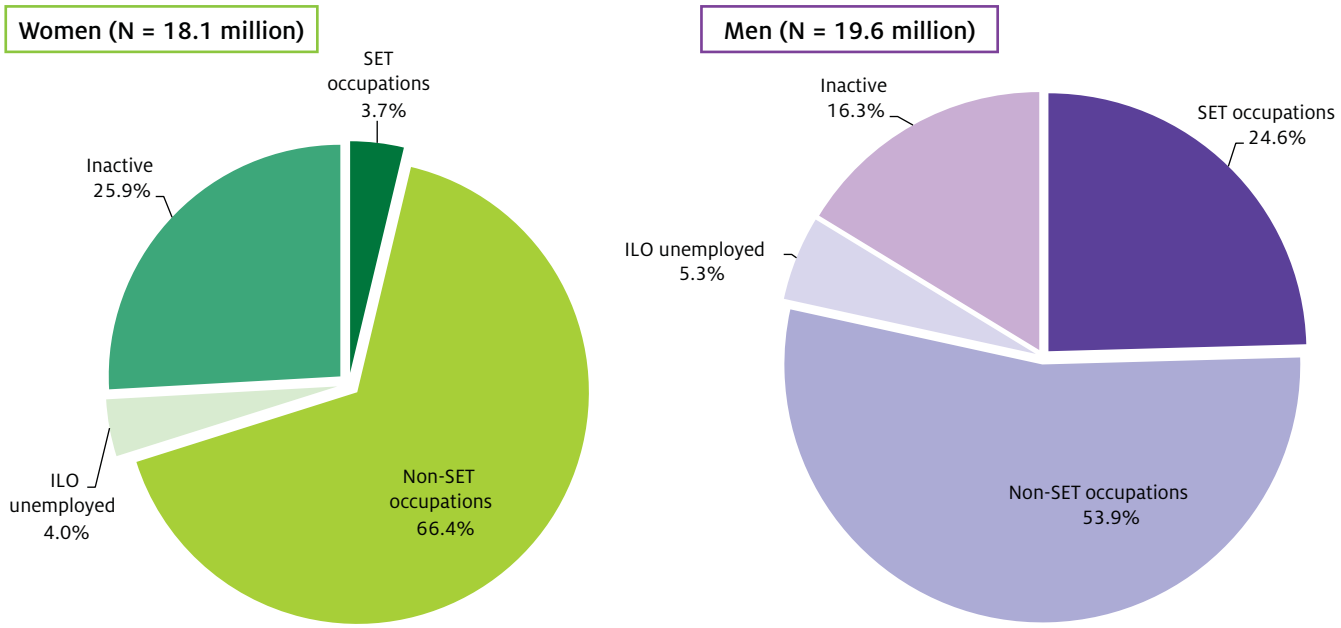
Analysis of those in unskilled occupations in SET is presented here separately in section 5.1.5 because those workers can be seen as part of the SET workforce that could - with training and experience - move into one of the other more skilled occupational groups.

The final sub-section examines the relationship between having a STEM graduate qualification and being employed in a SET occupation. We use the abbreviation STEM in this Guide when referring to educational qualifications (science, technology, engineering and mathematics) in keeping with common usage in education. We use the abbreviation SET when referring to employment (science, engineering and technology) in keeping with common usage in studies of women and the labour market. The ONS uses a label 'SET qualified' for those who hold a degree (or equivalent) qualification in STEM subjects (which we sometimes refer to as STEM graduates), while non-SET qualified are people who hold a degree qualification in non-STEM subjects.

5.1.1 Economic activity profiles of men and women in the UK

Figure 5.1.2 shows economic activity profiles of the working age population of the UK in 2008 for women (green pie) and men (purple pie) separately. These economic profiles include women and men who are unemployed, economically inactive, in non-SET occupations and in SET occupations (this includes health and skilled trades). The size of the pie charts indicates the relative size of the populations.

In 2008, slightly fewer women than men were classified as being of working age, about 18.1 million (47.9 per cent of the working age population) compared with 19.6 million (52.1 per cent) men. This figure is affected by the fact that, despite changes in the retirement age of women in the UK, the working age of women is still taken as 16-59 and of men as 16-64. The pie charts in Figure 5.1.2 show that a smaller proportion of women than men were classified as unemployed in 2008 (4.0 per cent compared to 5.3 per cent). The Office for National Statistics (ONS, 2009) indicates that unemployment rates have been consistently lower for women than for men in the UK since 1989.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.1.2
Economic activity profiles (inactive, unemployed, SET and non-SET occupations) for women and men in the UK, 2008

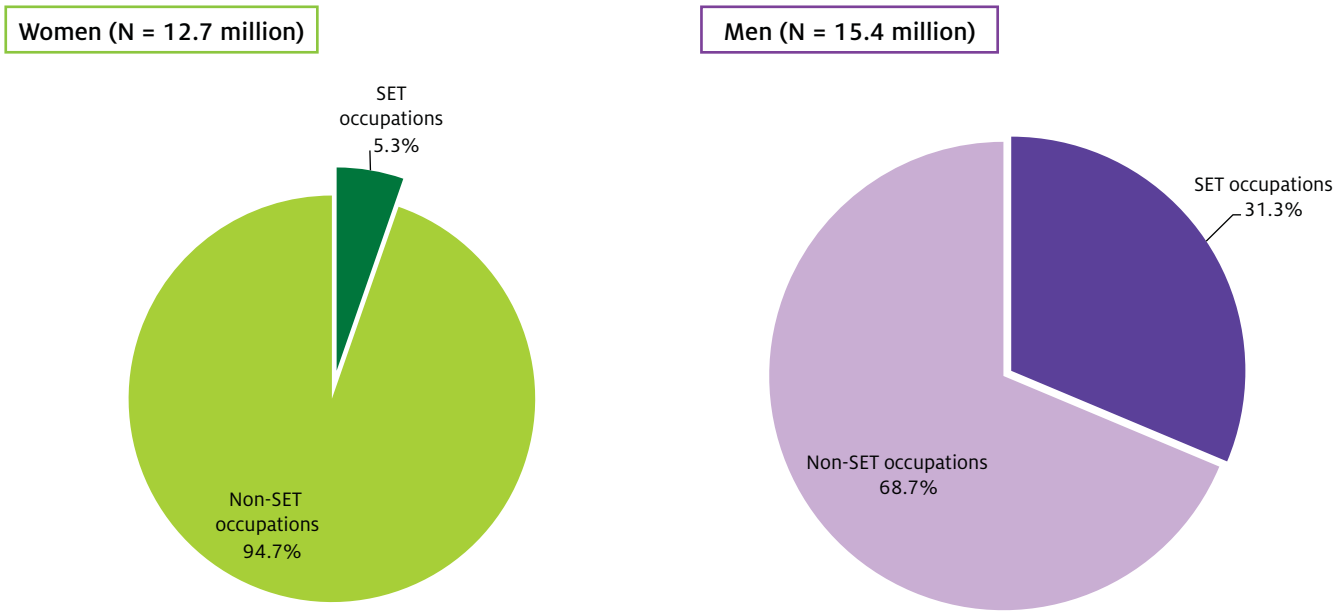
In 2008, about a quarter of women of working age were classified as economically inactive, defined as "not available for work and/or not actively seeking work". It is important to note that a relatively high proportion of men, about one sixth, were also in this category. ONS (2009) data show that while the inactivity rate for men keeps rising, the inactivity rate for women has been falling in the last 30 years, suggesting that more women with family obligations continue to work and return to work after childbirth. This is supported by statistics published by the Employment Policy Institute (Gregg and Wadsworth, 1998) showing that the fall in inactivity has been concentrated among women between ages 25 and 49. Notably, the increase in economic activity has been the most dramatic among mothers of children under age 2, with the proportion of this group who are economically active showing an increase from only a quarter in the 1970s to over a half in the late 1990s (Gregg and Wadsworth, 1998).

Figure 5.1.2 also shows that women are more likely than men to be employed in non-SET occupations: 66.4 per cent of all women compared to 53.9 per cent of all men in 2008. Only 3.7 per cent of women of working age, however, were employed in SET occupations compared to 24.6 per cent of men.

Figure 5.1.3
SET (including health and skilled trades) and non-SET occupations of working women and men in the UK, 2008

While Figure 5.1.2 shows the economic profile of the working age population (including the unemployed and the inactive), Figure 5.1.3 illustrates the participation in SET and non-SET occupations of women and men in employment.

Figure 5.1.3 shows that 5.3 per cent of all working women were employed in SET occupations in 2008, while for men this figure was 31.3 per cent. Working men are nearly six times more likely to be in SET occupations than working women.

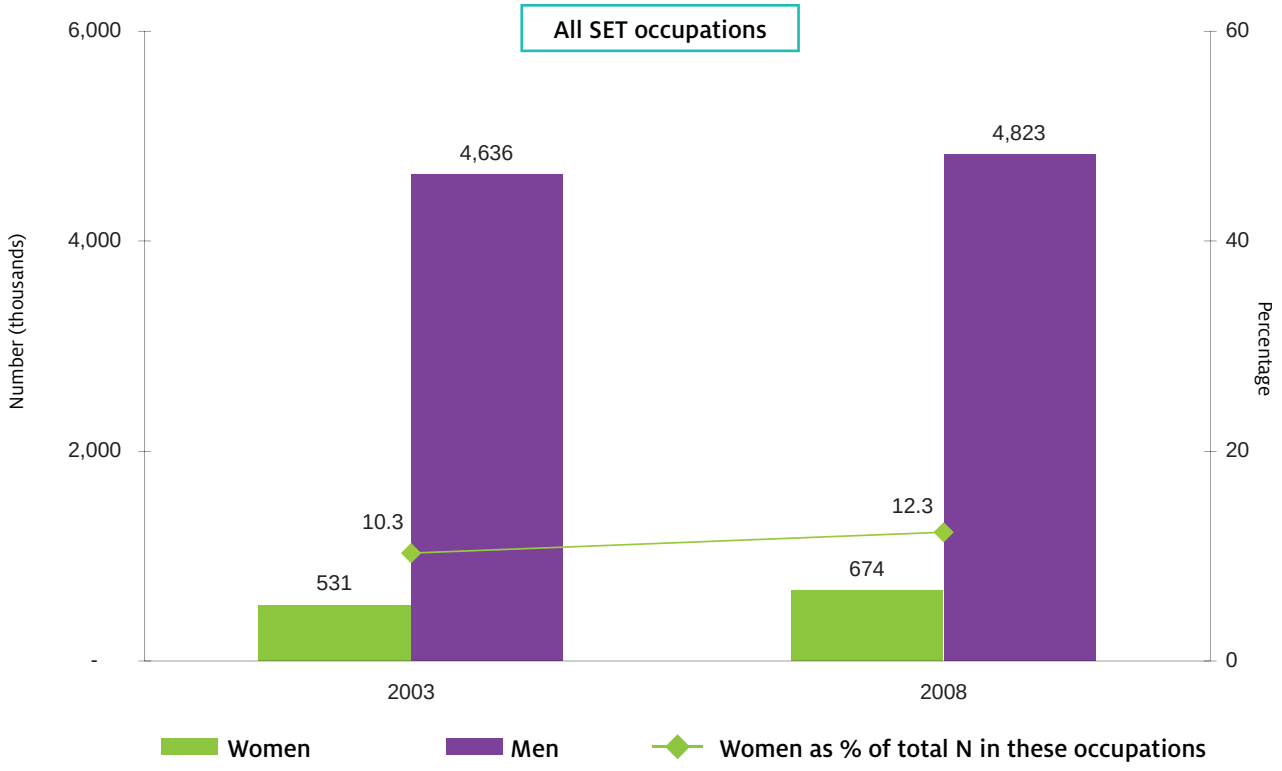


Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

5.1.2 SET occupations by gender

This sub-section looks at the participation of women and men in all SET occupations, followed by a more detailed analysis of the occupational sub-groups that form SET. Data for 2003 and 2008 are presented to see what changes might have occurred in these five years.

Figure 5.1.4 shows the number of women and men in all SET occupations (SET professions and associate professions including health, and SET skilled trades) in 2003 and 2008. The percentage of the total in each year that are women is shown as green diamonds.



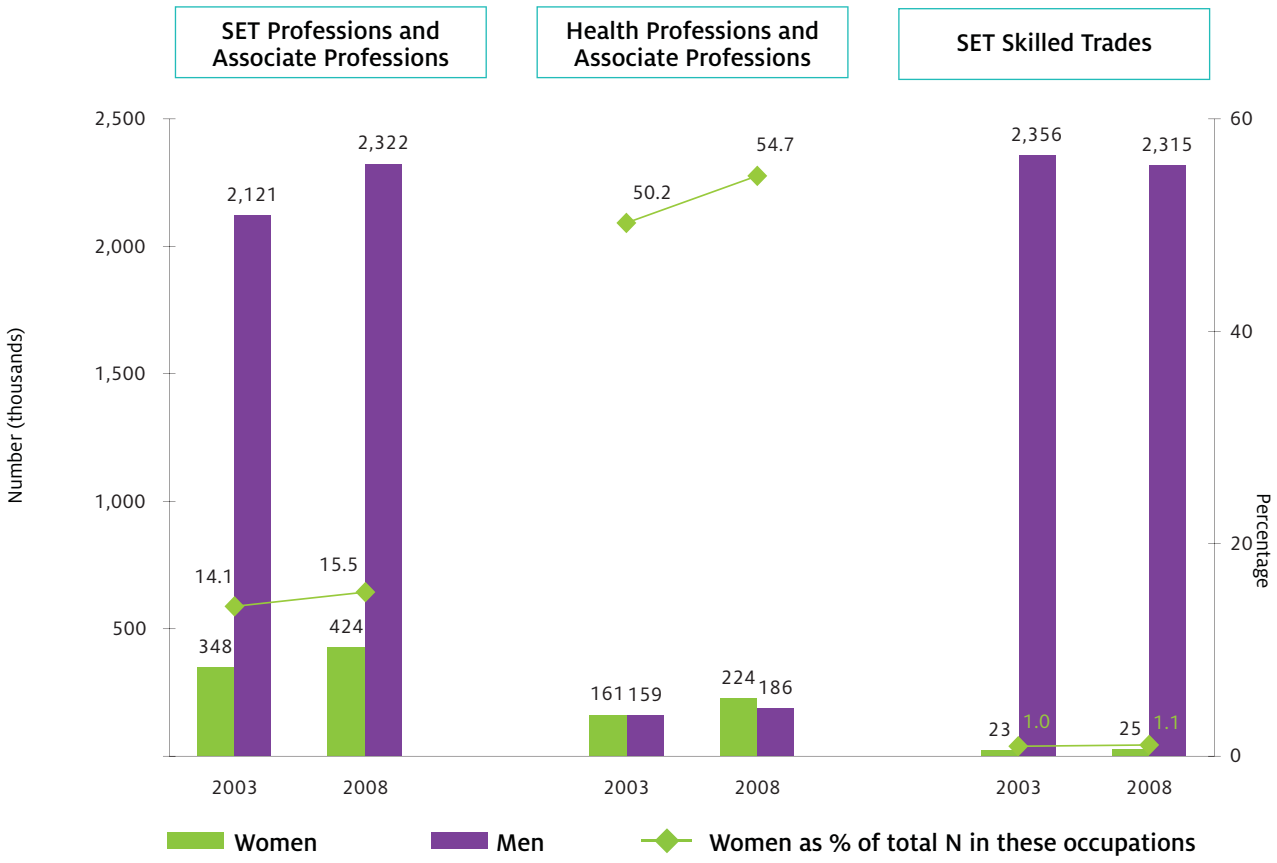
Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.1.4
The participation in SET occupations by gender, 2003 and 2008

Figure 5.1.4 shows that in 2008, about 674 thousand women worked in SET occupations, making up 12.3 per cent of the workforce in these occupations. The numbers of women in SET occupations rose as a proportion of total in SET occupations in the five years between 2003 and 2008, but the progress at just 2 percentage points has been slow. It should be noted (although it is not illustrated here) that there has not been a similar increase in the proportion of women in non-SET employment, which suggests a trend for a greater proportion of women to work in SET. It may be that more women with SET qualifications are entering the workforce and taking SET qualifications and/or more women with SET qualifications or experience are remaining in/returning to SET jobs.

Female participation in SET differs depending on the occupations they work in. For example, while women are well represented in health occupations, they are less represented in what have been seen as traditionally male SET professions and associate professions. For that reason we analyse these two categories separately in Figure 5.1.5. SET skilled trades are also examined separately in Figure 5.1.5 because the trades normally require lower entry qualifications than professions and associate professions.

Figure 5.1.5 contains three sets of bars. The first set shows the number of women and men in SET professional and associate professional occupations in 2003 and 2008, and the percentage of the total in each year that are women (green diamonds). The second set of bars shows the same type of information for health professional and associate professional occupations, and the third set of bars shows the same type of information for SET skilled trades.



Secondary analysis by the UKRC
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Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.1.5
The participation in SET and health professions and associate professions and SET skilled trades by gender, 2003 and 2008

63.0 per cent of all women in SET occupations (424 thousand) work in SET professions and associate professions, followed by 33.2 per cent (224 thousand) in health professions and associate professions, and just under 4 per cent (25 thousand) in SET skilled trades. Similar proportions of men (about 2.3 million) are employed in SET professions/associate professions and in SET skilled trades, but just under 4 per cent (186 thousand) are in health professions/associate professions.

Figure 5.1.5 shows that in 2008, women were 15.5 per cent of all SET professionals and associate professionals. Female representation in SET professions and associate professions has increased since 2003 by 1.4 percentage points.

Women are over half of all health professionals and associate professionals, and their numbers continue to rise as a proportion of the total, increasing by 4.5 percentage points between 2003 and 2008.

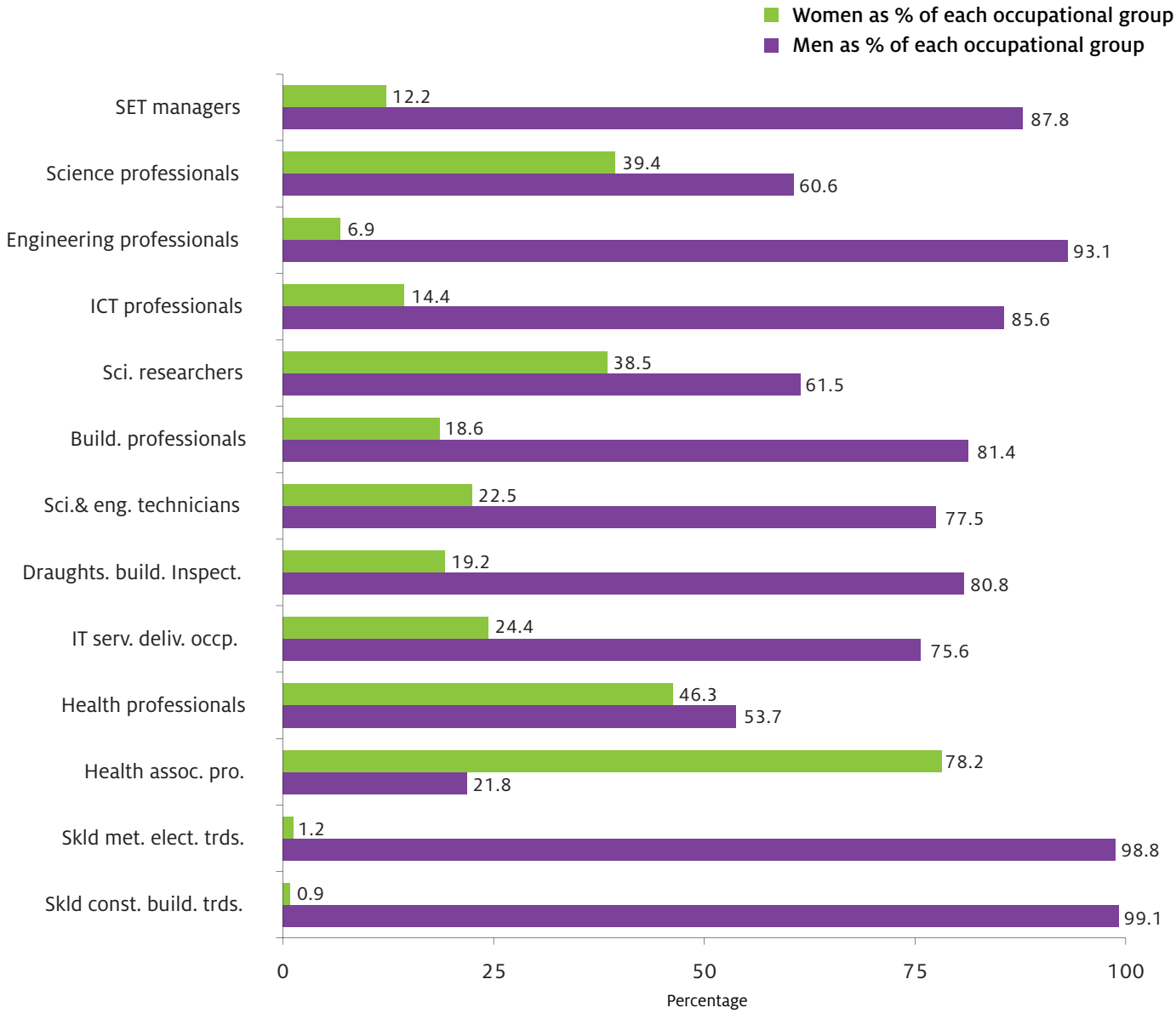
Occupational 'gendering' (i.e. where the participation of one gender is predominant) is particularly extreme in SET skilled trades, with women being only about 1.1 per cent of workers in these occupations. There has been a slight improvement (0.1 percentage points) in the gender balance of the SET skilled workforce in the five years since 2003.

Presenting the data disaggregated by occupational groups gives a better picture of what is a complex occupational area. The next section shows further divisions into 13 selected SET occupations.

5.1.3 Employment across a range of SET occupations by gender

In this sub-section we move to a more detailed discussion of the different SET occupations women and men are engaged in, further unpacking some of the groupings that we have been discussing so far. Figure 5.1.6 shows the proportion of women and men employed in each of 13 selected SET occupations.

Figure 5.1.6
The proportion of women and men within each SET occupational group, 2008



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.1.6 shows clearly that women are under-represented in all but one of the SET occupations (health associate professions), but their representation does vary greatly.

Women were 15.5 per cent of all SET professionals and associate professionals in 2008 (Figure 5.1.5). Figure 5.1.6 illustrates wide fluctuations either side of this 'average' figure. Women are approaching gender balance not only in health professions, but also in science, with women being nearly 40 per cent of science professionals and scientific researchers. However, representation of women in other professions is much poorer. For example, women are only 6.9 per cent of engineering professionals. Women are also severely under-represented in management positions, with women making up only 12.2 per cent of SET managers.

Figure 5.1.5 showed that more women than men work in health occupations, but Figure 5.1.6 shows that although women are more likely to work in health associate professions than men, their proportion in (higher level) health professions is just below 50 per cent.

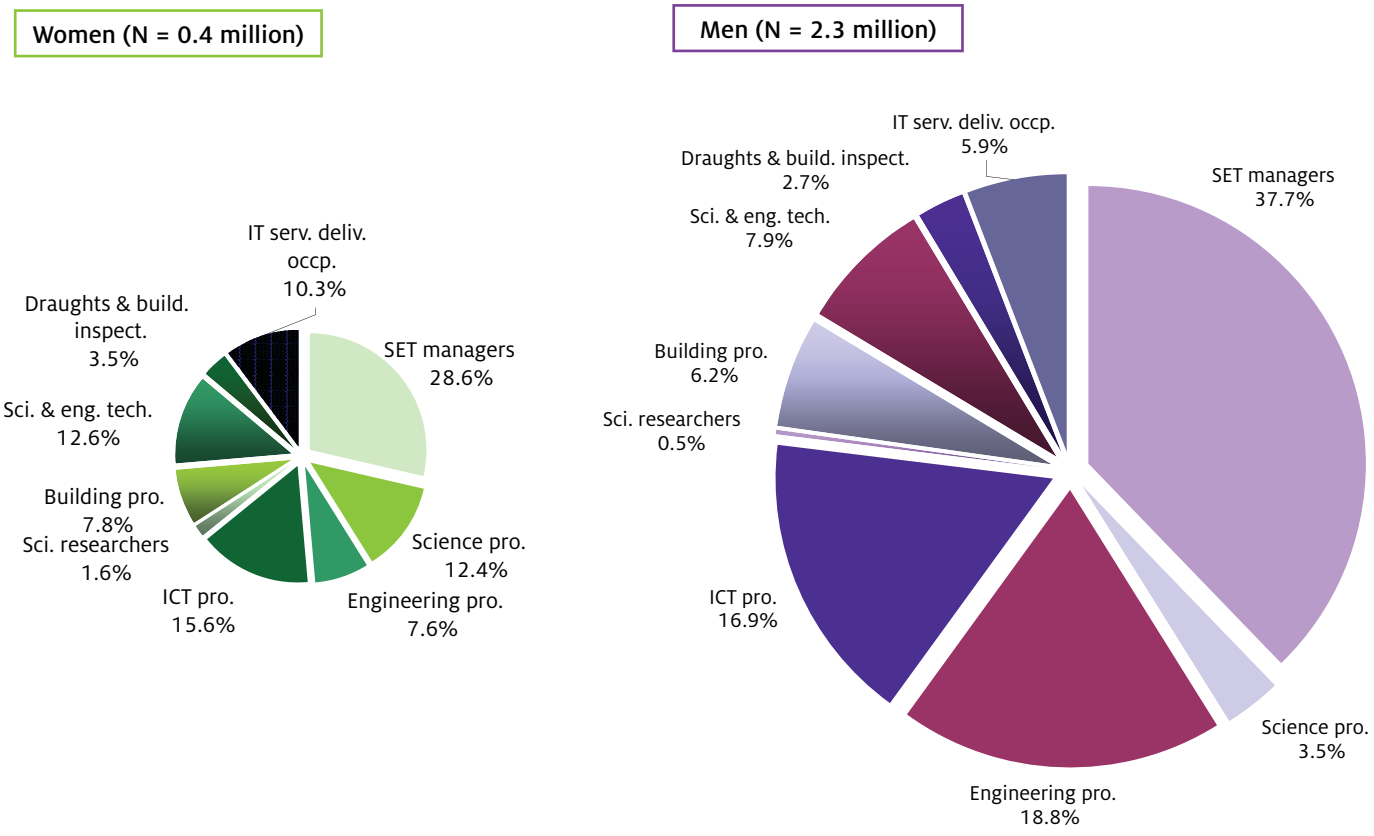
Both health and SET skilled trades are subdivided into only two further sub-categories in this Guide, but SET professions and associate professions can be divided into a larger number of sub-categories. The next section looks into the distributions of women and men across nine traditionally male SET professions and associate professions, to explore which of these SET occupations are more likely to be taken up by women and which are more likely to be taken up by men.

5.1.4 The distribution of men and women in SET professions/associate professions

The above sub-sections show clearly that many fewer women than men work in SET occupations at all levels with the exception of health professions and associate professions. Some occupations are more attractive (or have fewer barriers) to women than others. Another way of building a picture of the different ways in which men and women are distributed in SET occupations is to show which SET occupations are more likely to be taken up by women and which are more likely to be taken up by men. Figure 5.1.7 shows the distribution of women across nine SET professions and associate professions as a proportion of the total women in these occupations, and the same information for men.

