

Careers of doctorate holders (CDH) 2009



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Explanation of symbols

.	= data not available
*	= provisional figure
**	= revised provisional figure
x	= publication prohibited (confidential figure)
–	= nil or less than half of unit concerned
–	= (between two figures) inclusive
o (o,o)	= less than half of unit concerned
blank	= not applicable
2010–2011	= 2010 to 2011 inclusive
2010/2011	= average of 2010 up to and including 2011
2010/'11	= crop year, financial year, school year etc. beginning in 2010 and ending in 2011
2008/'09–	
2010/'11	= crop year, financial year, etc. 2008/'09 to 2010/'11 inclusive

Due to rounding, some totals may not correspond with the sum of the separate figures.

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Contents

1	Introduction	7
	1.1 Doctorate holders	7
	1.2 CDH-project	7
	1.3 The 2010 survey	7
2	Methodology	8
	2.1 Survey frame	8
	2.2 Reference year	8
	2.3 Classifications and definitions	8
	2.4 Units covered	9
	2.5 Data collection	9
	2.6 Weighting process	10
	2.7 Longitudinal Municipal Population Register (MPR-L) and other registrations	10
	2.8 Previous CDH data	11
3	Results	14
	3.1 Age class and sex	14
	3.2 Citizenship	15
	3.3 Field of doctorate	15
	3.4 Employment status	16
	3.5 Salary	17
	3.6 Mobility	18
4	Tables	20
5	References	22

1 Introduction

1.1 Doctorate holders

Doctorate holders (PhDs) are the highest educated group and are therefore considered to be very important in the advancement of knowledge-based activities and innovative practices. As this makes them important players on the labour market, it is important to collect data on their characteristics [1].

1.2 CDH-project

The Careers of Doctorate Holders (CDH) project was initiated and is strongly supported by the statistical office of the European Commission (Eurostat), the Organisation of Economic Development and Cooperation (OECD) and Unesco Institute for Statistics (UIS). This project aims to collect the most recent data on educational history, work experience and mobility of doctorate holders.

In order to be able to compare the data from different participating countries the project partners provide guidelines that should be respected in the various national surveys. The goal is to obtain high quality results through a harmonised list of variables, indicators and definitions.

1.3 The 2010 survey

Statistics Netherlands carried out a Dutch CDH survey in September and October 2010. This document presents an overview of the methodology and results of the survey. Chapter 2 gives a description of the research methodology, data sources and the differences between the current study and previous CDH studies. Chapter 3 gives an overview of the results. Chapter 4 shows the tables containing the survey results in detail.

2 Methodology

2.1 Survey frame

As no usable survey frame was available in the Netherlands before the CDH survey started, a frame was compiled based on PhD records provided to Statistics Netherlands by the Dutch universities. This information is quite varied but the following data are available for each individual doctorate holder:

1. Given name(s)
2. Last name
3. First name
4. Date of birth
5. Sex
6. Year of doctorate degree

Doctorate holders awarded their degree by a Dutch university in 1990 or later, resident in the Netherlands and registered in the Longitudinal Municipal Population Register on 1 August 2010 were in the target population for the CDH survey.

2.2 Reference year

The reference year is 2009.

2.3 Classifications and definitions

The international organisations involved in the study produced a model questionnaire that was strongly recommended for participating countries conducting their own CDH survey. Statistics Netherlands followed this model questionnaire in order to be able to compare output with output from other countries' surveys. The definitions used in the Dutch survey are consistent with the recommendations. The main variables used are:

Holder of advanced research qualification

ISCED 6 - second stage of tertiary education (advanced research qualification)

Gross time to completion of doctorate

Number of months elapsed between the start of the advanced research qualification and the award of the degree

Researcher

Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned.

Gross annual earnings

Gross annual earnings cover remuneration in cash and partly in kind paid during 2008 before any tax deductions and social-security contributions payable by wage earners and retained by the employer. There are two (minor) differences with the definitions as recommended: 1. Remuneration in kind is partly covered, 2. The reference year is 2008.

2.4 Units covered

The target population consisted of all doctorate holders who had been awarded their degree by a Dutch university between 1990 and academic year 2008/'09, who were resident in the Netherlands and registered in the Longitudinal Municipal Population Register on 1 August 2010. Dutch universities were asked to share their PhD records with Statistics Netherlands. No data were received from Tilburg University and because of difficulties in the data-matching process it was decided to leave out data for University of Amsterdam. Therefore the data reflect the target population without these two universities. In addition to this, data were only collected from respondents under 70 years of age.

2.5 Data collection

The CDH methodological guidelines present a number of potential data collection methods. The guidelines do not express a preference for a particular method. Statistics Netherlands decided to use online accessible web-questionnaires (CAWI).

The data collection took place from 11 September 2010 to 4 October 2010. The target population received a written invitation to take part in the survey and a link to the website on which they could access it. Two written reminders were sent to increase the response rate.

Dutch universities shared their PhD records with Statistics Netherlands and transferred personal data on over 49 thousand doctorate holders. This is the number before the selection of the desired target population. These data were used to acquire the actual addresses of the doctorate holders, using the Dutch Municipal Longitudinal Population Register. Ultimately over 21 thousand doctorate holders were invited to participate in the survey. Over 10 thousand of them responded and were finally included in the target population. Table 2.5.1 shows this breakdown.

2.5.1 Response breakdown

	Total
Number