Figure 5.1.7
The distribution of men and women across nine SET professions and associate professions, 2008

Figure 5.1.7 indicates vertical segregation in SET professions and associate professions. In 2008, men were more likely than women to take up SET management positions (37.7 per cent among men compared to 28.6 per cent among women). But a larger proportion of women were working in SET associate professions: as technicians, draughtspersons and inspectors, and in IT service delivery (26.5 per cent among women compared to 16.5 per cent among men).



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

In 2008, 73.4 per cent of 2.3 million men working in SET professions and associate professions were in SET management, followed by engineering and ICT professions. Over half of the 0.4 million female professionals and associate professionals were employed as SET managers, ICT professionals and science and engineering technicians. Women were particularly poorly represented in engineering with only 7.6 per cent of all SET professional and associate professional women employed in engineering professions, compared to 18.8 per cent of all SET professional and associate professional men.

Disaggregating the occupational data allows us to understand better the gendered composition of occupations and the different ways in which each gender is distributed across all SET occupations. It is a complex picture, showing not only what is well known: i.e. that women have a low participation in SET occupations, but also the different patterns of female representation in different occupations, suggesting that some occupations are more attractive and/or have less barriers to women than others. The distribution of each gender across SET occupations shows that men are concentrated in skilled trades. At professional level, they are in SET management as well as in engineering and ICT professions. Very few women work in skilled trades. They concentrate in health and science professions and associate professions. Worth noting are relatively large proportions of women who are working in (lower level) SET associate professions: as technicians, draughtspersons and inspectors and in IT service delivery.

The following sub-section 5.1.5 examines the participation of women in unskilled SET occupations. As explained in the introduction to section 5.1 those workers can be seen as part of the SET workforce that could - with training and experience - move into one of the other more skilled occupational groups.

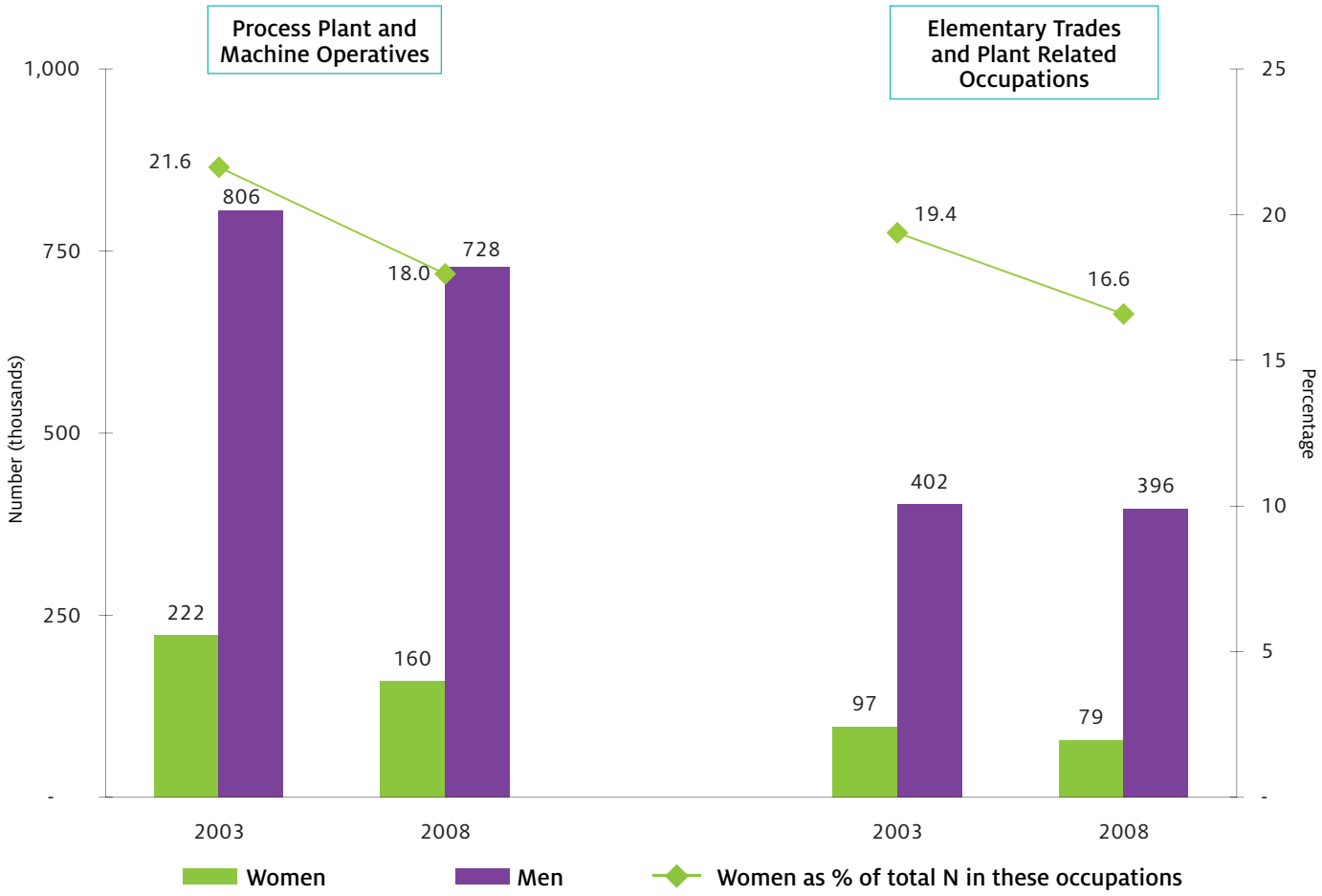
5.1.5 Unskilled SET occupations by gender

Two sets of bars representing two groups of unskilled occupations are shown in Figure 5.1.8. The first set presents the numbers of women and men employed as process plant and machinery operators in 2003 and 2008, and the percentage of the total that were women. The second set of bars presents the same information for elementary trades and plant related occupations. These two groupings represent nearly all elementary SET occupations.

Figure 5.1.8 shows that there are large numbers of women in both sets of unskilled occupations: about 239 thousand in 2008. This is considerably fewer than the number of women in SET professions and associate professions (424 thousand), and considerably more than those in skilled trades (25 thousand). Women were a relatively large percentage of all those working in elementary SET occupations in 2008, particularly compared to their proportion in SET skilled trades. UK women workers therefore have a significant investment in these jobs. However, between 2003 and 2008 there was a drop in the numbers of both men and women working in these occupations, with the decline being proportionately greater for women. Unlike SET professions, associate professions and skilled trades, these unskilled jobs are becoming an increasingly male area of work.

It is important to note the very small percentage of skilled-trades people who are women (presented in section 5.1.2), and compare this to the much larger percentage of unskilled SET workers who are women. This suggests that there is very little or no progression for women from unskilled to skilled SET occupations.

Figure 5.1.8
The participation in SET unskilled occupations by gender, 2003 and 2008



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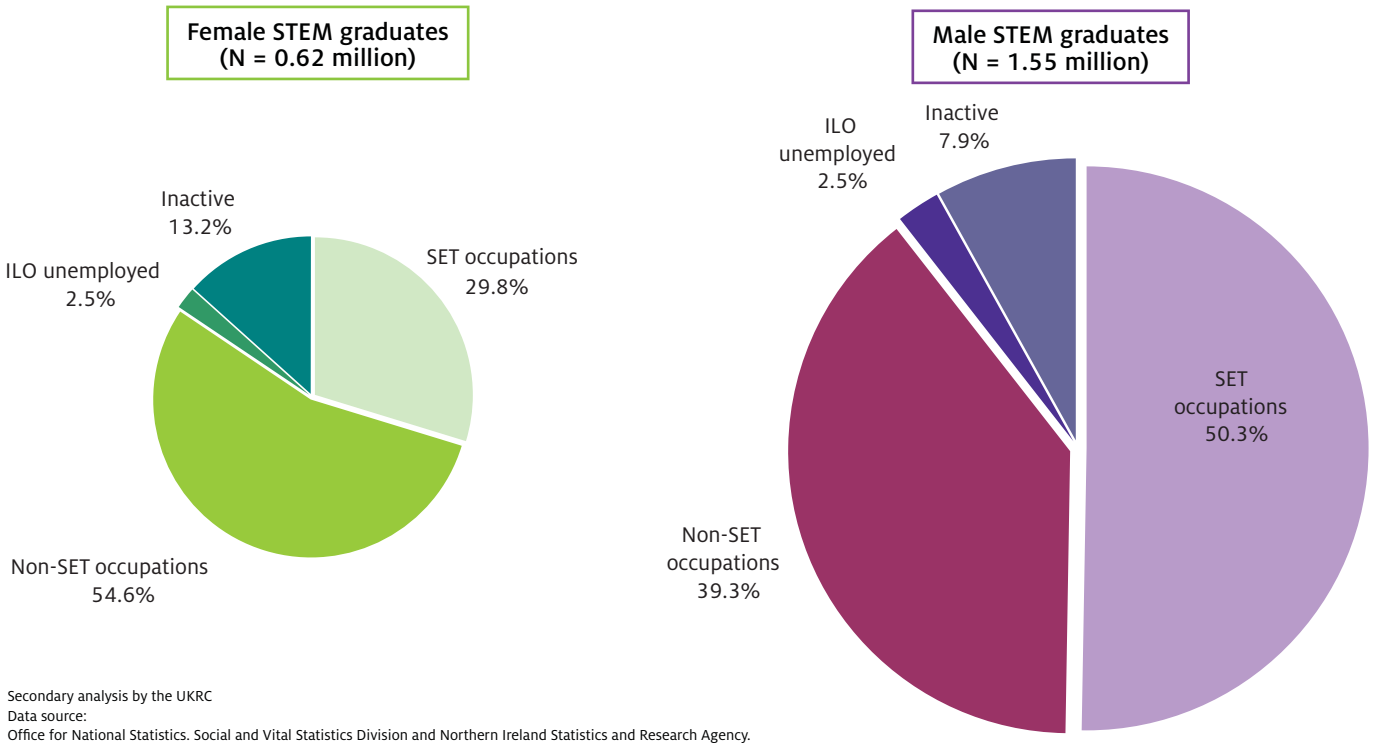

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In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.1.9
Economic activity profiles (inactive, unemployed, SET and non-SET occupations) for female and male STEM graduates in the UK, 2008

5.1.6 STEM graduates employed in SET occupations

This sub-section examines the relationship between having a STEM graduate qualification (degree or equivalent qualification in STEM subjects) and being employed in a SET occupation. As explained in the introduction to section 5.1 we use the abbreviation STEM in this Guide when referring to educational qualifications (science, technology, engineering and mathematics). We use SET when referring to employment (science, engineering and technology).

Section 3.3 discussed the first destination employment of STEM graduates, giving an indication of the different destinations of men and women. This sub-section uses data about the whole workforce which covers graduates at all stages of their careers.

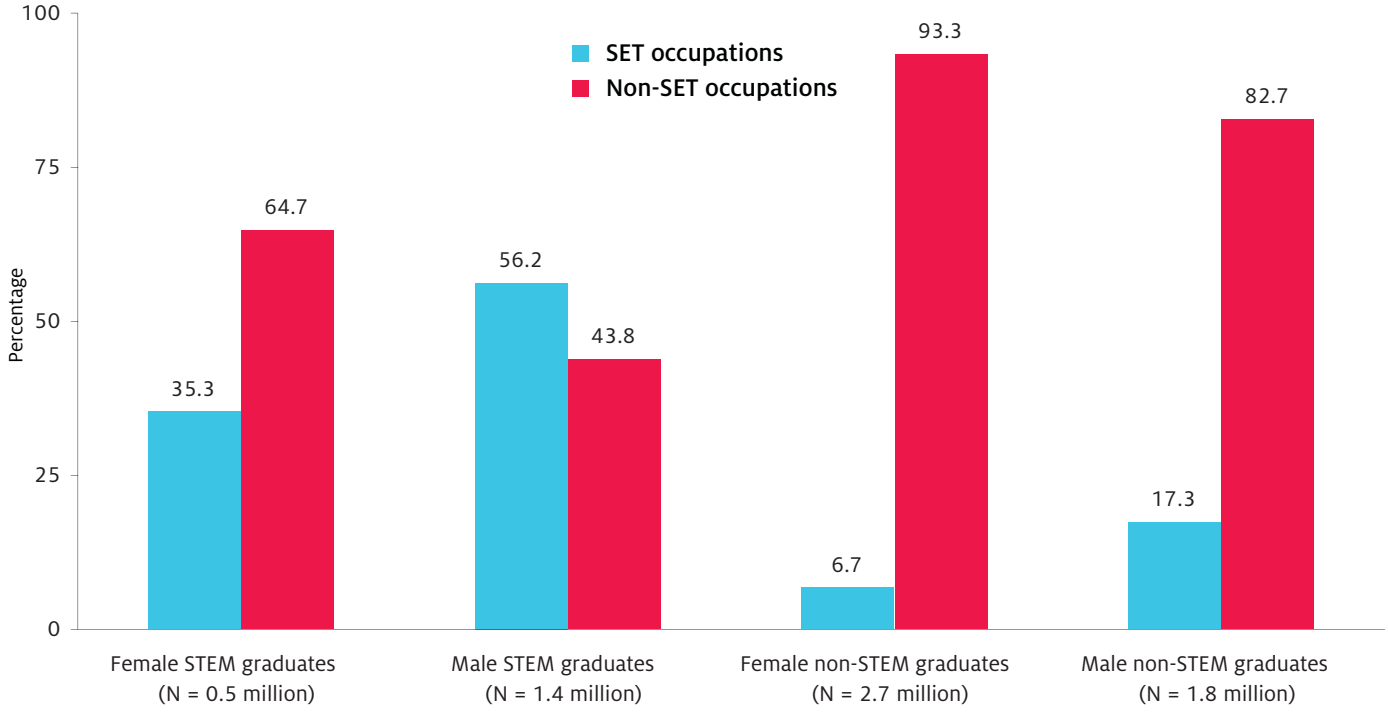
Figure 5.1.9 shows economic activity profiles of female and male STEM graduates of working age in the UK in 2008. These economic profiles include STEM qualified women and men who are unemployed, economically inactive, in non-SET occupations and in SET occupations.

As illustrated in Figure 5.1.9, there were 620 thousand female and 1.55 million male STEM graduates of working age in the UK in 2008. The pie charts in Figure 5.1.9 show that the same proportions (2.5 per cent) of women and men with STEM qualifications were classified as unemployed in 2008 (the national figure is 4.0 per cent for women and 5.3 per cent for men, presented in Figure 5.1.2). Worthy of note is the fact that inactivity levels nearly halved for female STEM graduates compared to the general female population in the UK (13.2 per cent compared to 25.9 per cent), and they more than halved for STEM qualified men (7.9 per cent and 16.3 per cent respectively). However, if actual numbers are considered, these proportions translate to nearly 100 thousand STEM qualified women (and 160 thousand STEM qualified men) who are either inactive or unemployed.

Figure 5.1.9 shows that only 29.8 per cent (185 thousand) of all female STEM graduates of working age in the UK were employed in SET occupations, compared to 50.3 per cent (782 thousand) of male STEM graduates. Less than one in three female STEM graduates, but just over one in two male STEM graduates, worked in SET occupations.

While Figure 5.1.9 shows the economic profile of the working age STEM graduates (including the unemployed and the inactive). Figure 5.1.10 shows how many women and men with STEM qualifications were working in SET and non-SET occupations in 2008, compared to non-STEM graduates.

Figure 5.1.10
STEM and non-STEM qualified by gender and type of occupation (SET and non-SET) in the UK, 2008



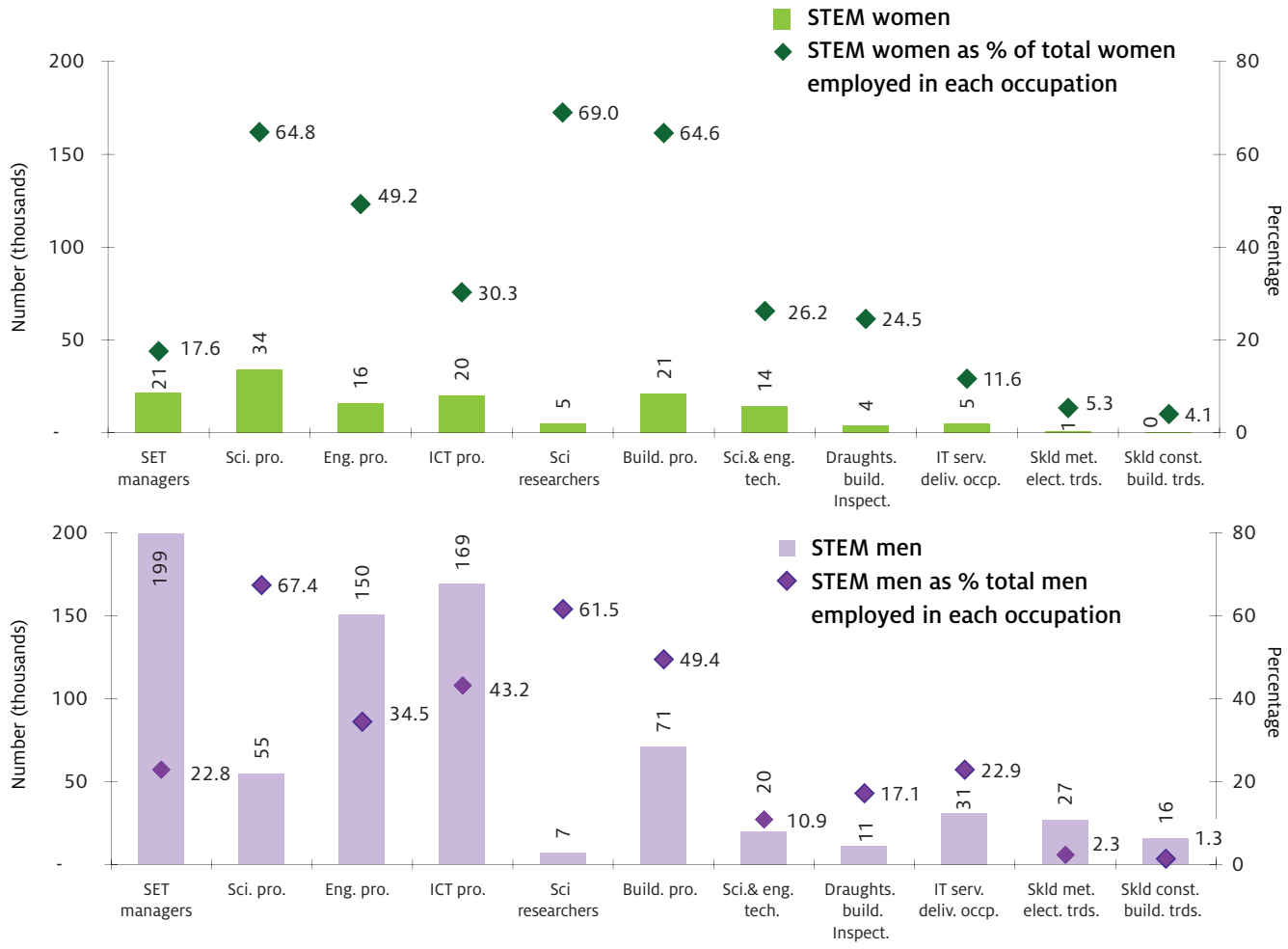
Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

It is clear that female STEM graduates are much less likely than their male counterparts to work in SET occupations. In 2008, only 35.3 per cent of working women with STEM degrees were employed in SET occupations compared with 56.2 per cent of their male counterparts. Among people with non-SET degrees men were more than twice as likely to work in SET occupations (17.3 per cent of men compared with 6.7 per cent of women).

Figure 5.1.11 gives us a more detailed picture of the different SET occupations women and men with STEM qualifications are engaged in. Note that any numbers below 6 thousand are under the statistically reliable thresholds as specified by the ONS, thus should be treated with caution. Figure 5.1.11 shows the distribution of female (top chart) and male (bottom chart) STEM graduates across eleven SET occupations. Each bar shows numbers of women and men with STEM qualifications who are employed in specific SET occupations. This number is also represented as a percentage of the total for each gender employed in that occupation.

So, for example the first two bars in the chart represent the numbers of STEM qualified men and women working as SET managers: 199 thousand and 21 thousand respectively. From earlier charts we are familiar with the gender imbalance in this occupation. However, what is surprising is that only 22.8 per cent of all male SET managers have a STEM qualification and even fewer female SET managers (17.6 per cent). There is no space in this guide to explore what other qualifications these managers have; we restrict ourselves here to looking only at the distribution of those with STEM qualifications.

Figure 5.1.11
The participation of women and men with STEM graduate qualifications in SET occupations, 2008



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

What is of note overall in this chart is that there are very few occupations where the percentage of male and female STEM graduates is the same. For most SET occupations a higher percentage of the female workforce has a graduate qualification than the male workforce. Sometimes the difference between the two percentages is large. For science and engineering technicians the difference is 15.3 percentage points, for engineering professionals 14.7, building professionals 15.2, scientific researchers 7.5, and draughtspersons and building inspectors 7.5. These figures suggest that overall women in SET occupations are more likely to be STEM graduates than men in the same occupation. Apart from SET managers it is only in IT occupations that a larger percentage of the male workforce have a STEM qualification: 12.9 percentage points more amongst ICT professionals and 11.2 amongst IT service and delivery occupations. It is also interesting to note that 5.3 per cent of women working in skilled metal trades and 4.1 per cent working in the building trades have a STEM graduate qualification.

These data merit more research. Some of the questions they pose are:

- What other qualifications do people in SET professions have – other than STEM graduate qualifications? For example, roughly one third of male and female professionals in science do not have a graduate STEM qualification.
- Do men take different educational routes to a career in a SET profession? Can the differences between the qualification levels of men and women be explained by men taking a vocational qualification route?
- Does 'on the job' experience play any role in the gender differences observed here?
- What is the relationship between qualification and salary? More women SET professionals have STEM qualifications than men, but in general a lower average salary (as discussed in section 6.1).

5.2 SET occupations by gender and ethnicity

Key statistics on SET occupations by ethnicity in the UK in 2008

- BME women are less likely than White women to be in employment. Less than a quarter of White women were classified as economically inactive, compared to 41.8 per cent of BME women. A relatively high proportion of BME men (roughly one in five), was also classified as inactive.
- BME women are more likely to work in SET occupations than White women. 8.2 per cent of all working BME women were employed in SET occupations, compared to 5.1 per cent of all working White women.
- Contrary to findings for women, BME working men were less likely to work in SET than White men (22.6 per cent compared to 32.2 per cent in 2008).
- The participation of BME women in SET occupations had been increasing at a faster rate than the participation of White women. Since 2003 the proportion of BME women in SET occupations increased by 3.7 percentage points.
- The proportion of BME women professionals and associate professionals in SET had shown even greater increase of 5.0 percentage points since 2003.
- BME women are a larger proportion of the BME workforce than White female group across all SET occupations with the exception of health. For example, BME women were 14.4 per cent of all BME engineering professionals, compared to only 6.3 per cent of White women among White engineering professionals.
- The largest single group of White women SET professionals and associate professionals – nearly one in three - was employed in SET management. The largest single group of BME women SET professionals and associate professionals – 27.7 per cent - was employed in ICT professions. Science and engineering professions were also more popular among BME than White women.

This section discusses the participation of White and Black and Minority Ethnic (BME) women and men employed in SET occupations. The data were obtained from the Labour Force Survey (LFS), which classifies the UK population by different ethnic groups. In this report we use only two: White, which consists of 'British' and 'Other White' categories and the BME group, which consists of 'White and Black Caribbean', 'White and Black African', 'White and Asian', 'Other Mixed', 'Indian', 'Pakistani', 'Bangladeshi', 'Other Asian', 'Black Caribbean', 'Black African', 'Other Black', 'Chinese', and 'Other' categories.

The BME group has not been analysed by the individual ethnic groups listed in the paragraph above because the ONS advises against publication of figures falling below statistically reliable threshold, and individual BME groups, when analysed by SET occupations, fall below this threshold. It is important to note, however, that different ethnic groups are represented differently across SET occupations. A general category of ethnicity (BME) disguises these differences and can only give a broad indication of how well different BME groups are represented in SET.

Occupational data in this publication are based on the Standard Occupational Classification (SOC2000), which is explained in sections 5.1 and 5.6.

In 2008, there were about 1.1 million BME women and 1.5 million BME men in employment in the UK, with women making up 42.8 per cent of the BME workforce. For the White ethnic group, there were about 11.6 million women and 13.9 million men in employment in the UK, with women accounting for 45.4 per cent of the White workforce. The BME workforce, therefore, has a slightly lower ratio of women to men than the White workforce.

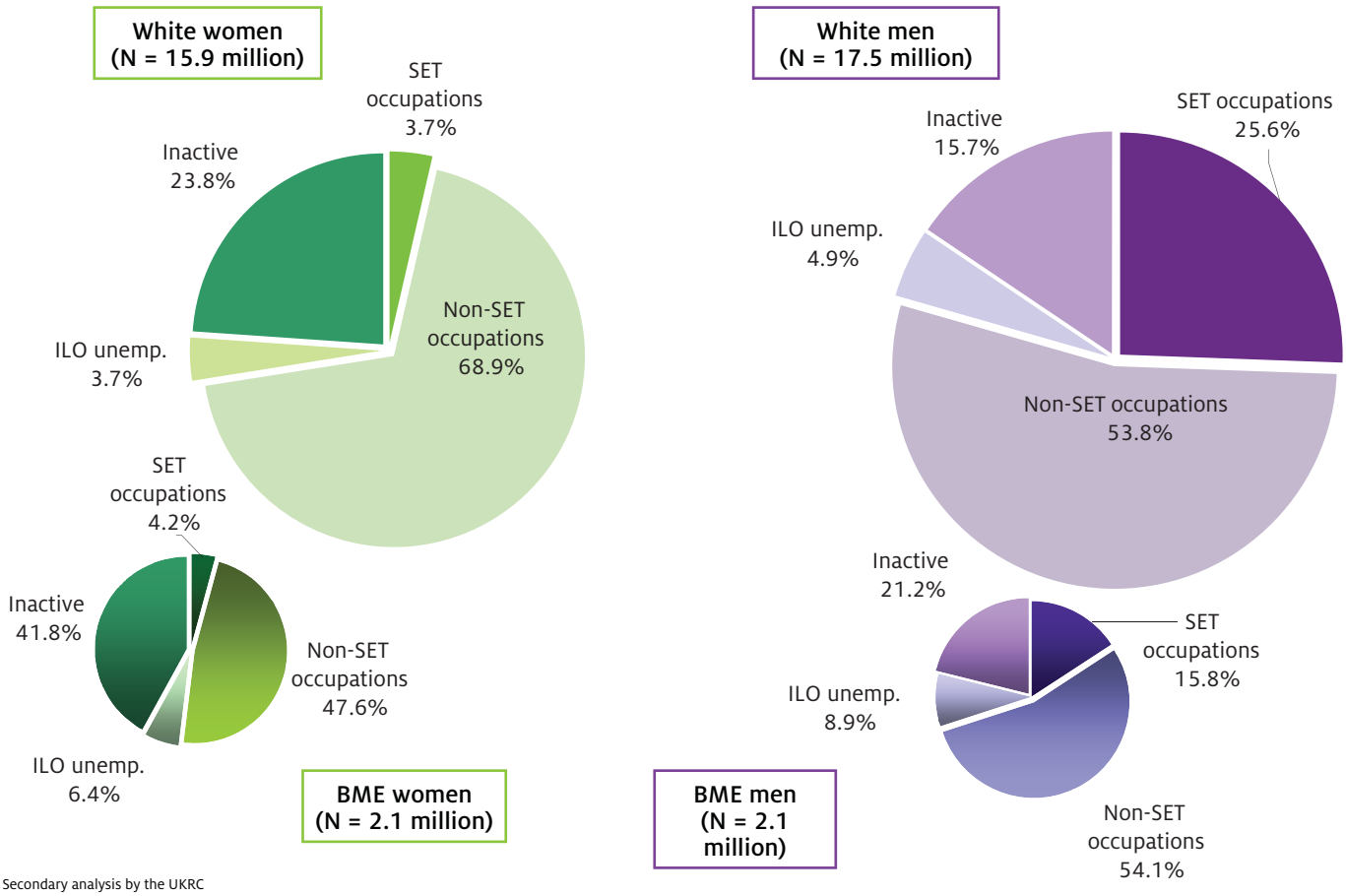
Economic activity profiles for each ethnic group by gender are shown in the first sub-section, followed by basic information on the participation of White and BME women and men in SET occupations and an indication of changes in this over the five years from 2003 to 2008. The following two sub-sections give more detailed information on employment in a range of SET occupations, showing the different distribution of White and BME women in SET. The final sub-section provides an analysis of those in unskilled occupations in SET.

5.2.1 Economic activity profiles of men and women by ethnicity in the UK

Figure 5.2.1 shows economic activity profiles of the working age population of the UK as two sets of two pie charts. These economic profiles include women and men who are unemployed, inactive, in non-SET occupations and in SET occupations. The first set of charts (in shades of green), presents economic profiles for both White women (top pie chart), and for BME women (bottom chart). The second set of pie charts (in shades of purple) shows the same information for men.

Figure 5.2.1 shows that in 2008, 2.1 million BME women and 15.9 million White women were classified as being of working age in the UK, with BME women accounting for 11.7 per cent of all women of working age. Amongst the population of working age men, 2.1 million were BME and 17.5 million were White, with BME men accounting for 10.6 per cent of all working age men.

Figure 5.2.1
Economic activity profiles (inactive, unemployed, SET and non-SET occupations) for each gender and ethnic group, 2008



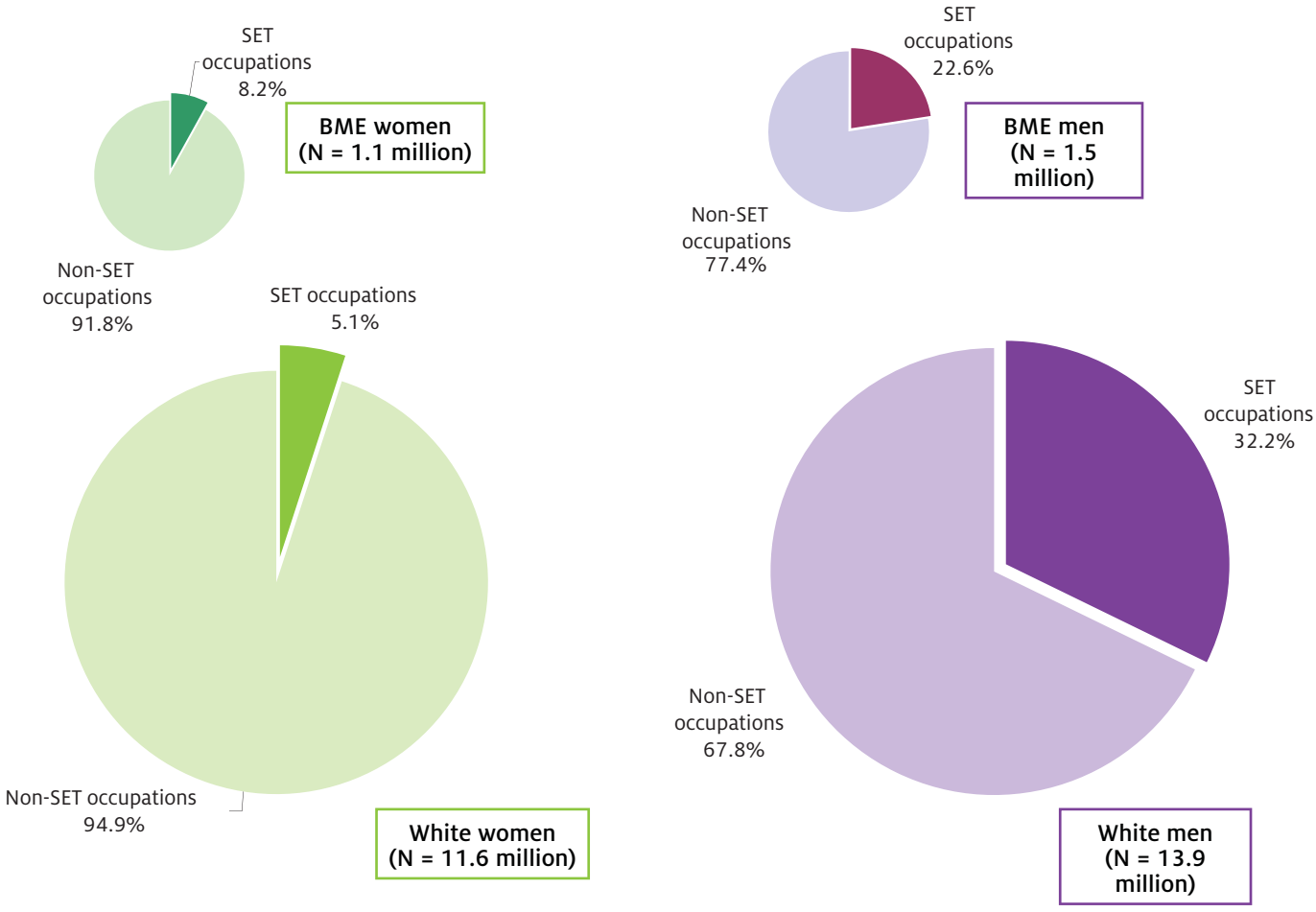
Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

The pie charts show that proportionally fewer White than BME women were classified as unemployed (3.7 per cent compared to 6.4 per cent respectively), but the highest unemployment rate was among BME men at 8.9 per cent. Less than a quarter of White women were classified as economically inactive, compared to 41.8 per cent of BME women. 'Inactive' is defined as "not available for work and/or not actively seeking work". It is important to note that a relatively high proportion of BME men (roughly one in five), was also classified as inactive.

While Figure 5.2.1 shows the economic profile of the working age population (including the unemployed and the inactive) by ethnicity, Figure 5.2.2 illustrates the participation in SET and non-SET occupations of the working population of women and men by ethnicity.

Figure 5.2.2
SET (including health and skilled trades) and non-SET occupations within each gender and ethnic group, 2008

Figure 5.2.2 shows that more BME working women (8.2 per cent) were employed in SET occupations in 2008 than White women (5.1 per cent). This is in contrast to the figures for men, with BME men being less likely to work in SET occupations (22.6 per cent) than White men (32.2 per cent).



Secondary analysis by the UKRC
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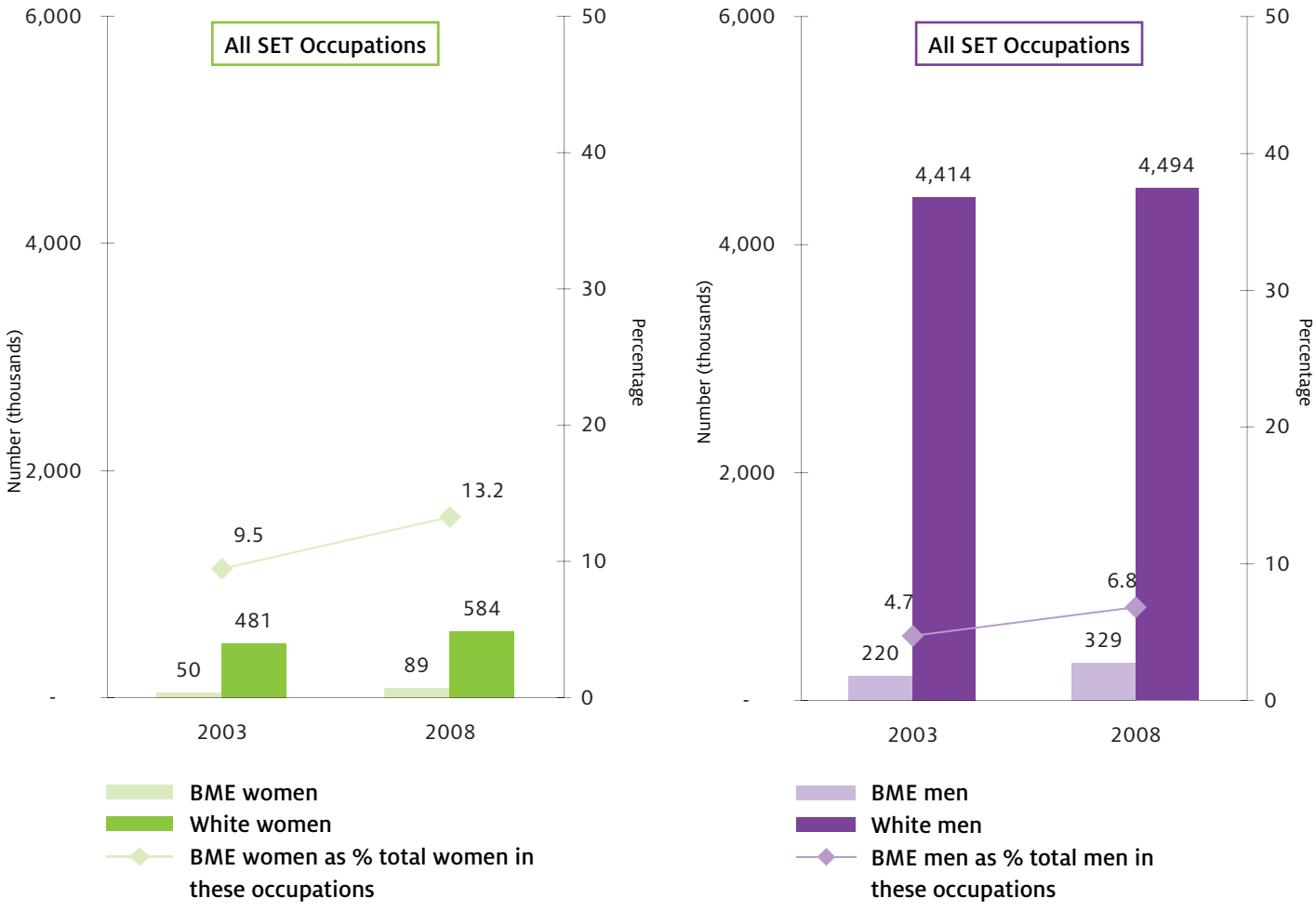
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

5.2.2 SET occupations by gender and ethnicity

In this sub-section we move from the big picture of the UK economic activity of White and BME women to look at their participation in SET occupations (Figure 5.2.3). Data for 2003 and 2008 are presented to see what changes might have occurred in these five years.

The left hand side chart of Figure 5.2.3 shows the number of BME and White women in all SET occupations (SET professions and associate professions including health, and SET skilled trades), in 2003 and 2008. Also presented are the percentages of BME women of all women employees in SET. The right hand side chart shows the same information for White and BME men.

Figure 5.2.3
The participation in SET occupations by gender and ethnicity, 2003 and 2008



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.2.3 shows that the numbers of BME and White women in all SET occupations had been rising in the five years between 2003 and 2008, and this increase had been proportionately greater for BME women than for White women. There had been a 3.7 percentage point improvement in the participation of BME women in SET occupations. The number of BME and White men in all SET occupations also rose in the five years between 2003 and 2008, with the increase greater for BME men.

As illustrated in section 5.1, the participation of women in SET differs depending on the type of occupations they work in. While women are well represented in health occupations, they are less represented in what have been seen as traditionally male SET professions and associate professions, and very few women are in SET skilled trades, which also normally require lower entry qualifications than professions and associate professions. For that reason we analyse these three categories separately in Figure 5.2.4.

Three sets of bars are shown in Figure 5.2.4. The first set shows the number of BME and White women in SET professions and associate professions in 2003 and 2008. Also presented is the percentage of BME women of all female employees in these occupations. The second set of bars presents the same information as the first set for health professions and associate professions, while the third set of bars shows SET skilled trades. Figure 5.2.5 shows the same information as Figure 5.2.4 for BME and White men. The pattern of this analysis is the same as in section 5.1.

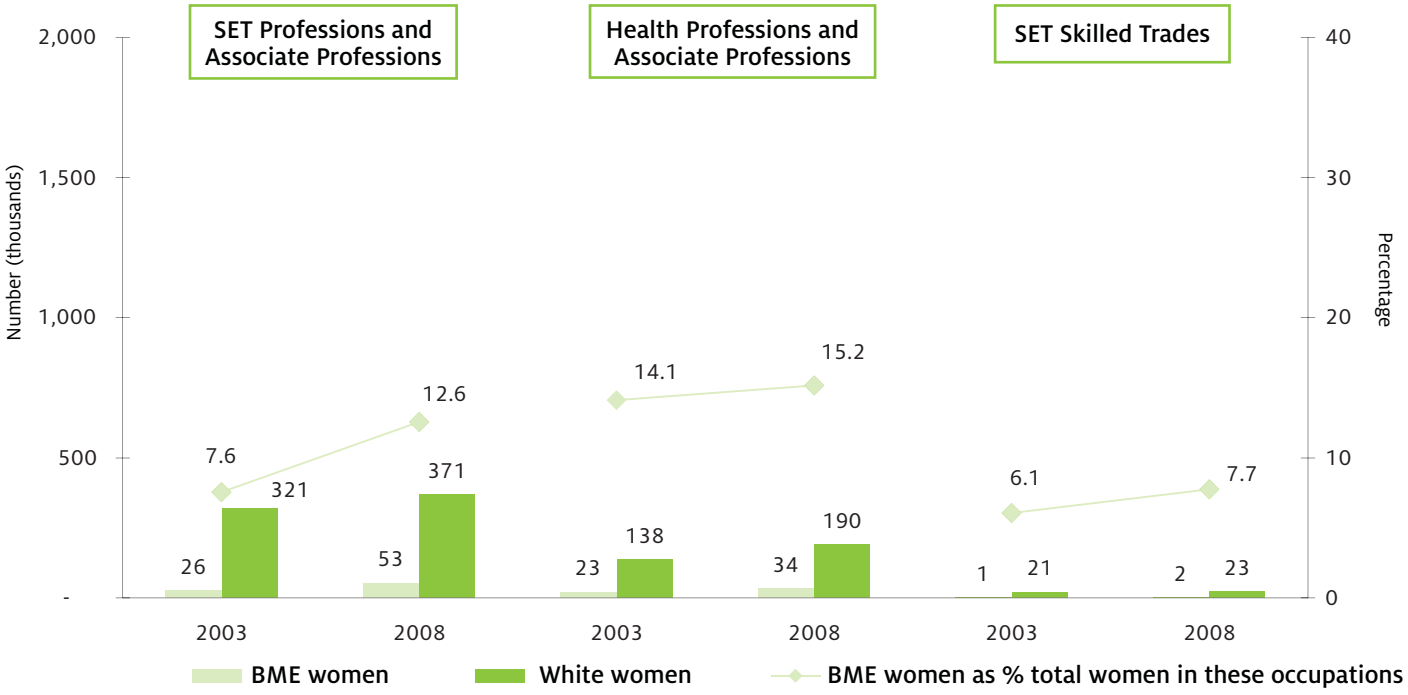
Figure 5.2.4 shows that the proportion of BME women increased in SET and health professions/associate professions and in the SET skilled trades. The proportion of BME female professionals and associate professionals in SET occupations had increased by 5.0 percentage points since 2003, indicating that the greatest proportional increase of BME women in SET occupations took place among this occupational grouping. As shown in Figure 5.2.5 the proportion of BME men of all male employees also increased in all SET occupational groupings.

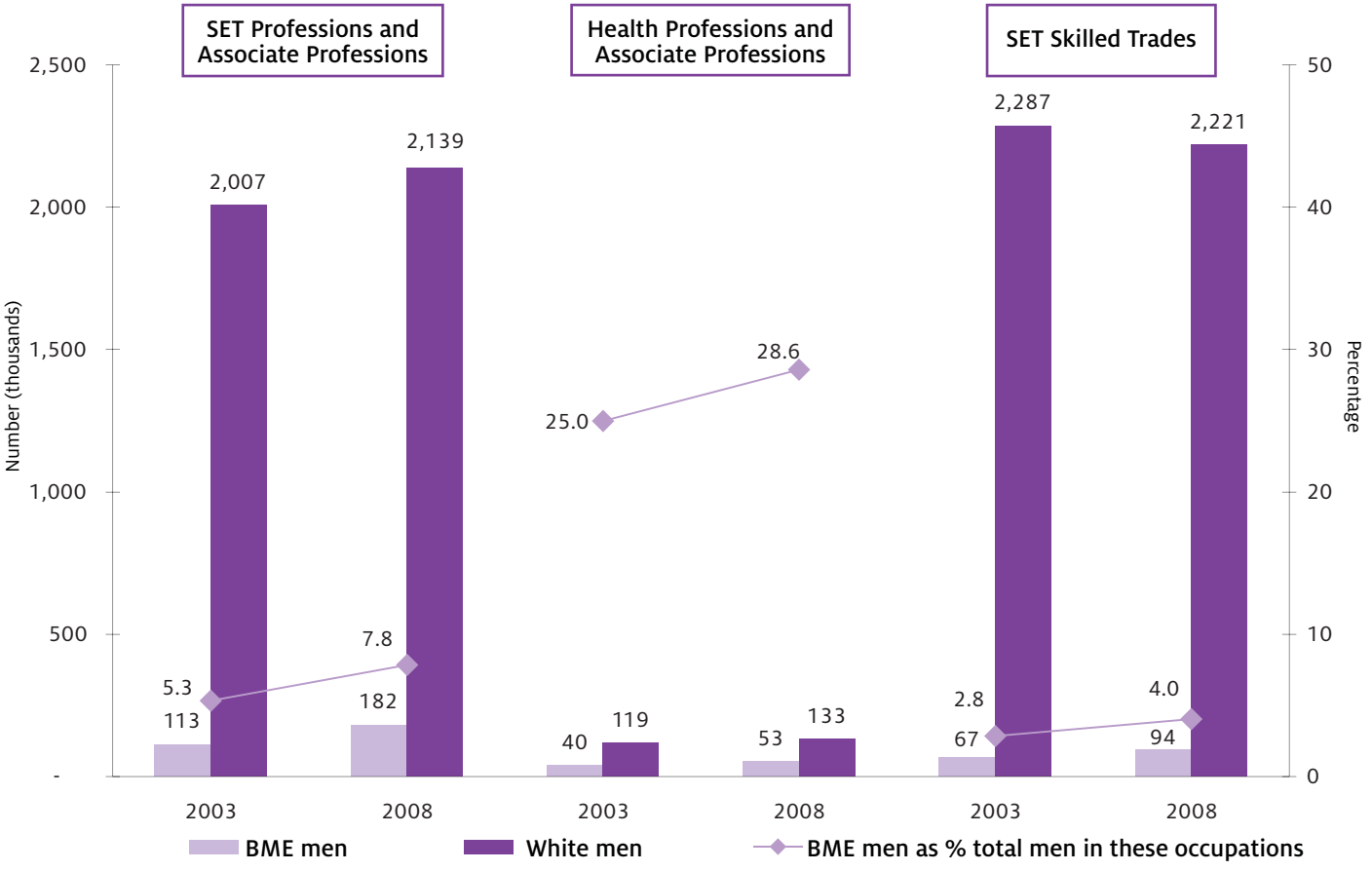
5.2.3 Employment across a range of SET occupations by gender and ethnicity

Sub-section 5.2.1 highlighted that in 2008, 8.2 per cent of all BME working women were employed in SET occupations, while for White women this figure was 5.1 per cent. In this sub-section we move to a more detailed discussion of the types of occupations BME women engage in and compare this with White women working within the same occupations.

Figure 5.2.4 (top)
The participation of women in SET and health professions and associate professions, and SET skilled trades by ethnicity, 2003 and 2008

Figure 5.2.5 (bottom)
The participation of men in SET and health professions and associate professions, and SET skilled trades by ethnicity, 2003 and 2008





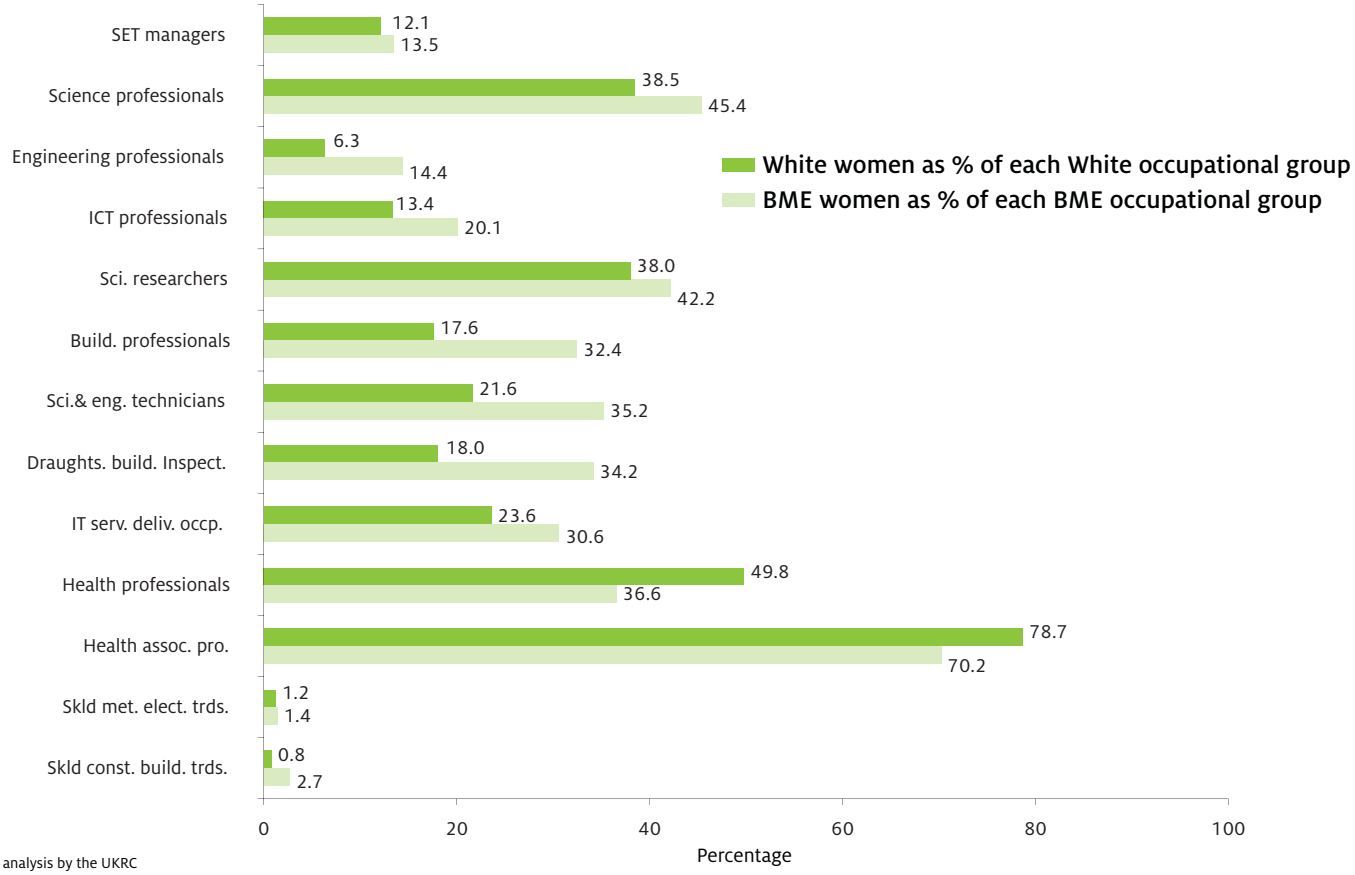
Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.2.6 shows the proportion of White women of all White employees and the proportion of BME women of all BME employees across 13 SET occupations.

Figure 5.2.6 shows that BME women are a larger proportion of most BME SET occupational groups than White women are of White groups with the exception of the two health-related occupations. This difference is particularly prominent in engineering and building professions with the proportional representation of BME women among BME professionals roughly twice that of White women. BME women also appear to be a slightly larger proportion of BME skilled trades, compared to White women. However, the data are only indicative, because of the small size of the samples (the sample sizes in the skilled trades are below the reliability threshold suggested by the ONS). The data suggest that BME women are more likely to enter traditionally male SET occupations (for example engineering and building) than White women.

Both health and SET skilled trades are subdivided into only two further sub-categories in this Guide, but SET professions and associate professions can be divided into a larger number of sub-categories. The next section looks into the distributions of White and BME women separately across nine SET professions and associate professions, to explore which of these occupations are more likely to be taken up by BME women and which are more likely to be taken up by White women.

Figure 5.2.6
The proportion of women within each SET occupational group by ethnicity, 2008

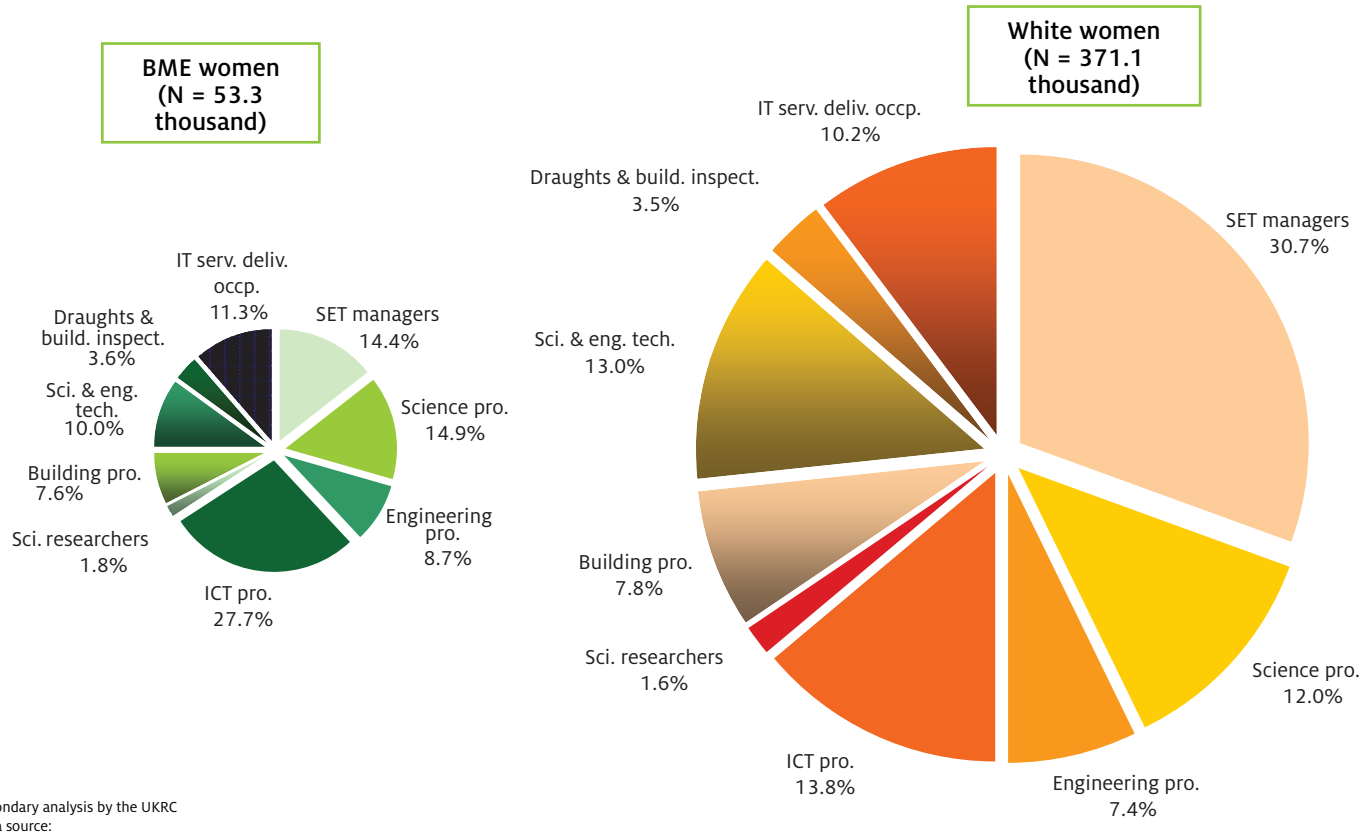


Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

5.2.4 The distribution of White women and BME women in SET professions/associate professions

Figure 5.2.7
The distribution of women within each ethnic group across nine SET professions and associate professions, 2008

Figure 5.2.7 shows the distribution of BME women across nine SET professions and associate professions as a proportion of the total BME women in these occupations, and the same information is provided separately for White women.



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In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.2.7 shows that the distributions of BME and White women differ across some SET professions and associate professions. White women are proportionally twice as likely to work in SET management as BME women, but BME women are proportionally twice as likely as the White female group to work in ICT professions.

The largest single group of White women SET professionals and associate professionals – nearly one in three - was employed in SET management. The largest single group of BME women SET professionals and associate professionals – 27.7 per cent - was employed in ICT professions. Science and engineering professions were also more popular among BME than White women.

Analysing the occupational data by ethnicity allows us to understand better how ethnicity affects the gendered composition of occupations. It is a complex picture, demonstrating, for example, that BME women are more likely to work in SET than White women, and that the proportion of all BME women working in SET occupations is increasing faster than the proportion of all White women working in SET occupations. There is no strong consistent pattern of ethnic inequality with respect to the location of BME women in any hierarchy of SET occupations, but it needs to be noted here that we only examined a general category of ethnicity (BME) and not different BME groups.

So far we have discussed the participation of women and men in professional and skilled SET occupations. Sub-section 5.2.5 shows the participation of women and men from different ethnic backgrounds in unskilled or elementary SET occupations.

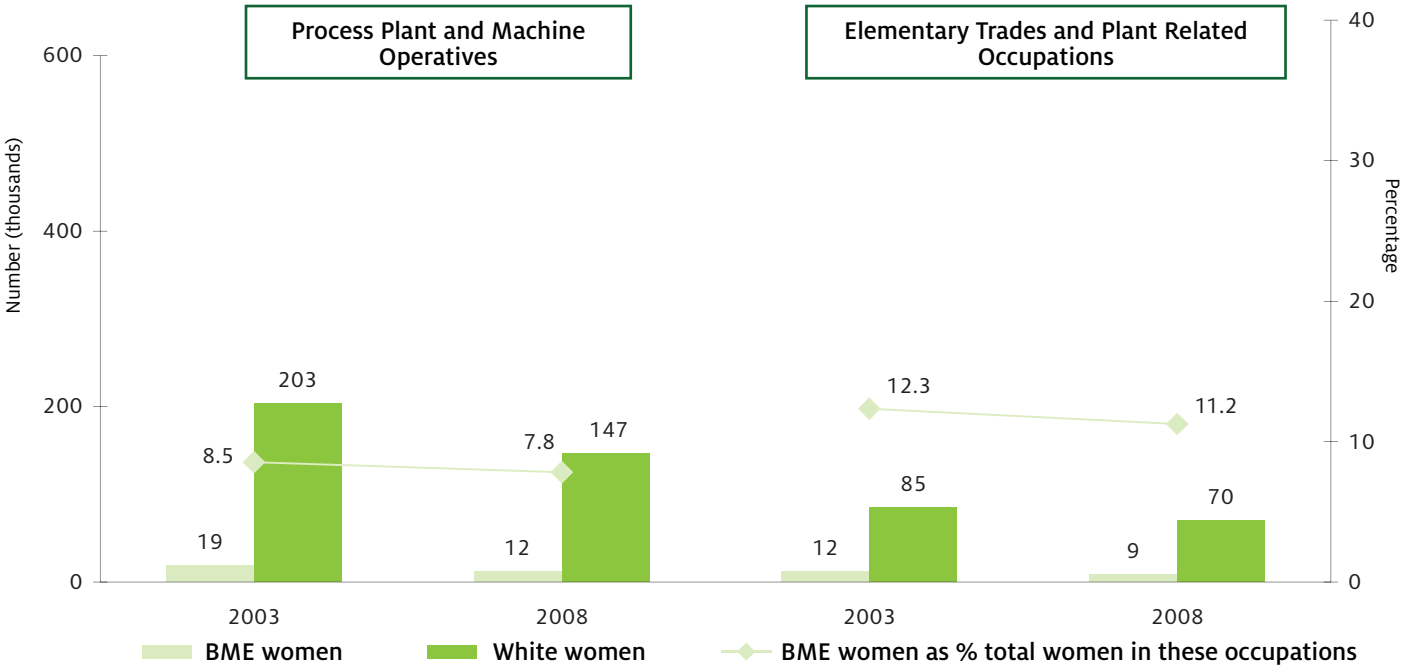
5.2.5 Unskilled SET occupations by gender and ethnicity

Figure 5.2.8 illustrates the participation of White and BME women in elementary SET occupations over time. The first set of bars shows the numbers of BME and White women employed as process plant and machinery operators in 2003 and 2008. Also presented are the percentages of BME women of all women employees in SET. The second set of bars presents the same information for elementary trades and plant related occupations. Figure 5.2.9 shows the same information for men in unskilled trades.

Figure 5.2.8 shows that the numbers of BME and White women in unskilled SET occupations decreased in the five years between 2003 and 2008, and that this decline has been greater for BME women. In contrast, Figure 5.2.9 shows that while the numbers and proportions of BME men in unskilled SET jobs have increased since 2003, the numbers have decreased for White men. This suggests that BME men are becoming a larger part of the unskilled SET workforce, while this in not the case for BME women.

Figure 5.2.8 (top)
The participation of women in SET unskilled occupations by ethnicity, 2003 and 2008

Figure 5.2.9 (bottom)
The participation of men in SET unskilled occupations by ethnicity, 2003 and 2008



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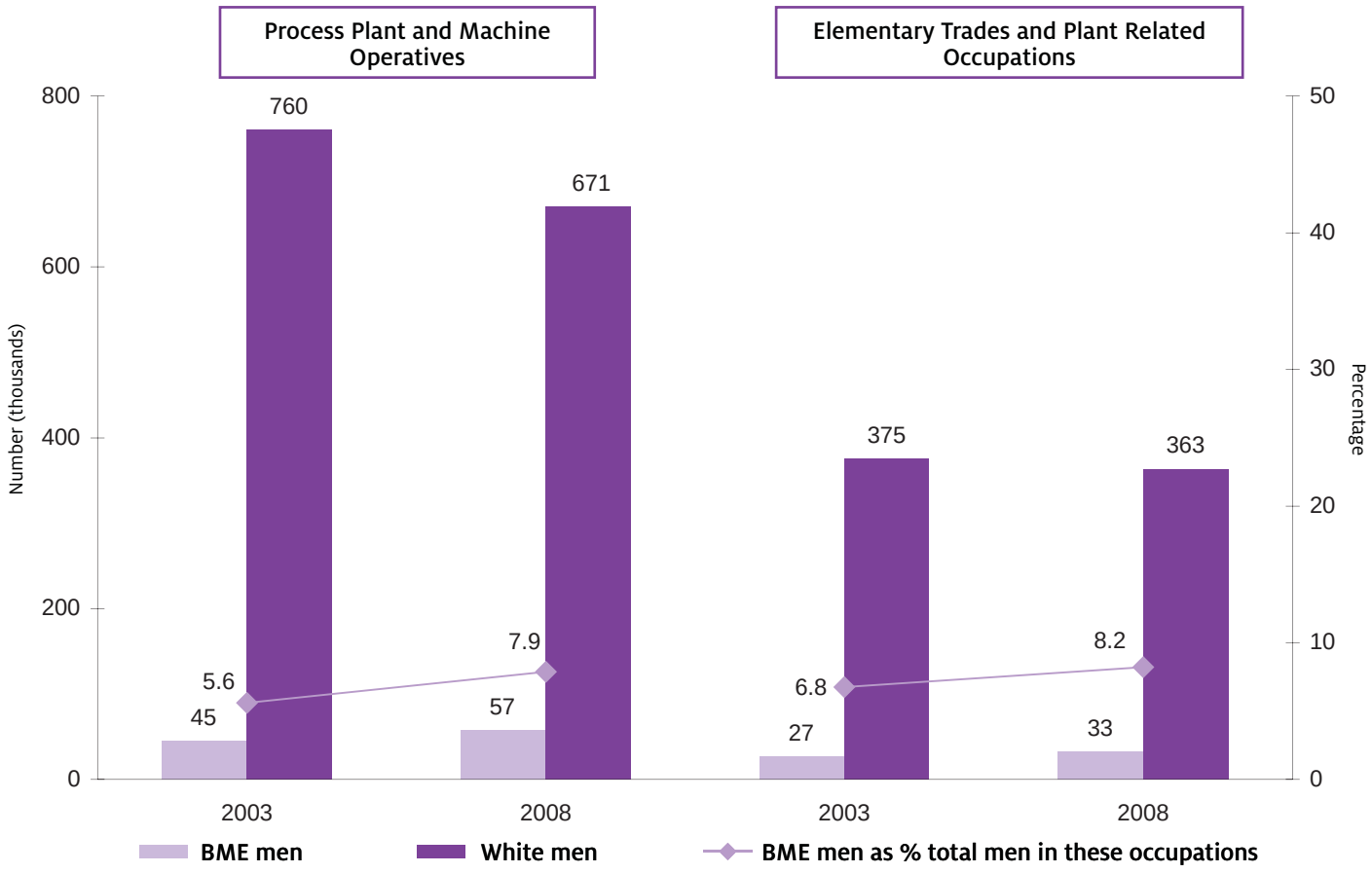
Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.



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Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, men aged 16 to 64 were included.

5.3 SET occupations by gender and disability

Key statistics on SET occupations by disability in the UK in 2008

- The major impact of disability is to exclude women and men from employment. Less than a quarter of women without disabilities were classified as economically inactive, compared to nearly one in two (47.3 per cent) of women with disabilities.
- Women with disabilities are slightly less likely to work in SET occupations in the UK than women without disabilities. 4.0 per cent of all working women with disabilities were employed in SET occupations in 2008, while the equivalent figure for women without disabilities was 5.5 per cent. For men the comparative figures were 28.3 per cent and 31.8 per cent respectively.
- Since 2003 there had been a proportional decline of 1.4 percentage points in the participation of women with disabilities in SET professions and associate professions. In contrast, the participation of men with disabilities in these occupations increased by 0.6 percentage points.
- Some SET occupations seem to be more attractive to women with disabilities than others. Women with disabilities are relatively well represented in SET professions where the numbers of women are generally high in areas such as science, ICT and health, and are less likely than women without disabilities to work in the SET professions that generally have low proportions of women, such as engineering and building professions.

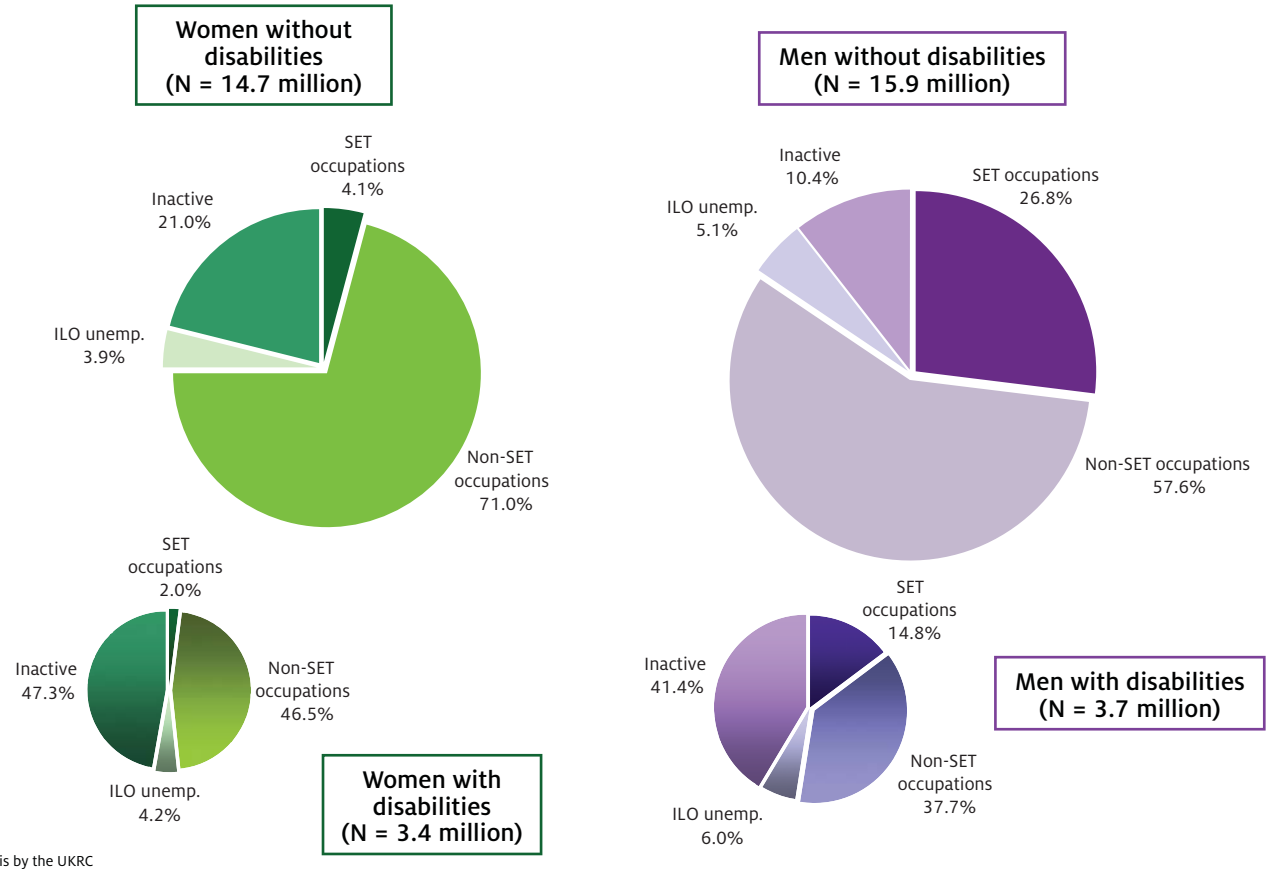
In 2008, about 3.4 million women with disabilities and 14.7 million women without disabilities were classified as being of working age in the UK: women with disabilities accounted for 18.6 per cent of all women of working age. Amongst working age men about 3.7 million reported having a disability and 15.9 million reported having no disabilities: 18.8 per cent of all men of working age had a disability. This suggests that there is no gender difference with respect to the proportion of people with disabilities in the UK workforce.

This section discusses the representation of women and men with and without disabilities employed in SET occupations in the UK. Because so many SET occupations involve high levels of physical skill and challenging physical working environments (such as construction sites and laboratories), there may be a presumption that SET is not an environment that can offer work to people with disabilities. This section explores whether this is the case and whether there is any gender difference in the employment of people with disabilities in SET occupations.

The data in this section were obtained from the Labour Force Survey (LFS). The LFS data on disability classifies the population by the level of difficulty individuals experience in their daily life: 1. Current long-term disability covered by the Disability Discrimination Act (DDA disabled); 2. Long-term disability which affects the kind or amount of work individuals might do (work-limiting disabled). In this section we have grouped the DDA disabled and work-limiting disabled into one category (women or men with disabilities), in order to keep numbers large enough to have statistical significance. If we disaggregate the data by both the type of disability as well as by SET occupations the data often are below the ONS threshold, and thus become unreliable. This is further explained in section 5.6. It should be noted here that the range of disabilities covered by the DDA is very large including various types of sensory, physical and intellectual impairment. Different types of impairment will impact differently on different kinds of work tasks. A general umbrella label disguises all these differences and can only give a broad indication of how well employers are responding to the needs of employees so that they can continue to work.

Occupational data in this publication are based on the Standard Occupational Classification (SOC2000), explained in section 5.6. Similar to previous sections we separately examine SET and health professions and associate professions, and SET skilled trades. See section 5.1 for further discussion of the occupational groupings.

Economic activity profiles for women and men with and without disabilities in the UK are shown in the first sub-section, followed by basic information on the participation of women and men with and without disabilities in SET occupations in the UK and an indication of changes between 2003 and 2008. The last two sub-sections give more detailed information on employment in a range of SET occupations by disability.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.3.1
Economic activity profiles (inactive, unemployed, SET and non-SET occupations) for each gender and disability group, 2008

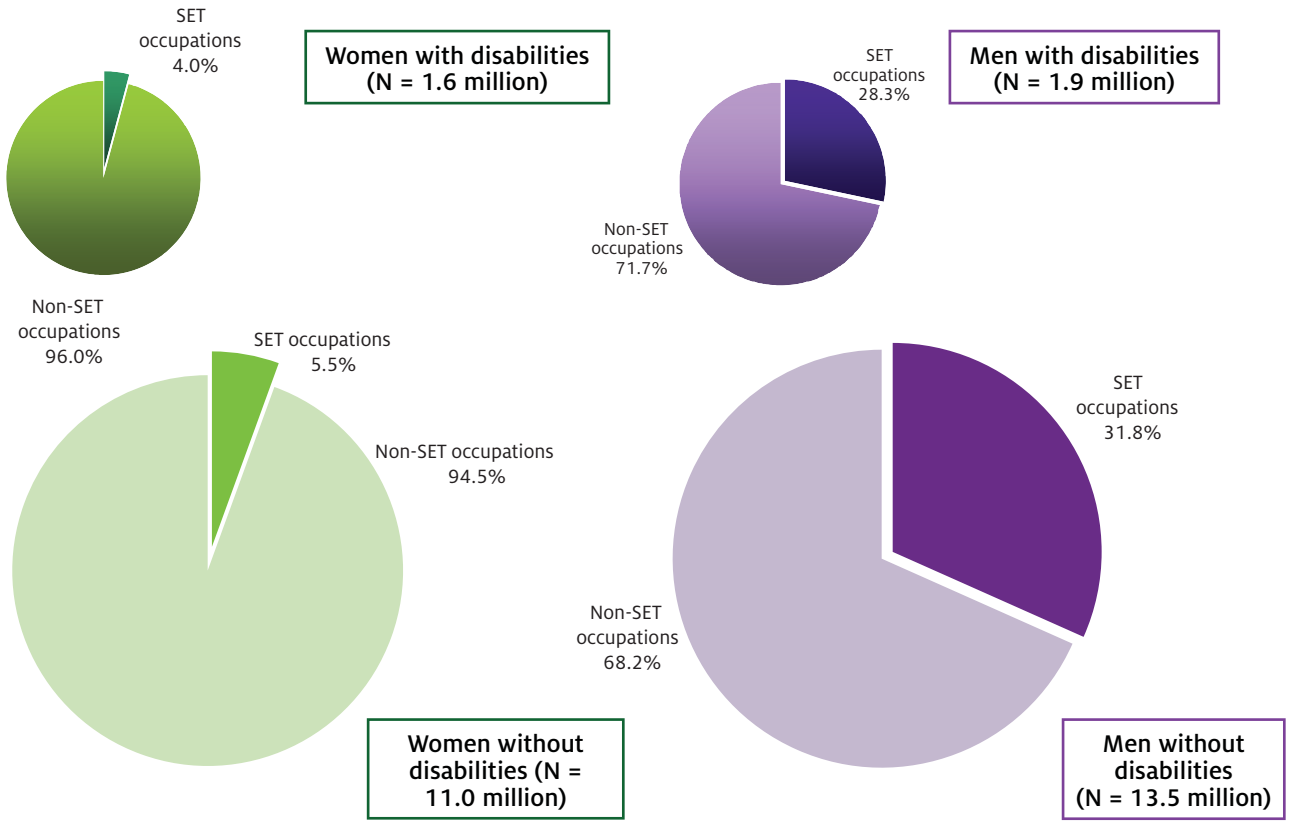
5.3.1 Economic activity profiles of men and women by disability in the UK

Figure 5.3.1 shows economic activity profiles of the working age population of the UK in two sets of pie charts. The first set (in shades of green) presents profiles separately for women without disabilities (top chart) and women with disabilities (bottom chart), and the second set (in shades or purple) shows the same information for men. Each economic activity profile includes information on the unemployed and inactive, in non-SET and SET occupations. The size of the pie charts indicates the relative size of the populations.

The pie charts show the high proportions of people with disabilities who are economically inactive; the presumption must be that their disability restricts their capacity to be employed. The proportion of women with disabilities who are inactive is slightly higher than that of men: 47.3 per cent compared with 41.4 per cent. However among the population without disabilities, women are twice as likely to be inactive as men. Figure 5.3.1 also shows that almost the same proportion of women with disabilities were classified as unemployed as women without disabilities (4.2 per cent compared to 3.9 per cent). These rates are smaller than unemployment rates for both male groups (5.1 and 6.0 per cent respectively). Figure 5.3.1 also suggests that people with disabilities are less likely to work in SET occupations than their counterparts without disabilities. The proportions are roughly half those for people without disabilities: for women 2.0 per cent compared with 4.1 per cent, and for men 14.8 per cent compared with 26.8 per cent. The gendered pattern of very low percentages of women working in SET occupations is now compounded by the variable of disability, which leads to there being very few women with disabilities in SET occupations.

However, the picture looks different when only those people in employment are analysed. Figure 5.3.2 illustrates participation in SET and non-SET occupations of working women and men by disability.

Figure 5.3.2
SET (including health and skilled trades) and non-SET occupations within each gender and disability group, 2008



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
Four quarterly datasets for 2003 and 2008 were combined to create an annual dataset. In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.3.2 shows that in 2008, 4.0 per cent of working women with disabilities were in SET occupations, compared with 5.5 per cent of working women without disabilities. For men the comparative figures were 28.3 per cent and 31.8 per cent respectively. If the ratios of men to women for the two groups are compared, it appears that women with disabilities are slightly less likely to work in SET occupations (female to male ratio 1:7) than women without disabilities (female to male ratio 1:6), suggesting an interaction of gender and disability that may be creating a barrier for women. However, the major impact of disability is to exclude women and men from employment. Once employed there are only small differences in whether they work in SET or not.

5.3.2 SET occupations by gender and disability

In this sub-section we move from the big picture of the UK economic activity of women with and without disabilities to examine their participation in SET occupations (Figure 5.3.3). Data for 2003 and 2008 are presented to see what changes might have occurred in these five years.

Figure 5.3.3
The participation in SET occupations by gender and disability, 2003 and 2008

Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

The left hand side chart of Figure 5.3.3 shows the numbers of women with and without disabilities in all SET occupations (SET professions and associate professions including health, and SET skilled trades) in 2003 and 2008. Also presented are the percentages of women with disabilities of all women employees in SET. The right hand side chart shows the same information for men with and without disabilities.

Figure 5.3.3 indicates an issue of concern: the proportion of women with disabilities in SET occupations declined between 2003 and 2008 by 0.7 percentage points. The total number of women with and without disabilities in all SET occupations rose, but the proportional increase was greater for women without disabilities than for women with disabilities. A similar pattern of decline in the representation of men with disabilities is absent in SET occupations.

As illustrated in section 5.1, participation of women in SET differs depending on the type of occupations they work in. To explore these differences we analysed SET skilled trades and SET and health professions/ associate professions separately in Figures 5.3.4 and 5.3.5.

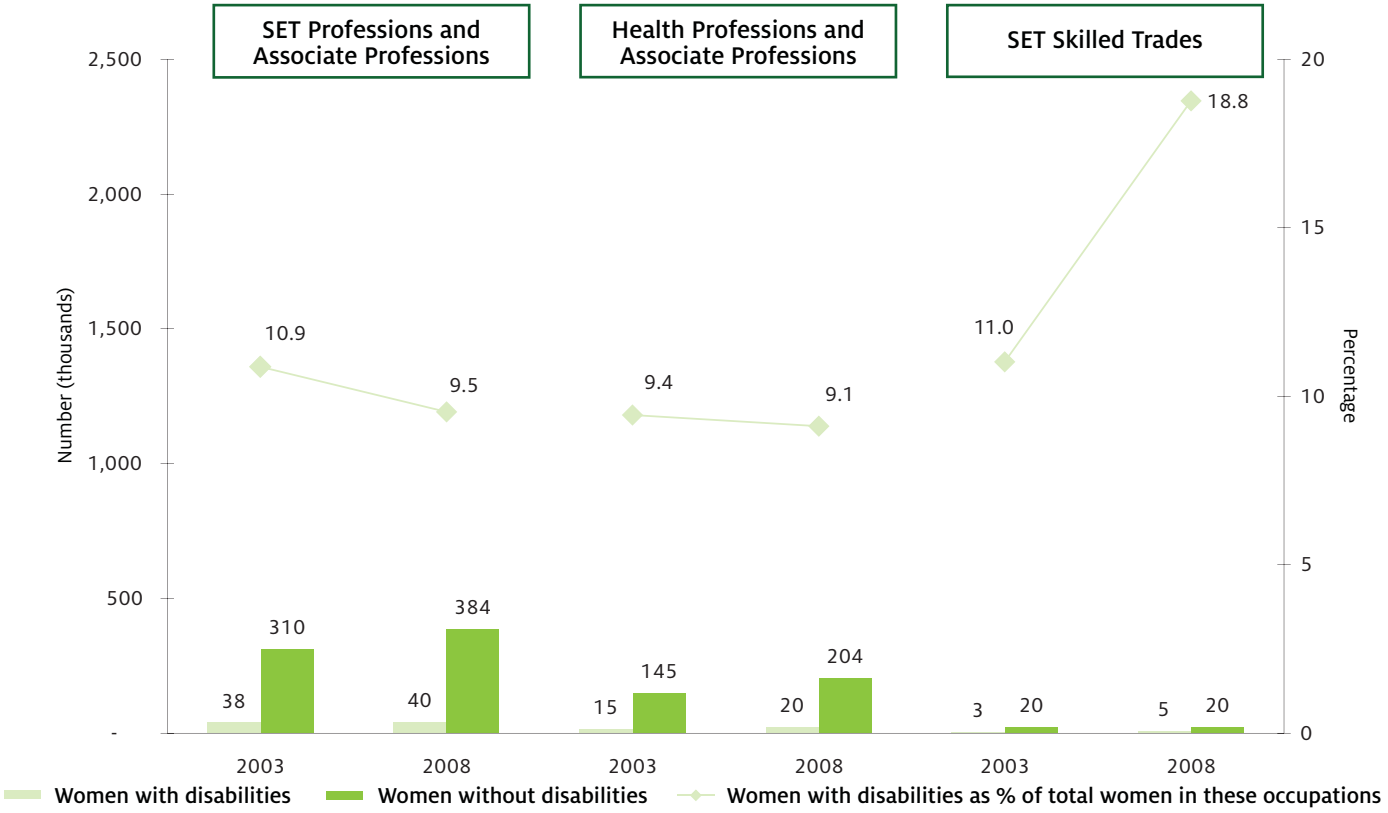
Three sets of bars are shown in Figure 5.3.4. The organisation of these charts follows that of the previous sections. The first set of bars shows the numbers of women with and without disabilities in SET professional and associate professional occupations in the UK for 2003 and 2008. Also presented are the percentages of women with disabilities of all female employees in these occupations. The second set of bars presents the same information as the first set for health professions and associate professions, while the third set of bars shows the data for SET skilled trades. Figure 5.3.5 shows the same information as Figure 5.3.4 for men with and without disabilities.

Figure 5.3.4 shows that the biggest decline in the proportion of women with disabilities of all female employees - at 1.4 percentage points - occurred in SET professions/associate professions. In contrast, Figure 5.3.5 shows that the proportion of men with disabilities of all male employees in SET professions/ associate professions increased by 0.6 percentage points. This clearly begs the question of why this pattern is developing with more disabled men in employment and fewer women.

Intriguingly, the participation of women with disabilities in skilled trades increased from 3,000 to 5,000, giving an overall increase in their proportional participation of 7.8 percentage points. However, this may be an artefact of the small numbers involved which fall below the ONS recommended reliability threshold. Figure 5.3.5 shows that for men the numbers with and without disabilities in SET skilled trades declined, but the proportion of men with disabilities in these trades remained unchanged since 2003 at 12.4 per cent.

Figure 5.3.4 (top)
The participation of women in SET and health professions/associate professions and SET skilled trades by disability, 2003 and 2008

Figure 5.3.5 (bottom)
The participation of men in SET and health professions and associate professions and SET skilled trades by disability, 2003 and 2008



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2003 and 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

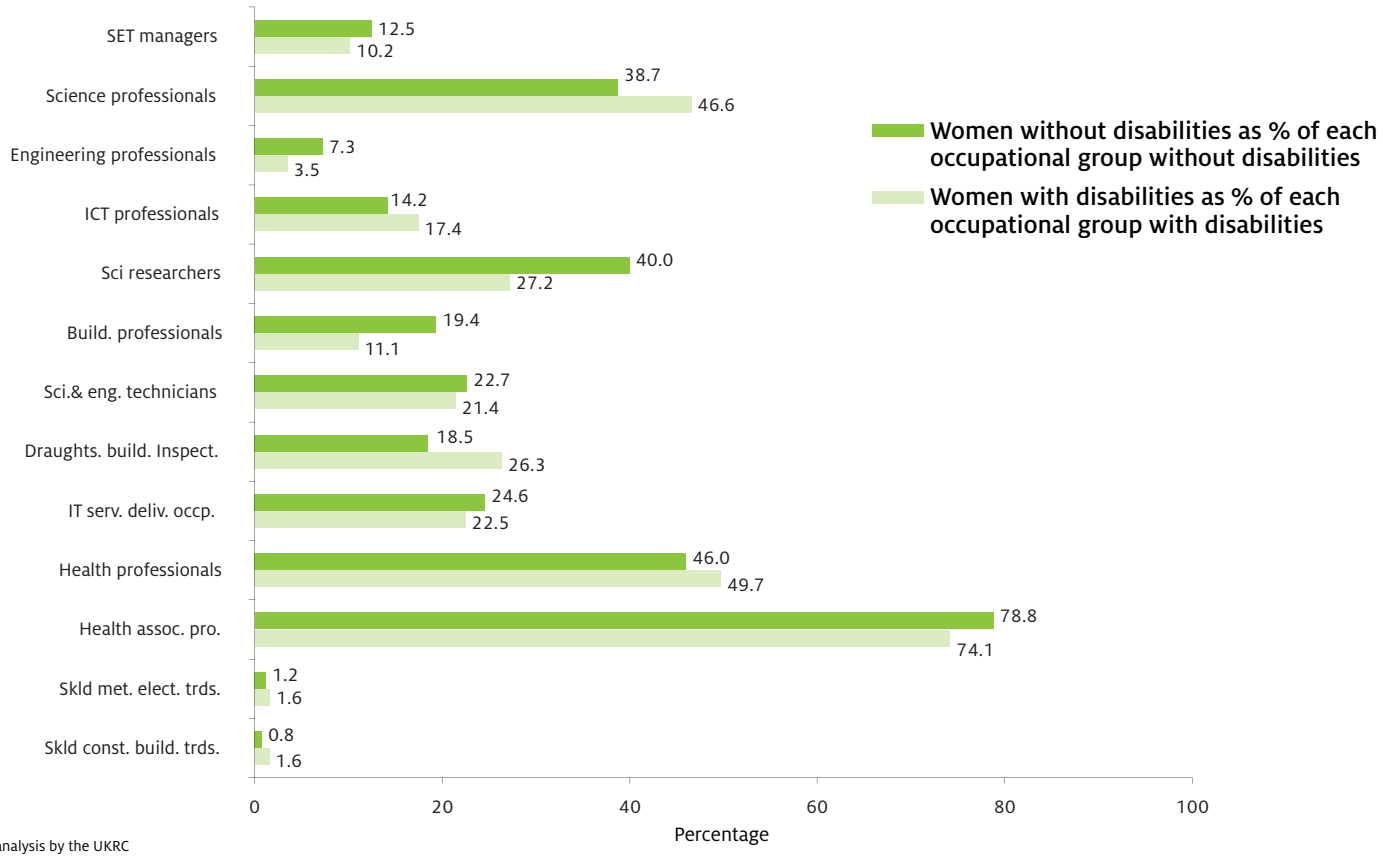
5.3.3 Employment across a range of SET occupations by gender and disability

This sub-section provides a more detailed discussion of the types of SET occupations women with disabilities engage in, and compares this with women without disabilities. Figure 5.3.6 shows the proportion of women without disabilities of all employees without disabilities in 13 SET occupations and the proportion of women with disabilities of all SET employees with disabilities.

Figure 5.3.6 suggests that some SET occupations are more accessible to women with disabilities than others. For example, women with disabilities form a larger proportion of employees with disabilities in science, ICT and health professions; the three professions where women are generally well represented. However there were lower proportions of women with disabilities in occupations which generally have very low proportions of women such as engineering and building professions.

It should be noted that although women with disabilities appear to represent a slightly larger proportion of skilled trades workers as well as draughtspersons and building instructors, compared to their counterparts without disabilities, the data are only indicative, because of the small (below reliability threshold suggested by the ONS) numbers.

Figure 5.3.6
The proportion of women within each SET occupational group by disability, 2008



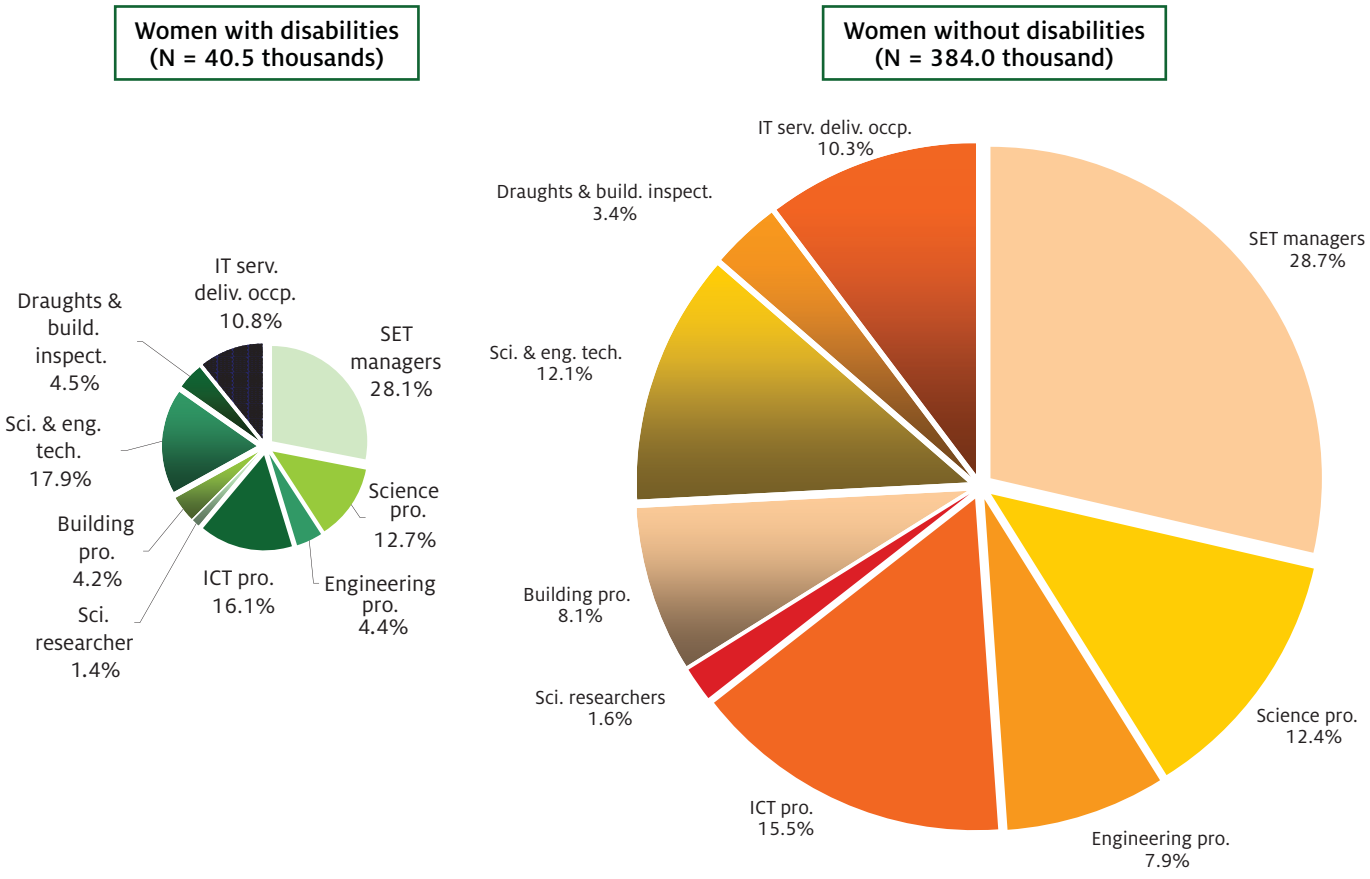
Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Both health and SET skilled trades are subdivided into only two further sub-categories in this Guide, but SET professions and associate professions can be divided into a larger number of sub-categories. The next section looks into the distributions of women with and without disabilities separately across nine SET professions and associate professions, to give an indication of which of these occupations are more and less likely to be taken up by women with disabilities.

5.3.4 The distribution of women with and without disabilities in SET professions/associate professions

Figure 5.3.7
The distribution of women within each disability group across nine SET professions and associate professions, 2008

The data presented in Figure 5.3.7 show the distribution of women with disabilities across a range of SET professions/associate professions in the UK. The same information is provided for women without disabilities (right hand side chart).



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 were included.

The data presented in Figure 5.3.7 show that in general the pattern of distribution of women with and without disabilities across different SET occupations is similar; however some occupations appear to be less attractive to women with disabilities. For example, women with disabilities were less likely to take up building and engineering professions than women without disabilities, but more likely to work as science and engineering technicians.

Analysing the occupational data by gender and disability allows us to understand better how disability might affect the occupational choices of women. The data show that women with disabilities are slightly less likely to work in SET occupations and that their numbers in SET are increasing at a slower rate compared to women without disabilities in SET and health professions/associate professions. Women with disabilities often choose different SET occupations compared to women without disabilities. Women with disabilities are relatively well represented in SET professions where the numbers of women are generally high in areas such as science, ICT and health, and are less likely than women without disabilities to work in the SET professions that generally have low proportions of women, such as engineering and building professions. However, the major impact of disability is to exclude women and men from employment, as shown by high economic inactivity levels among people with disabilities.

5.4 The participation of women in SET sector industries in the UK

Key statistics on women's participation in SET industries in 2008

- 10.7 per cent of women of working age were employed in SET industries. Although this represents a small proportion, it is three times larger than the numbers working in SET occupations (3.7 per cent).
- More men of working age were employed in SET industries (38.5 per cent) than were employed in SET occupations (24.6 per cent).
- Most women working in SET industries were not working in SET occupations.
- Women were never less than 12.6 per cent of the workforce in any of the traditionally male industries and men were never less than 22.0 per cent of any traditionally female industry. Non-SET industries are more likely to be closer to a gender-balanced labour force, while SET industries remain very male dominated.
- The majority of women working in SET industries were in manufacturing (40.2 per cent).
- Only 29.3 per cent of female STEM graduates in employment worked in SET industries compared with 54.8 per cent of their male counterparts.
- 66.0 per cent of all female STEM graduates working in SET industries were clustered in manufacturing and professional science and technology industries. A further 24.5 per cent were in construction and information and communication industries, leaving less than 10.0 per cent distributed across the other six SET industries. For male STEM graduates this clustering was less extreme.

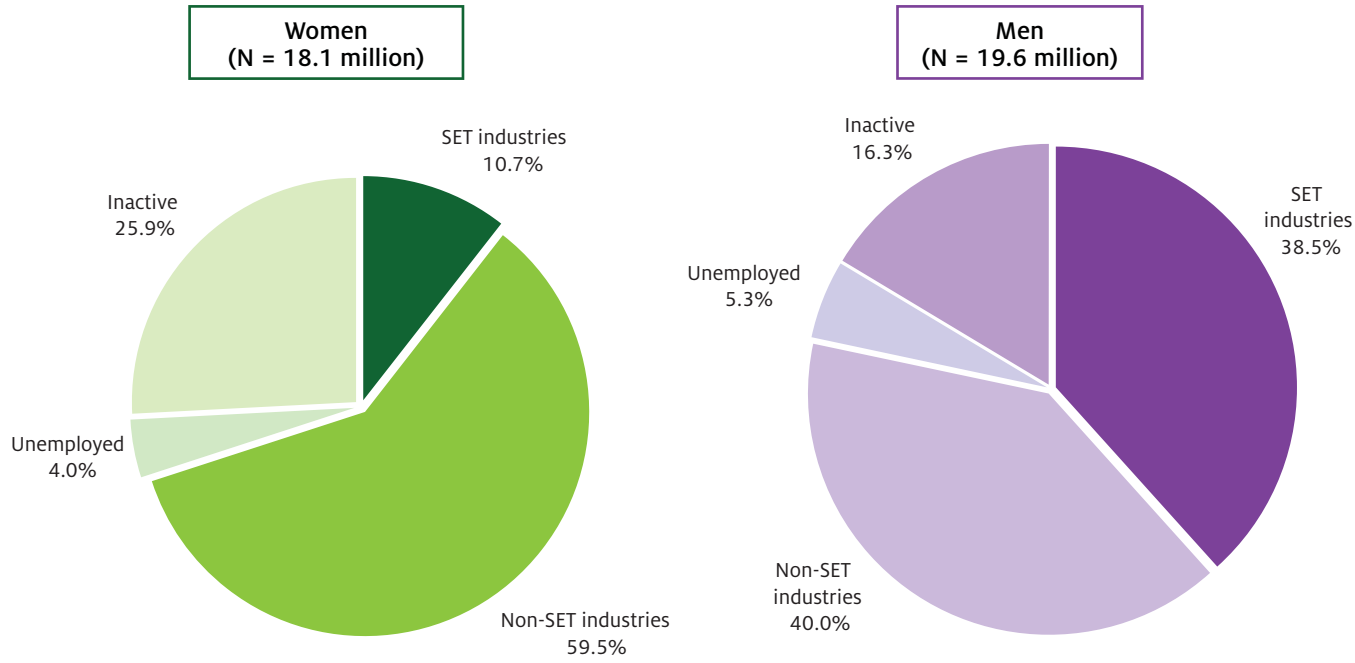
This section analyses the participation of women in SET sector industries, and includes a sub-section examining the employment profiles of women and men with STEM qualifications and their engagement in SET and non-SET industries.

As explained in section 5.1, the economic activity of the workforce can by analysed in two ways: by the occupation that a person carries out, or by the sector in which they work. This section examines the participation of women in SET and non-SET industries using the standard industrial classification (SIC2007). In other words, we examine where women and men work, rather than the jobs they do. Similar to the previous sections, in this chapter all data are from the United Kingdom Labour Force Survey run by the Office for National Statistics (ONS). The industrial sectors which we have included in our SET industry category are listed in section 5.6.

We use the abbreviation STEM in this Guide when referring to educational qualifications (science, technology, engineering and mathematics) in keeping with common usage in education. We use SET when referring to employment (science, engineering and technology) in keeping with common usage in studies of women and the labour market. The ONS uses a label 'SET qualified' for those who hold a degree (or equivalent) qualification in STEM subjects (which we refer to as STEM graduates), while non-STEM qualified are people who hold a degree qualification in non-STEM subjects.

5.4.1 Economic activity profiles of men and women in the UK

Figure 5.1.1 in section 5.1 illustrated the economic activity profile of working age women and men in the UK showing the proportions of unemployed, inactive, in non-SET occupations and in SET occupations for each gender. Figure 5.4.1 shows similar economic activity profiles, but by SET/non-SET industries. These economic profiles include, separately for women and men, those who are unemployed, inactive, or working in non-SET and SET industries. The size of the pie charts indicates the relative size of the populations.



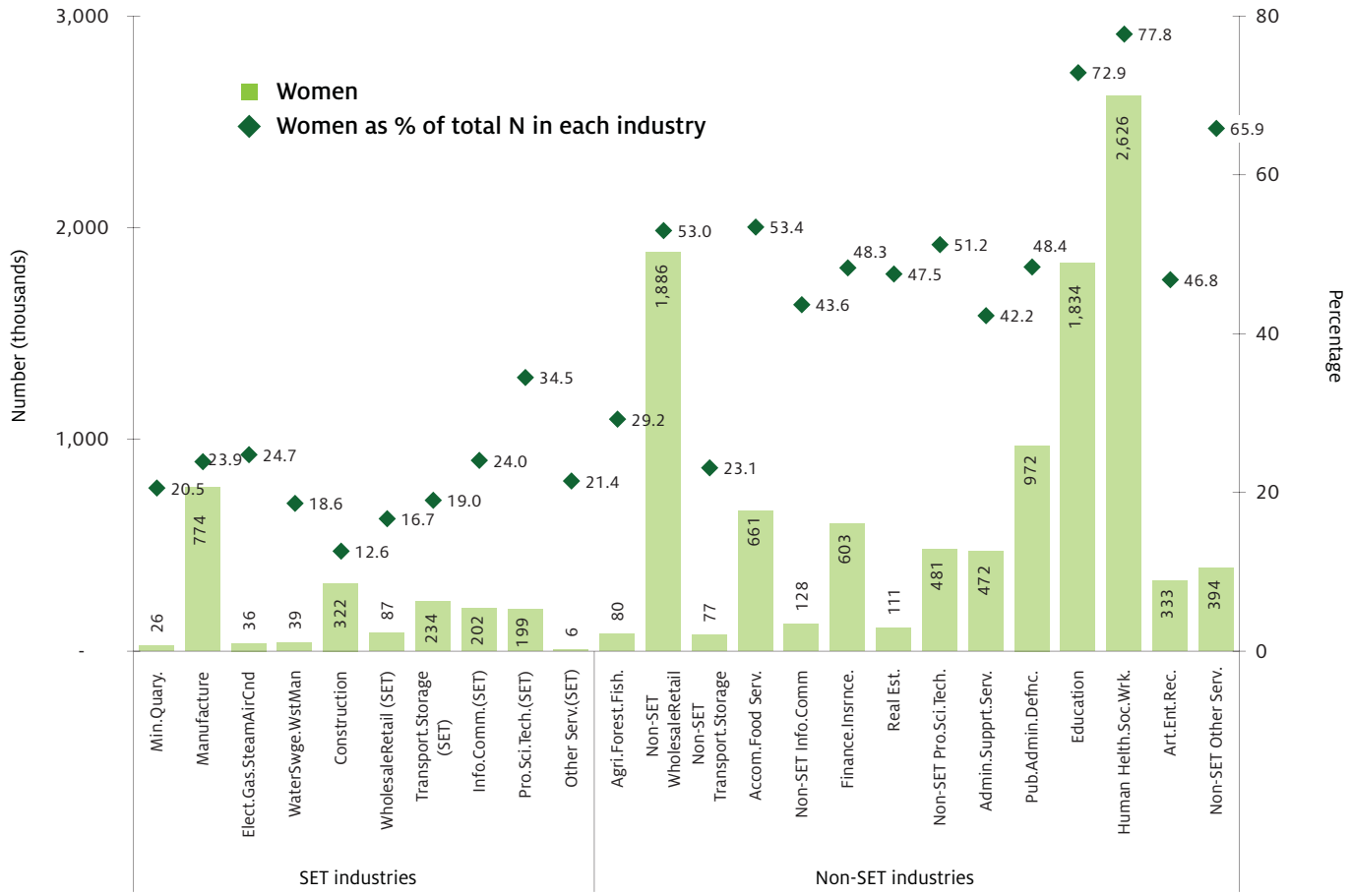
Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.4.1
Economic activity profiles (inactive, unemployed, SET and non-SET industries) for women and men in the UK, 2008

When Figure 5.4.1 is compared with Figure 5.1.1 it is clear that a much larger proportion of the workforce of both men and women are working in SET sector industries than work in SET occupations. In 2008, 10.7 per cent of women of working age were employed in SET industries. Although this is small, it is three times larger than the numbers working in SET occupations (3.7 per cent). More men are also working in SET industries than in SET occupations, but the difference between the two figures is much smaller: 38.5 per cent working in SET industries compared to 24.6 per cent working in SET occupations. The gender ratios are different. Women are three times more likely to work in SET industries than in SET occupations, while there are only 50 per cent more men in SET industries than in SET occupations. This is an indication of the importance of SET industries in the UK labour market, and the fact that most women working in SET industries are not working in SET occupations (see also Figure 5.1.1).

5.4.2 Employment across a range of SET and non-SET industries by gender

As shown in Figure 5.4.1, among the working age UK population, 10.7 per cent of all women of working age and 38.5 per cent of all men of working age are employed in SET industries. Figure 5.4.2 shows the numbers of women working in the main SET and non-SET industries in the UK in 2008. The green diamonds give these numbers as a percentage of all workers in each industry. For example, the sector with the largest number of women working in it is human health and social work, with 2,626 thousand women making up 77.8 per cent of this sector's total workforce. The sector containing the smallest percentage of women is construction where the 322 thousand women make up 12.6 per cent of the workforce.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor]. In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.4.2
The representation of women in 10 SET and 14 non-SET industries, 2008

Figure 5.4.2 shows that the industries employing the most women are human health and social work, wholesale and retail (non-SET)[1], education and administration and support services; all of which are non-SET industries. The first SET sector to appear in a ranking of sectors based on the numbers of female workers is manufacturing.

Figure 5.4.2 shows clearly that women are under-represented across all SET industries, and that there is considerable variation in the level of participation by women in the SET sectors. The 'gendering' (i.e. where the participation of one gender is predominant) is particularly extreme (below 20 per cent) in the construction industry, wholesale retail and transport (SET) and storage (SET) industries. The highest proportion of women in SET industries is in professional science and technology industries (34.5 per cent).

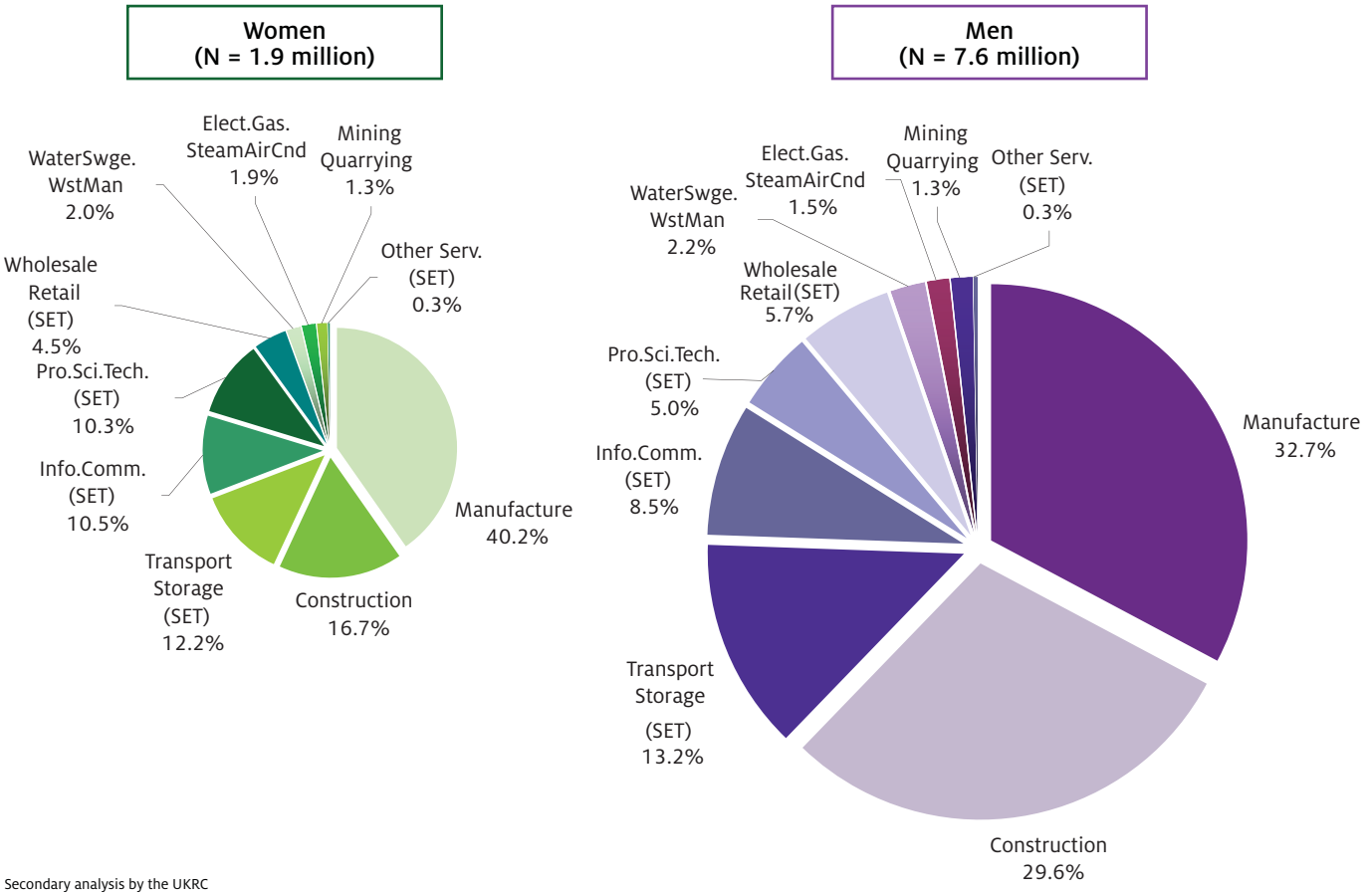
This chart shows very clearly the fact that the UK labour market is very gendered. It is not 'segregated' (in that any industry is composed of any one gender), as women comprise at least 12.6 per cent of the workforce of traditionally male industries, and men comprise at least 22.0 per cent of traditionally female industries. However, non-SET industries are more likely to have workforces which are close to being gender-balanced, while SET industries remain very male dominated. Among non-SET sectors only in the agriculture, forestry and fishing sector and the transport and storage (non-SET) sector the proportions of women in the workforce are below 40 per cent.

[1] Some industry groups such as wholesale and retail appear as SET and non-SET – this is because these industries have SET and non-SET components. To get around it, the ones in SET have SET added to their title, for example wholesale and retail (SET) (or wholesale and retail non-SET).

5.4.3 The distribution of men and women in SET and non-SET industries

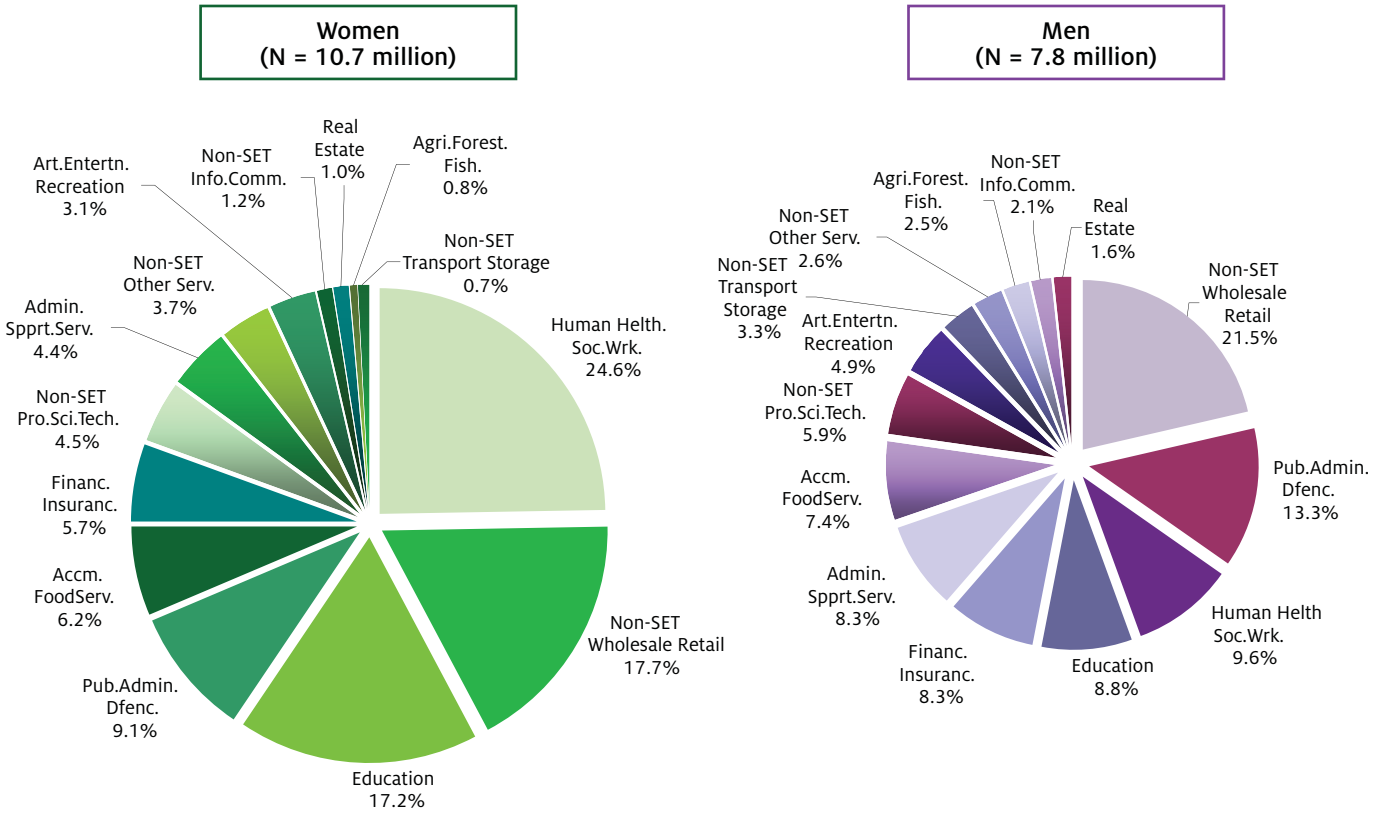
Figure 5.4.3
The distribution of women and men across SET industries, 2008

While in sub-section 5.4.2 we compared the representation of women and men in a range of industries, this sub-section examines the distributions of women and men separately across SET industries (Figure 5.4.3) and non-SET industries (Figure 5.4.4).



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor]. In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.4.3 shows that in 2008, the majority of women working in SET industries were in manufacturing (40.2 per cent), reinforcing the fact that manufacturing is still an important source of employment for women (and for men) in the UK. Other SET industries attracting more than 10 per cent of women working in SET industries were construction, transportation and storage, information and communication, and professional, scientific and technical activities. Apart from the lower popularity of manufacturing (32.7 per cent) and the higher popularity of construction (29.6 per cent) for men, the other industries showed a similar pattern of workforce distribution for both genders.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor]. In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

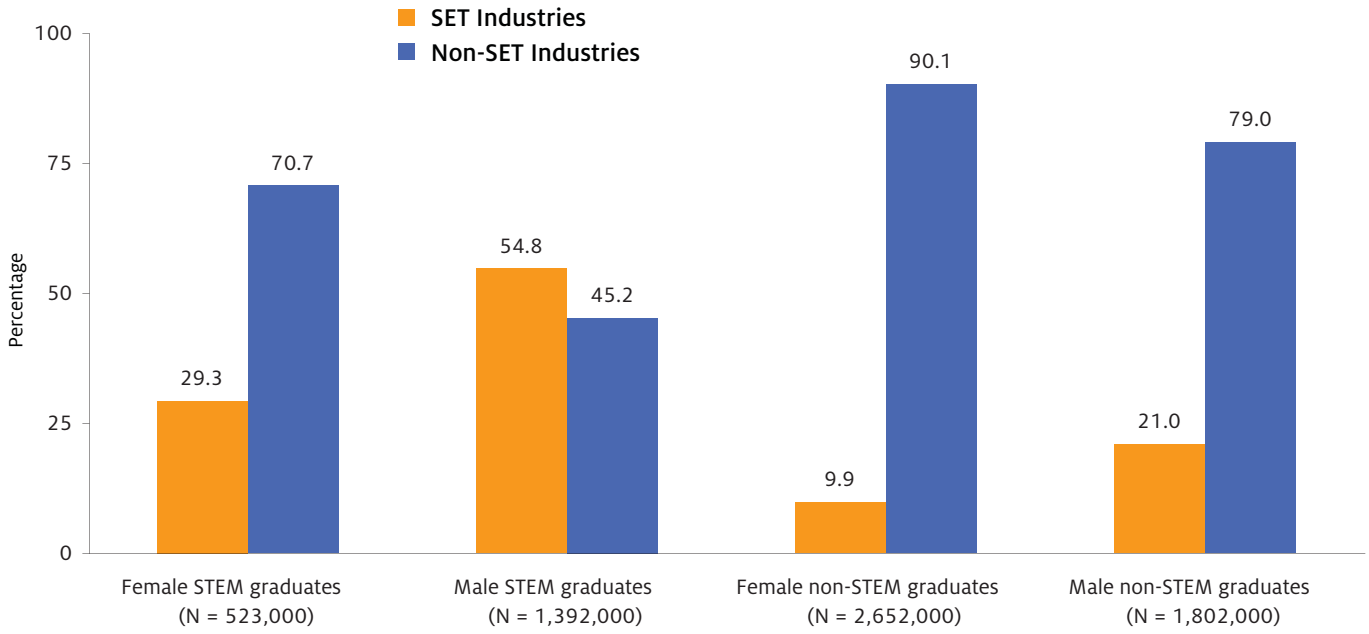
Figure 5.4.4
The distribution of women and men across non-SET industries, 2008

Figure 5.4.4 shows that there are very different patterns of female and male participation in non-SET sectors of industry. Human health, social work and education are significantly more popular industries for women to work in than for men. Wholesale and retail are popular sectors for both men and women. However, these sectors are even more popular among men than they are among women. The pattern of participation for men shows a flatter, more equal distribution across the non-SET sectors than it does for women.

5.4.4 STEM qualified women and men across a range of SET and non-SET industries

Section 3.3 presented data on the first employment destinations of STEM graduates. Male STEM graduates were twice as likely to enter SET occupations as female STEM graduates, and it is therefore likely that this will be reflected in the lower participation of female STEM graduates than male STEM graduates in the workforce of SET industries.

Figure 5.4.5 shows how many women and men with STEM qualifications (degree or equivalent qualification in STEM subjects) were working in SET and non-SET industries in 2008, compared to non-STEM graduates.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

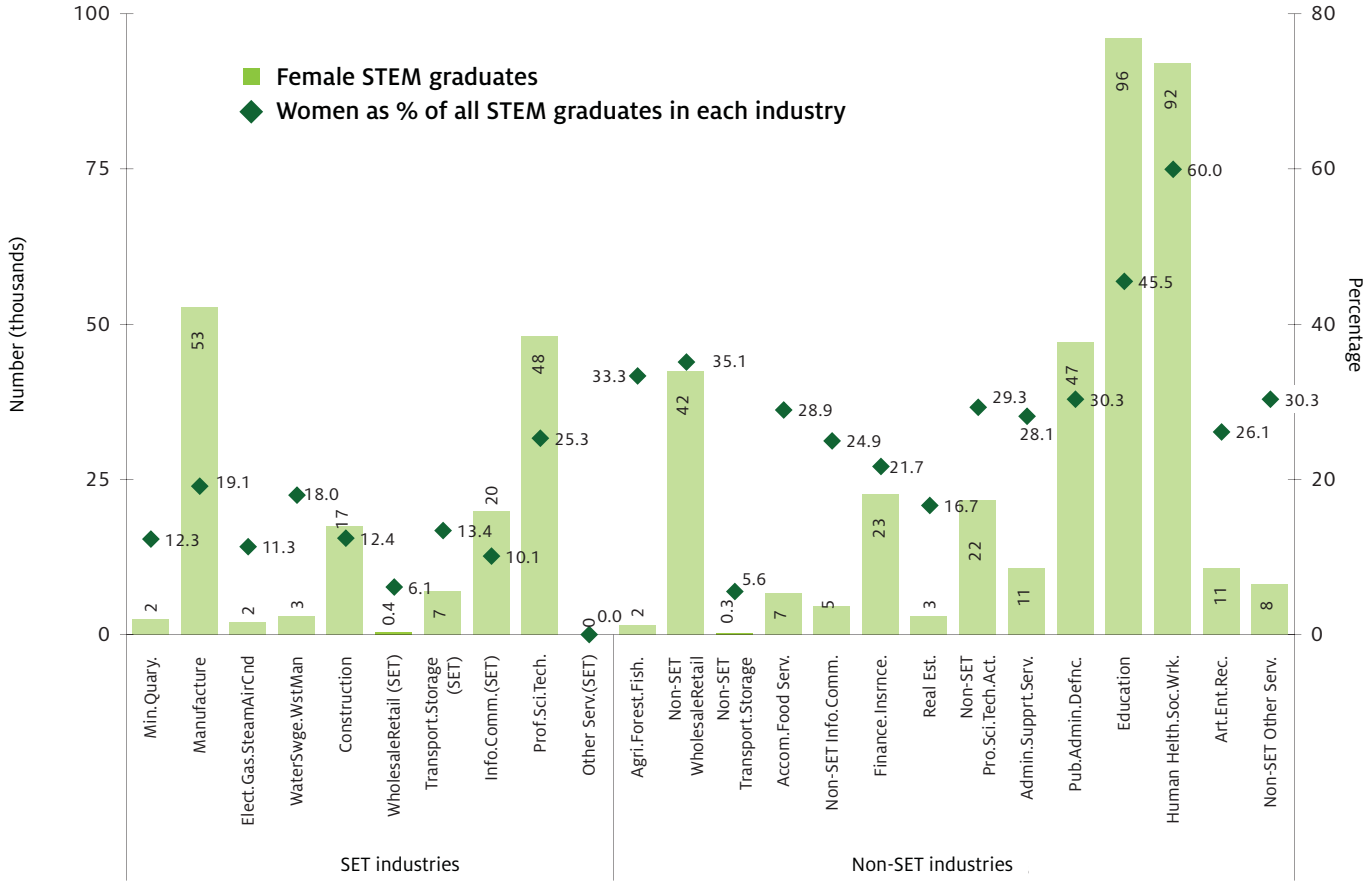
Figure 5.4.5
STEM and non-STEM qualified by industry and gender in the UK, 2008

It is clear that female STEM graduates are much less likely than their male counterparts to work in SET industries. In 2008, only 29.3 per cent of women with STEM degrees were employed in SET industries compared with 54.8 per cent of men with STEM degrees. Among people with other non-SET degrees men are more likely than women to work in SET industries; 21.0 per cent of men compared with 9.9 per cent of women. This shows that the SET sector is a significant employer of non-STEM male graduates, as well as of STEM graduates.

Next we move to a more detailed picture of the types of industries that female STEM graduates are employed in.

The picture in Figure 5.4.6 is a familiar one; it mirrors various charts that have been presented earlier. Women represent one quarter of STEM graduates working in professional science and technology industries, 19.1 per cent in manufacturing, 18.0 per cent in water and sewage treatment, 13.4 per cent in transport and storage, and 12.4 per cent in construction.

The right hand set of columns shows the preference by female STEM graduates for employment in what we categorise as the non-SET industry sectors. The large numbers of female STEM graduates in human health and social work and education could be predicted from earlier charts. However the large number and proportion of STEM graduate women in wholesale and retail (35.1 per cent), in finance and insurance (21.7 per cent) and in public administration (30.3 per cent) is worthy of note.



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency. Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor].
In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.4.6
The representation of female STEM graduates in 10 SET and 14 non-SET UK industries, 2008 [1]

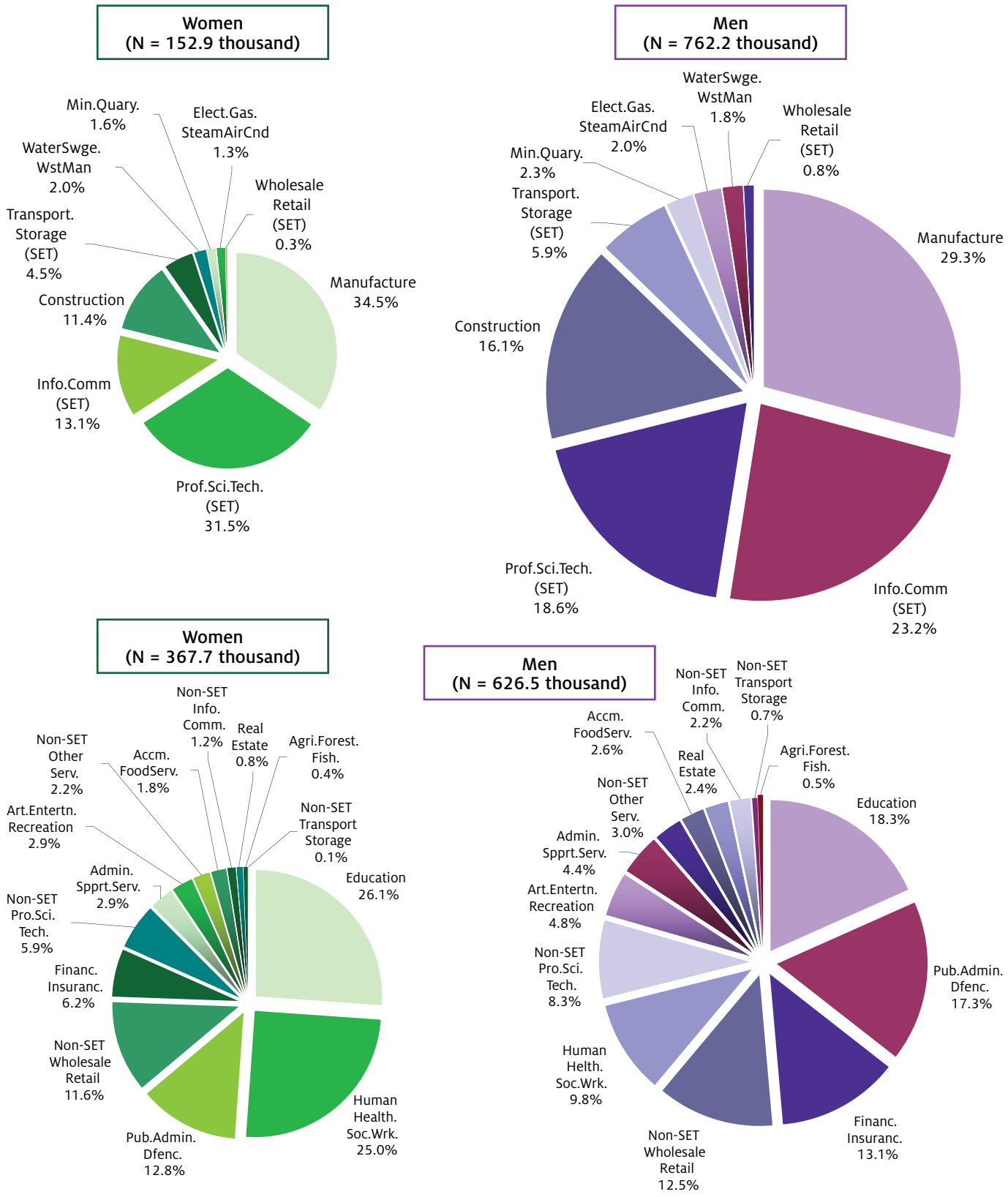
5.4.5 The distribution of STEM qualified women and men in SET and non-SET industries

While in the previous section we compared STEM qualified women and men in their preferences for employment across a range of SET industries, this section looks separately at the distribution of STEM qualified women and men across SET industries, to find out which industries are most and least popular within each gender.

[1] Please note: all numbers below 6,000 are below ONS reliability thresholds.

Figure 5.4.7 (top)
The distribution of STEM qualified women and men across **UK SET industries**, 2008

Figure 5.4.8 (bottom)
The distribution of STEM qualified women and men across **non-SET UK industries**, 2008



Secondary analysis by the UKRC
Data source:
Office for National Statistics. Social and Vital Statistics Division and Northern Ireland Statistics and Research Agency.
Central Survey Unit, Labour Force Survey January - December 2008 Colchester, Essex: UK Data Archive [distributor]. In this analysis, women aged 16 to 59 and men aged 16 to 64 were included.

Figure 5.4.7 shows the clustering of female STEM graduates into very few SET sector industries. In 2008, 66.0 per cent of all female STEM graduates working in SET industries were clustered in manufacturing and professional science and technology industries. A further 24.5 per cent were in construction and information and communication industries, leaving less than 10.0 per cent to be distributed across the other six SET industries. For men this clustering was less extreme. Four industries most popular among women also employed the majority of male STEM graduates who were working in SET, but in no case did they employ more than 30.0 per cent of the whole group.

Figure 5.4.8 does the same for the set of fourteen non-SET industries discussed above. In this case there are no surprises and the chart is simply another way of showing the patterns we have already identified when discussing Figure 5.4.6.

Overall this section has illustrated the fact that large numbers of STEM graduates male and female do not work in SET sector industries. The percentage is even greater for STEM graduate women. This combined with the analysis of the first destination of graduates in section 3.3 suggests that many STEM graduates never embark on a career in a SET occupation or work in a SET sector, and once established in a career in a non-SET sector they are unlikely to return to a SET sector of industry.

5.5 SET occupations – EU comparison

Key statistics on the EU comparisons in SET in 2008

- Based on Eurostat data, women in the UK make up 18.8 per cent of the SET workforce, slightly more than the EU average of 17.4 per cent.
- The UK ranks tenth among the EU-27 and fifth among the original EU-15 countries in terms of proportional representation of women in SET occupations.
- The proportion of women in SET occupations in the UK (based on Eurostat) increased by only 2.5 percentage points between 2003 and 2008, but this compares favourably to the EU-27 average increase of only 2.3 percentage points.
- Women remain under-represented in SET occupations across the EU: Luxemburg and Malta have the lowest proportion of women in SET (8.6 per cent) and Lithuania has the highest (28.2 per cent).
- Four countries showed no growth or a decline in numbers of women in SET (Netherlands, Latvia, Bulgaria and Cyprus).

This section provides some basic data on the participation of women in SET occupations in the European Union (EU) to enable a comparison to be made between the UK and the other 26 EU countries (EU-27). The data for this section were obtained from Eurostat (the statistical office of the European Union) and are based on the European Labour Force Surveys run in each European country.

The data in this section should not be used to make comparisons with data in other sections of this Guide. The SET occupational coding system used by Eurostat is based on the International Standard Classification of Occupations, while the UK Labour Force Survey (LFS) data (used for other sections of this Guide) are based on the Standard Occupational Classification 2000 (SOC2000) (as described in section 5.1). Using the SOC2000 allows a much better defined classification of SET occupations. We use 4-digit level code, which enables a finer level of selecting SET occupations. The LFS data (Figure 5.1.3) show that women employed in SET and health professions and associate professions as well as in SET skilled trades comprise 12.3 per cent of the workforce in these occupations. As a number of EU countries only use 3-digit level codes, it is not possible to select SET occupations in such detail, resulting in exclusion of some SET occupations and inclusion of some non-SET occupations. Consequently Eurostat data should only be used to make the European comparisons presented in this section (see section 5.6 for a full list of SET occupations extracted from the International Standard Classification of Occupations and more information on the data sources).

Eurostat data show that Germany, the UK, France and Italy are the biggest employers of both men and women in SET occupations. Consequently they employ the greatest numbers of women in the EU in these occupations. As the size of the SET workforce in any country is mainly a product of the size of the population and the industrial structure of that country rather than being directly attributable to gender discrimination we have not presented those data. Instead we have focused on the proportional representation of women in each country, since this is the most important indicator of gender inequality in SET. Table 5.5.1 shows the percentage of all employees in SET who are women for each of the EU-27 countries, in both 2003 and 2008.

It is clear that women are under-represented in SET occupations in all 27 countries. Based on the Eurostat data, women made up 18.8 per cent of the UK SET workforce in 2008, slightly more than the EU-27 average of 17.4 per cent. There are wide national differences in the representation of women in SET across the EU; from 8.6 per cent in Luxemburg and Malta to 28.2 per cent in Lithuania. Table 5.5.1 shows that the UK ranks tenth out of 27 EU countries in terms of the representation of women. Among the nine countries with a higher proportion of women in SET than the UK, five are Eastern European (Lithuania, Latvia, Romania, Hungary and Estonia) and four are members of the original EU-15 (Denmark, Sweden, Netherlands and Italy). Of the four EU countries with a very large SET workforce, only Italy has a better representation of women in SET than the UK. The other two countries, France and Germany, have lower proportions.

The overall proportion of women in SET occupations in the EU increased in the five years between 2003 and 2008 by 2.3 percentage points. Four countries showed no growth, or a decline, in numbers of women in SET (Netherlands, Latvia, Bulgaria and Cyprus). The proportion of women in SET occupations in the UK increased by 2.5 percentage points between 2003 and 2008, which compares favourably to the EU-27 average increase of 2.3 percentage points. Only five countries showed an increase in the proportion of women in SET occupations greater than the UK (Italy, Lithuania, Greece, Spain and Malta). Of these, the latter three countries have a smaller proportion of women in SET in 2008 compared to the UK.

Overall the data show that the UK compares well with southern European countries and its main industrial rivals – France and Germany - but has not caught up with the Scandinavian countries or the Netherlands. It has been leapfrogged by Italy which made a remarkable improvement of 6.6 percentage points in the participation of women in SET occupations between 2003 - 2008: this was the largest increase of all EU 27 countries, and is a change that is worth further research.

Table 5.5.1
Proportional participation of women in SET occupations in the EU-27, 2003 and 2008

	Women as % of all employees in SET occupations in each country		Percentage point difference (08 - 03)
The 27 EU countries	Women - 08	Women - 03	
Lithuania	28.2	24.6	3.6
Latvia	23.9	24.7	-0.8
Romania	22.0	n/a	n/a
Denmark	21.2	19.1	2.1
Sweden	21.0	19.1	1.9
Hungary	19.9	19.4	0.5
Estonia	19.4	18.3	1.1
Netherlands	19.1	19.1	0.0
Italy	19.0	12.4	6.6
UK	18.8	16.3	2.5
Slovenia	18.7	16.5	2.2
France	17.7	16.0	1.7
Bulgaria	17.7	23.3	-5.6
Belgium	17.5	15.8	1.7
Finland	17.3	16.6	0.7
Germany	17.3	16.1	1.2
Ireland	16.0	15.4	0.6
Poland	15.8	14.6	1.2
Slovak Republic	14.6	14.2	0.4
Czech Republic	14.5	13.6	0.9
Austria	13.7	12.4	1.3
Greece	13.2	10.0	3.2
Spain	12.9	9.8	3.1
Portugal	11.4	9.9	1.5
Cyprus	10.3	12.1	-1.8
Luxemburg	8.6	6.9	1.7
Malta	8.6	3.4	5.2
All 27 countries above*	**17.4**	**15.1**	**2.3**

Secondary analysis by the UKRC
Data source:
European Communities; European Labour Force Survey, 2003 and 2008

*The 2003 data for Romania are not available.

5.6 Terminology and data sources

Terminology and data sources for sections 5.1 to 5.3

List of SET occupational groups: Occupational data in this publication are based on the Standard Occupational Classification (SOC) 2000. SOC2000 provides a systematic classification of occupations into nine major groups, each of which has further divisions of occupations and can be found at (http://www.ons.gov.uk/about-statistics/classifications/current/SOC2000/index.html). From the SOC2000 list the following categories were classified as belonging to SET:

SET Managers

1121 Production, works and maintenance managers
1122 Managers in construction
1123 Managers in mining and energy
1136 Information and communication technology managers
1137 Research and development managers

Science Professionals

2111 Chemists
2112 Biological scientists and biochemists
2113 Physicists, geologists and meteorologists

Engineering Professionals

2121 Civil engineers
2122 Mechanical engineers
2123 Electrical engineers
2124 Electronics engineers
2125 Chemical engineers
2126 Design and development engineers
2127 Production and process engineers
2128 Planning and quality control engineers
2129 Engineering professionals n.e.c.

Information and Communication Technology Professionals

2131 IT strategy and planning professionals
2132 Software professionals

Scientific Researchers

2321 Scientific researchers

Building Professionals (or Architects, Town Planners, Surveyors)

2431 Architects
2432 Town planners
2433 Quantity surveyors
2434 Chartered surveyors (not quantity surveyors)

Science and Engineering Technicians

3111 Laboratory technicians
3112 Electrical/electronics technicians
3113 Engineering technicians
3114 Building and civil engineering technicians
3115 Quality assurance technicians
3119 Science and engineering technicians n.e.c.

Draughtspersons and Building Inspectors

- 3121 Architectural technologists and town planning technicians
- 3122 Draughtspersons
- 3123 Building inspectors

IT Service Delivery Occupations

- 3131 IT operations technicians
- 3132 IT user support technicians

Skilled Metal and Electrical Trades

521 Metal forming, welding and related trades

- 5211 Smiths and forge workers
- 5212 Moulders, core makers, die casters
- 5213 Sheet metal workers
- 5214 Metal plate workers, shipwrights, riveters
- 5215 Welding trades
- 5216 Pipe fitters

522 Metal Machining, Fitting and Instrument Making Trades

- 5221 Metal machining setters and setter-operators
- 5222 Tool makers, tool fitters and markers-out
- 5223 Metal working production and maintenance fitters
- 5224 Precision instrument makers and repairers

523 Vehicle Trades

- 5231 Motor mechanics, auto engineers
- 5232 Vehicle body builders and repairers
- 5233 Auto electricians
- 5234 Vehicle spray painters

524 Electrical Trades

- 5241 Electricians, electrical fitters
- 5242 Telecommunications engineers
- 5243 Lines repairers and cable jointers
- 5244 TV, video and audio engineers
- 5245 Computer engineers, installation and maintenance
- 5249 Electrical/electronics engineers n.e.c.

Skilled Construction and Building Trades

531 Construction Trades

- 5311 Steel erectors
- 5312 Bricklayers, masons
- 5313 Roofers, roof tilers and slaters
- 5314 Plumbers, heating and ventilating engineers
- 5315 Carpenters and joiners
- 5316 Glaziers, window fabricators and fitters
- 5319 Construction trades n.e.c.

532 Building trades

- 5321 Plasterers
- 5322 Floorers and wall tilers
- 5323 Painters and decorators

Health Professionals

2211 Medical practitioners
2213 Pharmacists/pharmacologists
2214 Ophthalmic opticians
2215 Dental practitioners
2216 Veterinarians

Health Associate Professionals

3214 Medical radiographers
3216 Dispensing opticians
3217 Pharmaceutical dispensers
3218 Medical and dental technicians

Unskilled SET trades (examined separately in sections 5.1.5 and 5.2.5): process plant and machinery operators, and elementary trades and plant related occupations. For a detailed list of unskilled SET trades please contact the UKRC.

Data source: Occupational data in this publication are from the Labour Force Survey run by the Office for National Statistics (ONS). We used 'annualised' data (i.e. from 4 quarters). Additional information about Labour Force Survey:

- UK Labour Force Survey: a quarterly sample survey of households living at private addresses in Great Britain.
- Systematic random sample design. Each quarter's sample contains 60,000 private households made up of 5 'waves', each of approximately 12,000 households. Each wave is interviewed in 5 successive quarters, so that one wave will be receiving their first interview, one wave their second etc. There is an 80 per cent overlap in the samples for successive quarters. Therefore high reliability of each sample.
- Method: face-to-face interviews for the first interviews and by telephone thereafter.
- Internationally agreed concepts and definitions for data are used.
- Note that for occupational data male and female populations are defined differently according to age: women of working age are defined as being between 16-59 years of age and men between 16-64.
- Note that those respondents who did not report their occupations were not included in original ONS analysis.

Reliability of data on Ethnicity and Disability: The Quarterly Labour Force Survey (QLFS) provides variables which classify the population by ethnicity and disability. The ONS suggests that any figures under the ONS publication thresholds (in the case of this report, 6,000) should not be published. The ONS further recommends that a factor of 2.5 be applied to the general thresholds for ethnic and disability estimates. For this reason, although it is possible to classify these categories into more detailed groups, we have classified the population in the section on ethnicity into two ethnic groups (white and BME) and in the section on disability into people with disabilities and without disabilities.

Terminology and data sources for section 5.4

A Standard Industrial Classification (SIC) classifies business establishments and other units by the type of economic activity in which they are engaged. UK SIC 2007 is divided into 21 sections, and the sections are broken down into divisions, and then into groups (three digits), into classes (four digits) and, in several cases, again into subclasses (five digits). The full structure of UK SIC 2007 is available from: http://www.statistics.gov.uk/methods_quality/sic/downloads/SIC2007explanatorynotes.pdf.

The latest version of SIC (2007) is not fully applied in the Quarterly Labour Force Survey datasets for 2008, on which our analysis is based. Because of this, some SET industries were excluded and some non-SET industries were included in the analysis. For more information, please contact the Research, Data and Policy Team at the UKRC.

List of SET industries used in section 5.4:

Section B Mining and Quarrying

05 Mining of coal and lignite
06 Extraction of crude petroleum and natural gas
07 Mining of metal ores
08 Other mining and quarrying
09 Mining support service activities

Section C Manufacturing

10 Manufacture of food products
11 Manufacture of beverages
12 Manufacture of tobacco products
13 Manufacture of textiles
14 Manufacture of wearing apparel
15 Manufacture of leather and related products
16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17 Manufacture of paper and paper products
18 Printing and reproduction of recorded media
19 Manufacture of coke and refined petroleum products
20 Manufacture of chemicals and chemical products
21 Manufacture of basic pharmaceutical products and pharmaceutical preparations
22 Manufacture of rubber and plastic products
23 Manufacture of other non-metallic mineral products
24 Manufacture of basic metals
25 Manufacture of fabricated metal products, except machinery and equipment
26 Manufacture of computer, electronic and optical products
27 Manufacture of electrical equipment
28 Manufacture of machinery and equipment n.e.c.
29 Manufacture of motor vehicles, trailers and semi-trailers
30 Manufacture of other transport equipment
31 Manufacture of furniture
32 Other manufacturing
33 Repair and installation of machinery and equipment

Section D Electricity, Gas, Steam and Air Conditioning Supply

35 Electricity, gas, steam and air conditioning supply

Section E Water Supply; Sewerage, Waste Management and Remediation Activities

36 Water collection, treatment and supply
37 Sewerage
38 Waste collection, treatment and disposal activities; materials recovery
39 Remediation activities and other waste management services.

Section F Construction

41 Construction of buildings
42 Civil engineering
43 Specialised construction activities

Section G Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles

45 Wholesale and retail trade and repair of motor vehicles and motorcycles

Section H Transportation and Storage

49 Land transport and transport via pipelines
50 Water transport
51 Air transport
52 Warehousing and support activities for transportation

Section J Information and Communication

61 Telecommunications
62 Computer programming, consultancy and related activities
63 Information service activities

Section M Professional, Scientific and Technical Activities

71 Architectural and engineering activities; technical testing and analysis
72 Scientific research and development
74 Other professional, scientific and technical activities
75 Veterinary activities

Section S Other Service Activities

95 Repair of computers and personal and household goods

Data source: ONS (2010) UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007): Structure and explanatory notes. Available from:
http://www.statistics.gov.uk/methods_quality/sic/downloads/SIC2007explanatorynotes.pdf.

Terminology and data sources for section 5.5

Eurostat (the statistical office of the European Union) is the only provider of statistics at European level. Eurostat does not collect data. This is done in Member States by their statistical authorities. They verify and analyse national data and send them to Eurostat. Eurostat's role is to consolidate the data and ensure they are comparable, using harmonised methodology.

The data are based on the **European Labour Force Survey.** Each European Union Labour Force Survey is a quarterly large sample survey covering the population in private households in the EU, EFTA (except Lichtenstein) and Candidate Countries. It provides quarterly results on labour participation of people aged 15 and over as well as persons outside the labour force. Conscripts in military or community service are not included. The national statistical institutes are responsible for selecting the samples, preparing the questionnaires, conducting the direct interviews among households, and forwarding the results to Eurostat in accordance with the common coding scheme. The sampling rates vary between 0.2% and 3.3% across the countries. The data are obtained by interviewing the sampled individuals directly and in most countries at least the first wave interview is conducted in person, while subsequent follow-up interviews can be conducted via telephone.

Participation in the survey is compulsory in Belgium, Germany, Greece, Spain, France, Italy, Cyprus, Malta, Austria, Portugal and Norway. Part of the data can be supplied by equivalent information from alternative sources, including administrative registers, provided the data obtained are of equivalent quality. Typically, the Nordic countries supply the demographic information directly from the population registers. The sample design and rotation patterns are not fully harmonised. Different schemes are used to sample the units from the simple random sampling method to complex stratified multi-stage sampling methods of clusters.

Data source: Eurostat (2007) Developments and organisation of the EU labour force survey. Available from: http://circa.europa.eu/irc/dsis/employment/info/data/eu_lfs/LFS_MAIN/LFS/LFS_DEVELOPMENT.htm accessed on 8 December 2009.

List of SET occupational groups

based on the International Standard Classification of Occupations [ISCO-88]:

122 Production and operations managers
211 Physicists, chemists and related professionals
212 Mathematicians, statisticians and related professionals
213 Computing professionals
214 Architects, engineers and related professionals
221 Life science professionals
222 Health professionals (except nursing)
311 Physical and engineering science technicians
312 Computer associate professionals
313 Optical and electronic equipment operators
314 Ship and aircraft controllers and technicians
315 Safety and quality inspectors
321 Life science technicians and related associate professionals
322 Health associate professionals (except nursing)
711 Miners, shotfirers, stone cutters and carvers
712 Building frame and related trades workers
713 Building finishers and related trades workers
714 Painters, building structure cleaners and related trades workers
721 Metal moulders, welders, sheet-metal workers, structural-metal preparers, and related trades workers
722 Blacksmiths, tool-makers and related trades workers
723 Machinery mechanics and fitters
724 Electrical and electronic equipment mechanics and fitters
742 Wood treaters, cabinet-makers and related trades workers

References

Gregg, P., and Wadsworth, J. (1998). **Unemployment and non-employment: Unpacking economic inactivity**. Report published by the Employment Policy Institute (ISSN 1351-2145).

ONS (2009) Economic & Labour Market Review Vol. 3 No. 4 April 2009 edition. Available from: http://www.statistics.gov.uk/elmr/04_09/downloads/ELMR_Apr09.pdf. Accessed 26 November 2009.

6. The Gender Pay Gap in Science, Engineering and Technology (SET)

Key statistics on the 2008 gender pay gap in SET

- The pay gap between the median hourly earnings of women and men working full-time (excluding overtime) in SET was generally less than the median national pay gap of 12.6 per cent and in some cases significantly smaller than the gender pay gap in some more feminised occupations.
- The gender pay gap for SET professionals was 11.0 per cent.
- The gender pay gap for SET associate professionals was 12.6 per cent.
- The gender pay gap for metal and electrical skilled workers was 4.2 per cent.
- The gender pay gap for SET professions failed to improve between 2003 and 2008.
- The gender pay gap narrowed in SET associate professions by 8.7 per cent between 2003 and 2008.
- In the skilled metal and electrical trades the gender pay gap narrowed by 69.6 per cent between 2003 and 2008 although the small numbers of women in these occupations means that the data need to be treated with caution.
- Surprisingly the data for 2008 show that women SET professionals working part-time earn slightly more per hour (1.1 per cent), than their female colleagues working full-time. Part-time female health professionals also earn more than their full-time female colleagues.
- However women part-time SET associate professionals earned 21.8 per cent an hour less than their female counterparts working full-time.
- Also within the skilled metal and electrical trades part-time women earned 26.1 per cent an hour less than their full-time female colleagues.
- The pay gap between different occupations of similar professional standing, for example between women health professionals and women SET professionals, is wider than the pay gap between men and women in the same profession.
- The pay gap between the highest and the lowest status occupations in SET is greater than the gender pay gap within any occupation.

The national gender pay gap for full-time employees (as measured by the median hourly pay excluding overtime), was 12.6 per cent in 2008 (ONS, 2009). This section examines the gender pay gaps in various groups of SET occupations and compares these with the national gender pay gap.

The pay gap is normally measured as either mean or median. The pay gap in this section is based on median earnings per hour, excluding overtime. The advantage of using median as a measure of average earnings is that the results are not distorted by a few extreme values such as a relatively small number of very high earners.

Section 6.4 explains how the median is calculated. This section also contains a list of the SET occupational groups discussed here and explains more about the data source.

The data for this section of the Guide come from the 2008 UK Annual Survey of Hours and Earnings (ASHE). We used three main SET occupational categories from the Standard Occupational Classification (SOC2000):

1. SET professionals [1] (excluding health, medicine and teaching),
2. SET associate professionals/technicians,
3. SET skilled trades (for this we used the large category of metal and electrical trades which employ the majority of women who work in skilled SET trades).

These three occupational categories indicate to some extent the skill level (and status) of each group. Because women and men are differently distributed across these three groups we did not think that it would be useful to produce a gender pay gap figure for the combined SET workforce. Such a figure would be more a product of the different distribution of men and women across the different levels, than any indication of whether there was a gender pay gap between men and women at the same occupational levels.

This section first presents data on the gender pay gap in professions, associate professions and skilled trades in SET, followed by a discussion of changes in these gender pay gaps over time. It also examines the pay gap between SET women working part-time and full-time. Data for health/caring occupations, where women make up about 50 per cent of workers, are provided as a comparison with more 'feminised' occupations and to raise the question of whether the size of the gender pay gap in any occupation is related to the proportion of women in that occupation.

[1] ASHE occupational category is Science and Technology professionals, but as this group includes engineering professionals, we use the term SET professionals. We applied the same rule to associate professionals.

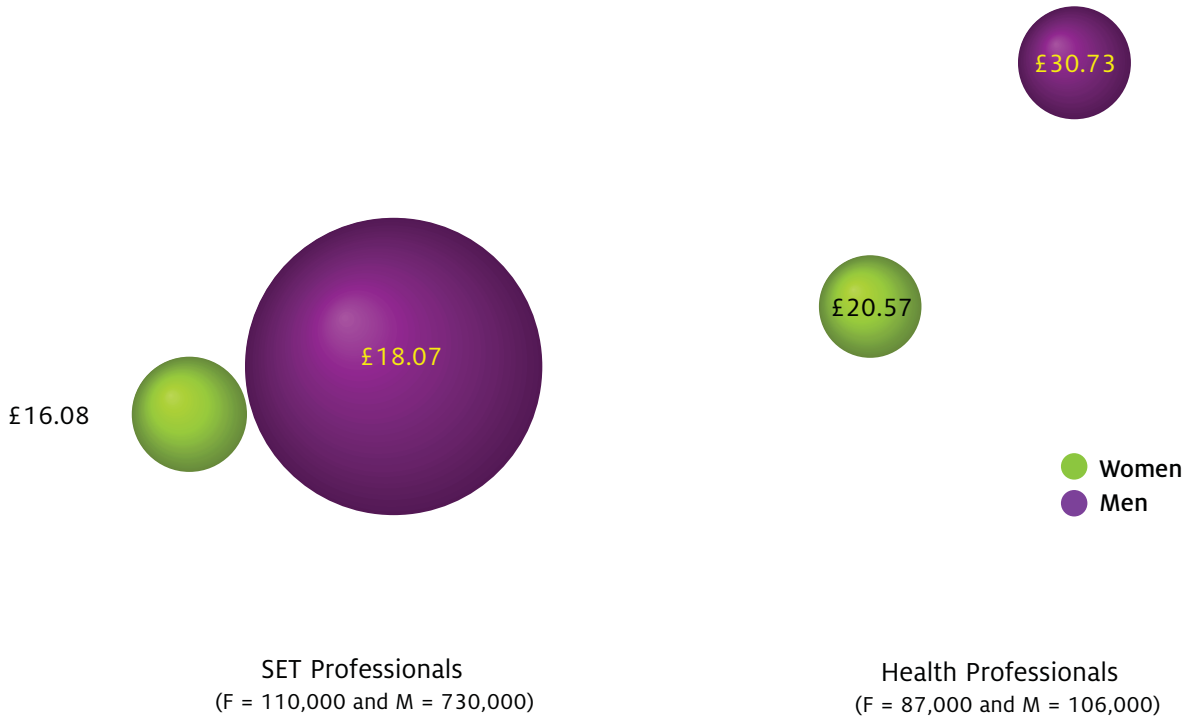
6.1 The gender pay gap in SET occupations

6.1.1 SET Professionals

Figure 6.1.1 is the first of a number of 'bubble' charts in this section. These charts show the median hourly pay (excluding overtime), of men and women. The charts also give an indication of the comparative sizes of each population group, by the size of each bubble and by the number in brackets.

Figure 6.1.1 shows the median hourly pay for female and male full-time SET professionals and health professionals. Data on health professionals are given to enable a comparison with a more gender balanced occupation. In all of these charts green colouring indicates a female group and purple colouring a male group. The size of the bubbles shows that men outnumber women roughly 6.5 to 1 as full-time SET professionals. Full-time health professionals on the other hand have a much better gender balance of 11 men to every 9 women.

Figure 6.1.1
Median hourly earnings excluding overtime of full-time SET professionals and health professionals by gender in the UK, 2008



Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results. Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.
The size of the workforce is only an estimate.

Figure 6.1.1 indicates that in 2008, female SET professionals working full-time were earning on average £1.99 (or 11.0 per cent) an hour less than their male colleagues. The gender pay gap for SET professionals was less than the national pay gap of 12.6 per cent. It also compares well with the much larger pay gap for the health professionals where men earned over £10.16 (32.9 per cent) an hour more than their female colleagues. This figure is also notable for showing the much lower average hourly earnings of SET professionals compared with health professionals – this gap was £12.66 per hour for men (a gap of 41.2 per cent) and £4.49 per hour for women (a gap of 21.8 per cent). This figure suggests – at least at the professional level – that traditionally masculine professions appear to have a smaller gender pay gap than professions with higher proportions of women.

As shown in Table 6.1.1, when the SET data are disaggregated further into different SET professional groups the gender pay gap is different for different groups. For example, the gender pay gap was the highest (13.9 per cent) in ICT; which is also the highest paid profession in SET.

Table 6.1.1
Median hourly earnings (£) excluding overtime of full-time SET professionals by gender, 2008

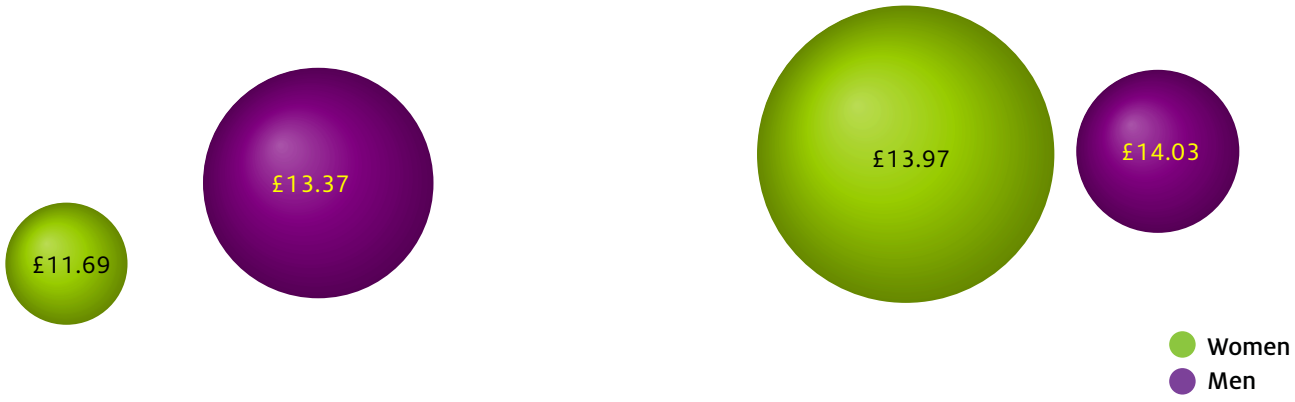
	Women	Men	**Difference (W-M)**	pay gap %
Science Professionals	£15.93	£18.01	**-£2.08**	11.5
Engineering Professionals	£15.53	£17.43	**-£1.90**	10.9
ICT Professionals	£16.46	£19.12	**-£2.66**	13.9

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.

6.1.2. SET associate professionals

Figure 6.1.2 presents earnings data for female and male full-time SET associate professionals compared with health and social welfare associate professionals. It was not possible to select associate health professionals for our comparison so we have used the next best grouping: health and social welfare. The gender balance of these groups is different from those in the previous sub-section. There are roughly the same numbers of female full-time SET associate professionals as professionals, but fewer male SET associate professionals. The ratio of men to women is roughly 3.5 to 1 for this group in SET. The ratio of men to women in health and social welfare at this level is the reverse of that in SET: 1 to 3.5.

Figure 6.1.2
Median hourly earnings excluding overtime of full-time SET associate professionals and health and social welfare associate professionals by gender in the UK, 2008



SET Associate Professionals
(F = 104,000 and M = 370,000)

Health and Social Welfare Associate Professionals
(F = 616,000 and M = 185,000)

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.
The size of the workforce is only an estimate.

Figure 6.1.2 shows that in 2008, women in SET associate professions working full-time were earning £1.68 an hour (or 12.6 per cent) less than their male colleagues. This gender gap was the same as the national average for 2008, but larger than the gender pay gap in the more feminised health and social welfare associate professions where women earned only 6 pence per hour (or 0.4 per cent) less than their male colleagues. Figure 6.1.2 also shows that at the associate professional level, both male and female SET workers earn less than those of the same gender in the health and social welfare associate professions. At this level, as well as at professional level, SET workers are earning a lower hourly rate than workers in the traditionally female health and social welfare occupations.

When this SET occupational group is disaggregated, as shown in Table 6.1.2, the largest pay gap at 21.3 per cent was among engineering and science associate technicians; 1.7 times the median national pay gap in 2008.

Table 6.1.2

Median hourly earnings (£) excluding overtime of full-time SET associate professionals by gender, 2008

	Women	Men	**Difference (W-M)**	pay gap %
Science and Engineering Technicians	£10.16	£12.91	**-£2.75**	21.3
Draughtspersons and Building Inspectors	£12.84	£13.55	**-£0.71**	5.2
IT Service Delivery Occupations	£12.59	£14.12	**-£1.53**	10.8

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.

6.1.3. Metal and electrical skilled trades

Figure 6.1.3 shows median hourly pay for women and men in full-time skilled metal and electrical trades (one large group of skilled SET occupations), compared with caring and personal service occupations. At this level we now see the very strong gendering of each workforce. At 939 thousand men, this SET grouping is larger than either of the higher status SET groups discussed earlier, but the number of women is very small, giving a male to female ratio of 45 to 1. For a comparable skilled comparison we have chosen caring and personal services. This grouping contains roughly the same numbers of men and women as those working in health and social welfare associate professions giving a ratio of men to women of 1 to 5.

Figure 6.1.3
Median hourly earnings excluding overtime of full-time skilled metal and electrical trades and caring and personal service workers by gender in the UK, 2008

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.
The size of the workforce is only an estimate.

As shown in Figure 6.1.3 women in metal and electrical skilled trades working full-time were earning 48 pence (or 4.2 per cent) less than their male counterparts. This gap is much lower than national pay gap of 12.6 per cent and compares favourably with the pay gap within the caring and personal care occupations, which was 61 pence per hour (or 7.1 per cent) in favour of male workers. At this level SET workers are earning significantly more per hour than workers in the caring occupations. Skilled SET women are earning over one third more than female skilled care workers.

The single exception to the relatively small pay gap in SET skilled trades is in the skilled trade of metal machining, fitting and instrument making where the gender pay gap was very high at 22.8 per cent (as shown in Table 6.1.3). Table 6.1.3 also shows that the small number of women working in metal forming, welding and related trades are earning more (per hour) than their male colleagues. This was the only occurrence in full-time SET occupations of a pay gap in favour of women.

To summarise this section on the pay of those in full-time SET occupations:

- there is a gender pay gap for those working full-time in almost all SET occupations.
- the pay gap for full-time workers (excluding overtime) in SET is generally less than the median national pay gap at 12.6 per cent and is in some cases significantly smaller than the gender pay gap within more traditionally female health and caring occupations.
- the gender gap is different in different SET occupational groups.
- the smallest pay gap, both in terms of actual earnings and as a percentage of male salary, is for women working in skilled metal and electrical trades.

Table 6.1.3
Median hourly earnings (£) excluding overtime of full-time skilled metal and electrical trades by gender in the UK, 2008

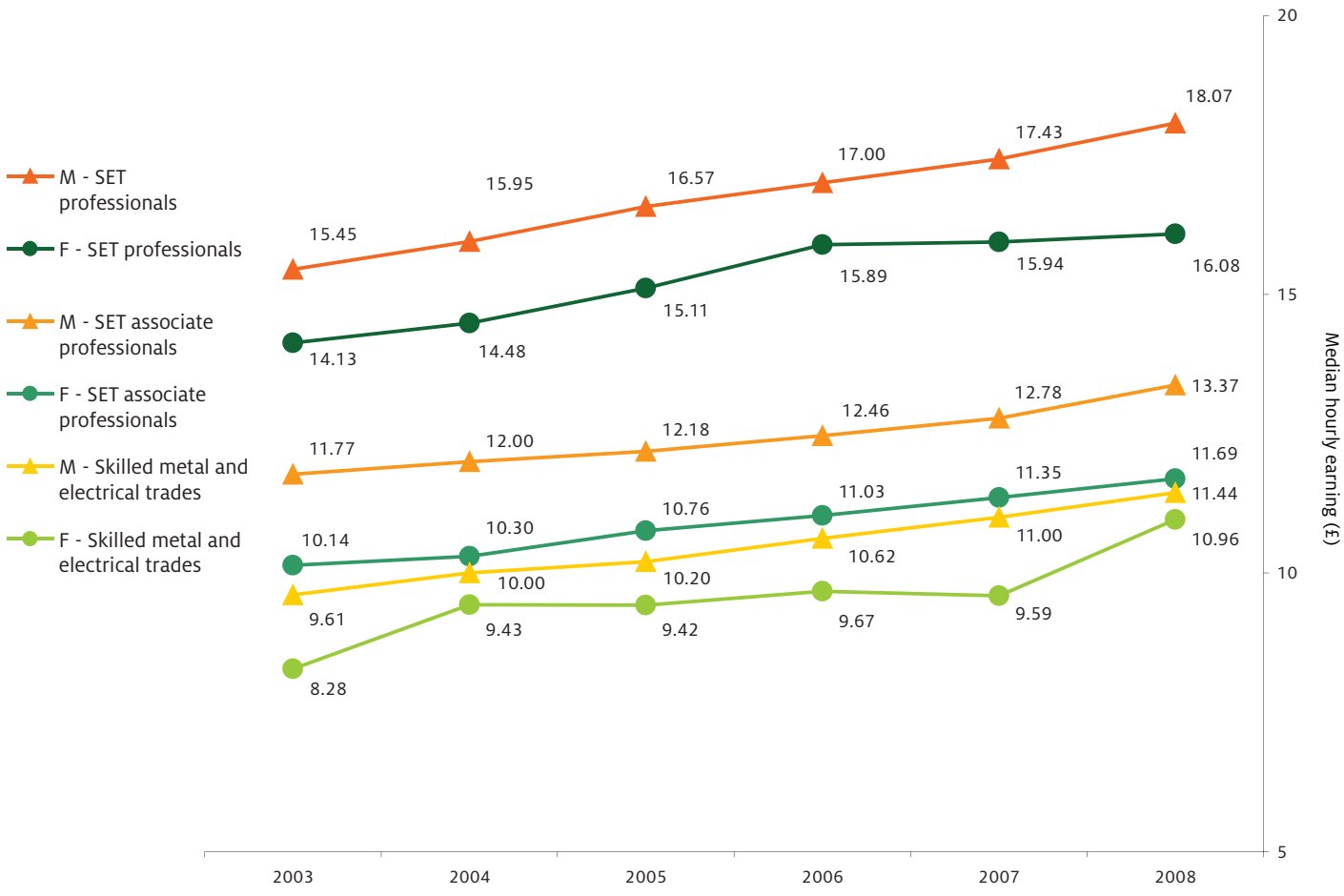
	Women	Men	**Difference (W-M)**	pay gap %
Metal Forming, Welding and Related Trades	£10.96	£10.40	**+£0.56**	5.4
Metal Machining, Fitting and Instrument Making Trades	£9.02	£11.68	**-£2.66**	22.8
Vehicle Trades	£8.96	£10.15	**-£1.19**	11.7
Electrical Trades	£11.72	£12.40	**-£0.68**	5.5

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.

6.2 The gender pay gap in SET occupations – changes over time

Figure 6.2.1 shows the trends in median hourly earnings excluding overtime from 2003 to 2008 across the three SET occupational groups discussed above: SET professionals, SET associate professionals and skilled metal and electrical trades, separately for both women and men. Each coloured line traces the hourly pay of one group and demonstrates both the wide gap in earnings between the better and worse paid groups, as well as the fact that there has been little change in the pay gaps between most groups over time.

Figure 6.2.1
Median hourly earnings excluding overtime of full-time SET occupations by gender in the UK, 2003 to 2008



Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) 2003 -2008 Results. Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.

Figure 6.2.1 also shows that the pay gap for SET professions failed to improve in the five years up to 2008. The gender pay gap narrowed for SET associate professions from 13.8 to 12.6 per cent and in the skilled metal and electrical trades it also decreased from 13.8 to 4.2 per cent. However the latter data should be used with caution, as the time series representing women working in skilled metal and electrical trades shows large fluctuations which could be a statistical sampling effect caused by the small numbers of women in these occupations.

SET occupations do not show extreme pay differentials between the highest and lowest paid occupations. SET full-time male professionals had the highest median hourly pay of all SET occupations at £18.07 per hour, and within the skilled trades women working part-time had the lowest at £8.10 per hour (this is shown in the next section on part-time work in Figure 6.3.3).

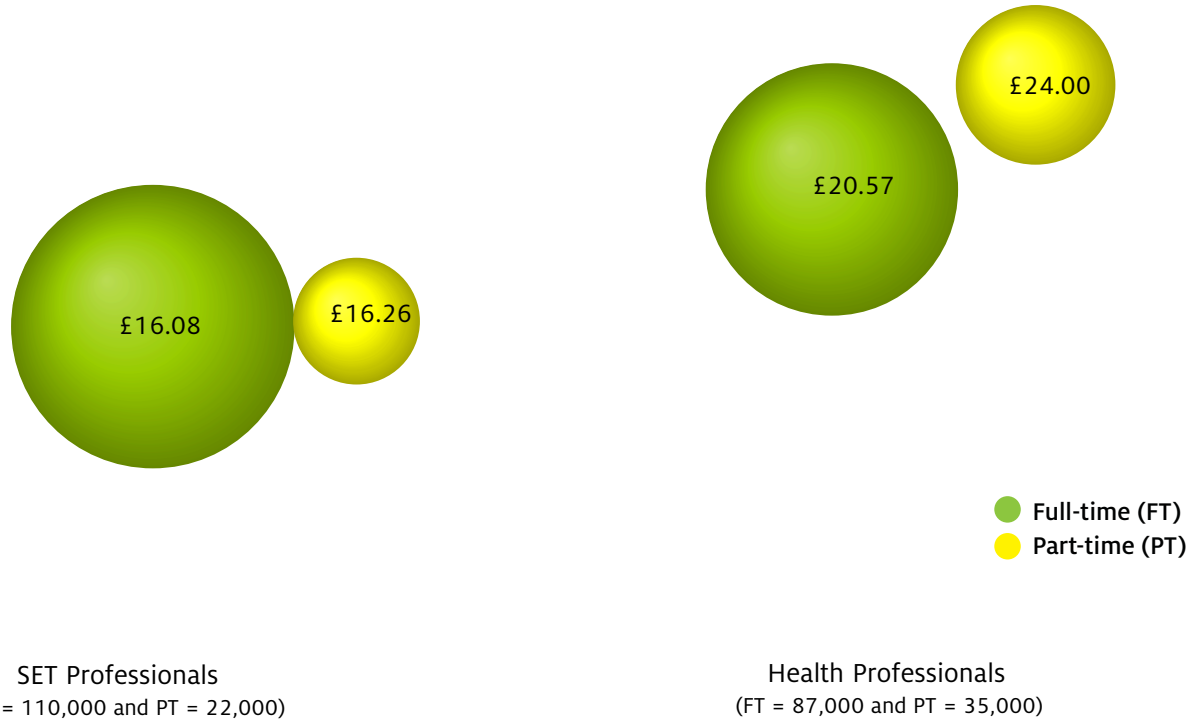
In SET occupations the hourly rate at the top is over double that at the bottom. Compare this with health occupations where the highest median hourly rate was £30.73 for full-time male professionals (see Figure 6.1.1) and the lowest was £7.63 for part-time women in skilled caring occupations (see Figure 6.3.3). Here the pay at the top is roughly four times the pay at the bottom.

Very recent ASHE data show that the national gender pay gap actually narrowed from 12.6 per cent to 12.2 per cent between 2008 and 2009 (ONS, 2009). We hope to see similar trends in SET but the disaggregated data were not available at the time of writing.

6.3 The gender pay gap between part-time and full-time women in SET

This section takes the three SET groups discussed in the earlier parts of section 6 and compares the earnings of full-time and part-time women.

A criticism of the average national pay gap data on gender, (22.6 per cent in 2008) based on median earnings, has been that it is skewed if the earnings of part-time and full-time workers are combined. This is because more women work part-time (41 per cent of women compared to just 11 per cent of men) and part-time work tends to be lower paid. So for this analysis of SET data we have separated full-time and part-time workers. Section 6.1 dealt only with full-time workers. This section compares the hourly earnings of part-time and full-time women workers to see what pay gap there is between comparable groups.



Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.
The size of the workforce is only an estimate.

Figure 6.3.1
Median hourly earnings excluding overtime of female full-time and part-time SET professionals and Health professionals in the UK, 2008

Figure 6.3.1 shows the median hourly earnings excluding overtime of female part-time and female full-time SET professionals and health professionals. It illustrates the surprising finding that part-time women SET professionals earned 18 pence (or 1.1 per cent) more an hour than women professionals working full-time. The higher earnings of part-time women are also in evidence among the comparative group of health professionals where women working part-time earned £3.43 (16.7 per cent) more an hour than women working full-time. This is a finding that is worthy of deeper research and is an indication of what is becoming known as 'quality' part-time work, something that is now emerging in professional groups.

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.
The size of the workforce is only an estimate.

Figure 6.3.2
Median hourly earnings excluding overtime of female full-time and part-time SET associate professionals and health and social welfare associate professionals in the UK, 2008

Figure 6.3.2 shows the median hourly earnings of female part-time and female full-time SET associate professionals compared with health and social welfare associate professionals. For this group of workers the pay gap is in the direction that we have learned to expect; women working part-time in SET associate professions earned £2.55 (or 21.8 per cent) an hour less than their full-time female colleagues. For health and social welfare associate professions hourly earnings appear to be almost identical.

Secondary analysis by the UKRC
Data source:
Annual Survey of Hours and Earnings (ASHE) - 2008 Results.
Available from: http://www.statistics.gov.uk/. Accessed 07 January 2009.
The size of the workforce is only an estimate.

Figure 6.3.3
Median hourly earnings excluding overtime of female full-time and part-time skilled metal and electrical trades and caring personal service occupations in the UK, 2008

Finally, Figure 6.3.3 shows the median hourly earnings excluding overtime of female part-time and full-time skilled metal and electrical trades (representing the largest group of skilled SET occupations), compared with caring and personal service occupations.

Figure 6.3.3 shows that in skilled SET trades the gap between full-time and part-time women's pay is wider than it is in the SET associate professional group; to the disadvantage of skilled part-time women. In skilled metal and electrical trades part-time women earned £2.86 (or 26.1 per cent) an hour less than their full-time female colleagues who (as shown in Figure 6.1.3), earn almost the same as their full-time male colleagues. The pay gap between female part-time and full-time workers in caring and personal service occupations was much smaller at 36 pence (4.5 per cent).

Data in this section suggest that gendered pay differentials for SET occupations do not appear to follow national trends. This merits further research.

6.4 Terminology and data sources

The data on pay gap come from the Annual Survey of Hours and Earnings (ASHE).

ASHE provides information about the levels, distribution and make-up of earnings and hours paid for employees within industries, occupations and regions.

- ASHE is based on a sample of employee jobs taken from HM Revenue and Customs records. A questionnaire is sent to employers of those people in the sample and employers supply the data.
- Earnings or 'pay' refers to gross pay (before tax) of employees on adult rates whose pay for the survey week was unaffected by absence.
- The self-employed are not included and special supplementary surveys are done to find out about those whose earnings fall below the PAYE threshold.
- Data are weighted to give a representative sample for occupations, sex, age, workplace region.
- Both hourly and weekly earnings data are collected. The last available at the time of writing was for 2008.
- Median figures are used as 'averages' because they are less affected by a small number of extreme values.

The median is the value below which 50 per cent of employees fall. The ONS (2009) notes that although median hourly pay provides a useful comparison between the earnings of men and women, it does not necessarily indicate differences in rates of pay for comparable jobs. Pay medians are affected by the different work patterns of men and women and their length of time in a job.

For this section we have selected the following groups from the Standard Occupational Classification (SOC2000). The SET groups were chosen to give the best estimates of SET occupations at each level and the health/care occupations were included to provide a comparison with a feminised area of work that also had occupations at each of the three skills/status levels.

Occupations analysed in this section:

SET professionals

- Science Professionals
- Engineering Professionals
- Information and Communication Technology Professionals

Health Professionals

- Health Professionals

SET associate professionals

- Science and Engineering Technicians
- Draughtspersons and Building Inspectors
- IT Service Delivery Occupations

Health and social welfare associate professionals

- Health Associate Professionals
- Therapists
- Social Welfare Associate Professionals

Skilled metal and electrical trades

- Metal Forming, Welding and Related Trades
- Metal Machining, Fitting and Instrument Making Trades
- Vehicle Trades
- Electrical Trades

Caring personal service occupations

- Healthcare and Related Personal Services
- Childcare and Related Personal Services
- Animal Care Services

References

Office for National Statistics (ONS). (2009). **Gender Pay Gap**. Available at http://www.statistics.gov.uk/cci/nugget.asp?id=167. Accessed in November 2009.

7. Public Engagement and Leadership

7.1 Directors of FTSE 100 companies in Science, Engineering and Technology (SET) sectors

Key statistics on female directors of SET FTSE 100 companies in 2009

- Only 10.8 per cent of Board directorships were held by women (61 women across 53 companies).
- Exclusively male Boards still existed in 28.3 per cent of companies.
- Only 30.2 per cent of companies had more than one female director on their Boards.
- Only four companies had a female Executive Director on their Boards.
- There were only three female Chairs of FTSE 100 companies and none of these were in the SET sectors.

In 2009, women made up 12.2 per cent of all directors of FTSE 100 companies (Sealy, Vinnicombe and Doldor, 2009). This section discusses female and male representation on the Boards of the Financial Times Stock Exchange (FTSE) 100 companies in SET sectors. We have categorised 53 FTSE 100 companies as belonging to the SET sectors in 2009. See section 7.4 for a list of SET FTSE 100 companies in 2009 (Table 7.4.1).

All data are extracted from 'The Female FTSE Board Report 2009' (Sealy, Vinnicombe and Doldor, 2009) and 'The Female FTSE Report 2004' (Cranfield Centre for Developing Women Business Leaders, 2004), published annually by the International Centre for Women Leaders at Cranfield University.

The data in Table 7.1.1 show female and male representation on FTSE 100 company Boards in 2009 in the SET sectors, as compared to the 2004 figures for SET sectors, and to the 2009 figures for non-SET sectors.

This table shows that in 2009, women made up only 10.8 per cent of directors in the SET FTSE 100 companies, an increase of 2.4 percentage points in the five years since 2004. There is a lower proportion of female held directorships in SET companies than on the Boards of non-SET FTSE 100 companies, which had 13.7 per cent female directorships in 2009. Moreover, there were still 28.3 per cent SET companies with no women on their Boards, compared to 19.1 per cent exclusively male Boards in non-SET companies. More positively, the proportion of SET companies without any women directors on Boards declined by 8.7 percentage points since 2004.

Women directors are rarely Chairs of Boards or Chief Executive Officers (CEOs). In 2009, there were only four female CEOs within FTSE 100 companies, and only one of these positions was held by a woman in the SET sectors. There were only three female Chairs of the FTSE 100 companies and none of these were in the SET sectors.

Female representation in FTSE 100 companies	**53 SET FTSE 100 companies 2009**	46 SET FTSE 100 companies 2004	47 non-SET FTSE 100 companies 2009
Female held directorships	**10.8% (61 women)**	8.4% (44 Women)	13.7% (70 women)
Female chairs	**0**	0	3
Female executive directorships	**4**	4	12
Female non executive directors	**57**	39	58
Companies with female executive directors	**7.5% (4)**	6.5% (3)	21.3% (10)
Companies with at least one female director	**71.7% (38)**	63.0% (29)	80.9% (38)
Companies with multiple female directors	**30.2% (16)**	21.7% (10)	44.7% (21)
Companies with no female directors	**28.3% (15)**	37.0% (17)	19.1% (9)

Source: Table 7.1.1 is a modified version of Table 1 presented in the Female FTSE Board Report 2009 (Sealy, et al., 2009), page 15.

Table 7.1.1
Female FTSE 100 2009 and 2004 Index for SET and Female FTSE 100 2009 Index for non-SET sectors

Few women are Executive Directors. There were only four female Executive Directorships in SET companies (no increase since 2004), compared to 12 in non-SET companies. Statistics presented in this section show that women remain severely under-represented on company Boards, the increase in representation of women on Boards is very slow, and women are less well represented as company directors in SET sector companies than in non-SET sector companies. The UK is far behind Norway where increased participation of women was brought about by 2006 legislation requiring at least 40 per cent women on Boards of all ASA (public) companies registered on the Oslo stock exchange. Although some companies have not reached the 40 per cent quota just yet, in 2009 30.5 per cent of directorships of top 100 ASA companies were held by women (data from Sealy, et al., 2009).

7.2 SET public bodies by gender

Key Statistics on SET public bodies in 2008

- Women were only 23.7 per cent of all members of SET public bodies in the UK (179 women); a decline of 2.0 percentage points (and a loss of 30 women) since 2006.
- Gender representation differs across SET public bodies. Only four public bodies had equal gender representation or more women members than men. Women were under-represented in the remaining 52 (92.9 per cent) public bodies. Three public bodies had no female members.

The total number of members of SET public bodies decreased in recent years from 814 in 2006 to 756 in 2008.

For this section 56 public bodies were classified as SET public bodies in 2007 and 2008, and 57 in 2006. Criteria for classifying an institution as a public body are explained in section 7.4. Information on female and male representation on SET public bodies was collated by Dr Pat Morton, Sheffield Hallam University (March 2008).

Figure 7.2.1 shows the gender composition of SET public bodies in the UK for a three year period (2006 to 2008).

The total membership of SET public bodies has declined in recent years, with the number of women falling at a faster rate than that of men. In 2008, women were only 23.7 per cent of all members of SET public bodies in the UK; a decline of 2.0 percentage points since 2006.

Gender representation among members differs across SET public bodies. Only two, the Human Genetics Commission, Department of Health (69.2 per cent women) and the Human Fertilisation and Embryology Authority, Department of Health (61.1 per cent women) had more female than male members. Two public bodies, the Pesticides Residue Committee, Department for Environment, and the Darwin Advisory Group, Department for Environment had equal representation of female and male members. Women were under represented in the remaining 52 (92.9 per cent) of public bodies. Public bodies with no female representation in 2008 were the Nuclear Research Advisory Council, the Construction Industry Training Board, and the UK Chemical Weapons Convention National Authority Advisory Committee.

Figure 7.2.1
The representation of women and men on SET public bodies in the UK, from 2006 to 2008

In part, the low representation of women members on public bodies reflects the general under-representation of women in SET. However, the data show that women were also under-represented in SET public bodies belonging to those SET sectors with a high participation of women employed in that field. For example, although women were 46.3 per cent of health professionals in 2008, female membership of public bodies in the Department of Health was only 35.5 per cent in the same year.

Secondary analysis by the UKRC
1. The number of SET public bodies: 57 in 2006, 56 in 2007 and 2008

7.3 Members of Parliament with background in SET by gender

Key Statistics on Members of Parliament (May 2010)

- Out of 620 MPs representing the three major UK parties there are 136 women (21.9 per cent).
- Women make up 31.4 per cent of Labour Party MPs, but only 15.7 per cent of Conservative Party MPs and 12.3 per cent of Liberal Democrat MPs.
- Of the 604 MPs with known qualifications/work backgrounds there are 10 women (1.7 per cent of all MPs) and 77 men (12.7 per cent of all MPs) with SET qualifications and/or work experience.
- 10 female MPs (7.6 per cent of all female MPs) have a qualification in SET, four of those are members of Labour Party, four are Conservatives, and two are members of the Liberal Democrats. A slightly higher percentage (and much larger number) of male MPs have SET qualifications (52 MPs or 11.0 per cent of all male MPs).
- No female MPs have experience of working in SET without SET qualifications. In comparison, 25 male MPs (5.3 per cent of all male MPs) have experience of working in SET, but do not have SET qualifications.

This section considers the backgrounds of the 620 female and male Members of Parliament (MPs) belonging to the three major UK political parties in terms of whether or not they have STEM qualifications and/or have worked in SET. MPs were classified as having a background in SET if they recorded that they had a SET qualification, or experience of working in a SET occupation in their public biographical data. A SET qualification is defined as vocational training, or a first degree (or higher) in STEM subjects. Information about the websites used to access biographies of MPs can be found in section 7.4. Data were collected in May 2010 about two weeks after the general election. Information about educational and/or employment background was not available for 16 out of 620 MPs and they were excluded from the analysis.

Table 7.3.1 shows the backgrounds of female and male MPs representing the three major UK political parties. A SET background is defined as either 'SET qualifications' and shows the numbers of MPs with SET qualifications in each party, or defined as 'SET work' and shows the numbers of MPs without SET qualifications, but with experience of working in a SET occupation.

Table 7.3.1 shows that there are 136 women out of 620 MPs in Westminster (21.9 per cent) representing the three main parties. Women make up 31.4 per cent of Labour Party MPs, but only 15.7 per cent of Conservative Party MPs and 12.3 per cent of Liberal Democrat MPs.

Of the 604 MPs with known qualifications/work experience there are ten women (1.7 per cent of all MPs) and 77 men (12.7 per cent of all MPs) with SET backgrounds. Ten female MPs (7.6 per cent of all female MPs) have a qualification in SET, four of those are members of the Labour Party, four are Conservatives, and two are members of the Liberal Democrats. A slightly higher percentage of male MPs have SET qualifications (52 or 11.0 per cent of all male MPs). In addition, none of the female MPs have experience of working in SET without SET qualifications. In comparison 25 male MPs (5.3 per cent of all male MPs) have experience of working in SET without having SET qualifications.

Liberal Democrats have the highest percentage of MPs with a background in SET with 33.3 per cent of their female MPs and 31.3 per cent of their male MPs having a SET qualification or experience of working in a SET occupation. In the Labour Party only 5.2 per cent of female MPs and 19.7 per cent of male MPs have SET backgrounds. For the Conservatives the figures are 8.3 per cent of female MPs and 11.1 per cent of male MPs.

Table 7.3.1
MPs with SET or non-SET backgrounds by political party post May 2010 general election

	SET/non-SET Background	Liberal Democrat (57 MPs)	Conservative (305 MPs)	Labour (258 MPs)
Women	Non-SET	4	44	73
	SET qualifications	2	4	4
	SET work	0	0	0
	No background information	1	0	4
Men	Non-SET	33	224	139
	SET qualifications	10	19	23
	SET work	5	9	11
	No background information	2	5	4

Secondary analysis by the UKRC
Data for Table 7.3.1 were collected in May 2010.

7.4 Terminology and data sources

Terminology and data sources for section 7.1

Definition of the FTSE 100 Index: a share index of the 100 most highly capitalised UK companies listed on the London Stock Exchange. It is the most widely used of the FTSE Group's indices, and is frequently reported (e.g. on UK news bulletins) as a measure of business prosperity.

Table 7.4.1
FTSE 100 companies in SET by sector, showing proportion of women on boards, board size and the number of female directors, 2009

SET Industry Sector	Company	Rank	Women directors (%)	Board (N)	Women directors (N)
Aerospace & Defence	BAE SYS	94	0	11	0
	COBHAM	84	0	9	0
	ROLLS-ROYCE GROUP	69	7.1	14	1
Beverages (production)	DIAGEO PLC	3	36.4	11	4
	SABMILLER PLC	39	12.5	16	2
Chemicals	JOHNSON MATTLEY	52	10.0	10	1
Electricity	INTERNATIONAL POWER PLC	99	0	12	0
	SCOT&STH ENERGY	52	10.0	10	1
Food Producers	A.B. FOOD	80	0	8	0
	UNILEVER	17	21.4	14	3
	CADBURY PLC	43	11.1	9	1
Gas, Water & Multi-utilities	CENTRICA	20	20.0	10	2
	NATIONAL GRID	32	15.4	13	2
	SEVERN TRENT	60	9.1	11	1
	UNITED UTILITIES GROUP PLC	43	11.1	9	1
Health Equipment	SMITH & NEPHEW	43	11.1	9	1
Household Goods & Home Construction	RECKITT BEN GR	43	11.1	9	1
Mining	ANGLO AMERICAN	25	18.2	11	2
	ANTOFAGASTA	84	0	9	0
	BHP BILLITON	69	7.1	14	1
	EURASIAN	63	8.3	12	1

SET Industry Sector	Company	Rank	Women directors (%)	Board (N)	Women directors (N)
Mining (cont.)	FRESNILLO	90	0	10	0
	KAZAKHMYS PLC	84	0	9	0
	LONMIN	52	10.0	10	1
	RANDGOLD RES	80	0	8	0
	RIO TINTO	69	7.1	14	1
	VEDANTA	77	0	6	0
	XSTRATA PLC	94	0	11	0
Oil and Gas Producers & Services	BG GROUP	60	9.1	11	1
	BP	37	13.3	15	2
	CAIRN ENERGY	63	8.3	12	1
	ROYAL DUTCH SHELL PLC	69	7.1	14	1
	TULLOW OIL PLC	25	18.2	11	2
Oil Equipment, Services & Distribution	AMEC	39	12.5	8	1
	PETROFAC	84	0	9	0
Pharmaceuticals & Biotechnology	ASTRAZENECA	9	25.0	12	3
	SHIRE	52	10.0	10	1
	GLAXO-SMITH-KLINE	63	8.3	12	1
Software & Computer Services	INVENSYS PLC	80	0	8	0
	AUTONOMY	78	0	7	0
	SAGE GROUP	25	18.2	11	2
Support services (SET-related)	SERCO GROUP	35	14.3	7	1
	INTERTEK GROUP	43	11.1	9	1
	RENTOKIL INITIAL	94	0	11	0
	WOLSELEY	90	0	10	0
Technology Hardware & Equipment	SMITHS GROUP	39	12.5	8	1

SET Industry Sector	Company	Rank	Women directors (%)	Board (N)	Women directors (N)
Telecommunications	BT GROUP	30	16.7	12	2
	CABLE & WIRELESS	9	25	12	3
	VODAFONE GROUP	69	7.1	14	1
	INMARSAT	9	25.0	8	2
Tobacco	BR. AMER. TOB.	9	25.0	12	3
	IMP. TOBACCO GROUP	32	15.4	13	2
Travel & Leisure (SET-related only)	BRITISH AIRWAYS	4	33.3	9	3

Secondary analysis by the UKRC
All data in Table 7.4.1 are extrapolated from 'The Female FTSE Board Report 2009' published annually by the International Centre for Women Leaders at Cranfield University (Sealy, Vinnicombe and Doldor, 2009).

References

Sealy, R., Vinnicombe, S. and Doldor, E. (2009). **The Female FTSE Board Report 2009**. International Centre for Women Leaders, Cranfield University.

Terminology and data sources for section 7.2

Non departmental public body is defined as a body which has a role in the processes of national Government, but is not a Government Department or part of one, and which accordingly operates to a greater or lesser extent at arm's length from Ministers. Public bodies deliver important and essential public services. A list of public bodies is published annually by the Cabinet Office.

Source: Cabinet Office (2009). Public bodies 2009. The report can be downloaded from http://www.civilservice.gov.uk/ndpb.

Terminology and data sources for section 7.3

Information on the SET backgrounds of Members of Parliament of the three major UK parties was sourced in May 2010 from official Party websites (http://www.conservatives.com/People/Members_of_Parliament.aspx; http://www.libdems.org.uk/meps.aspx?letter=A), the Westminster Parliamentary Record website (http://www.parliamentaryrecord.com/content/profiles/by-name.aspx; http://www.parliament.uk/mps-lords-and-offices/mps/), The Guardian http://politics.guardian.co.uk/person/browse/party/candidates/0,,-152,00.html, and Wikipedia (http://en.wikipedia.org/wiki/Main_Page).

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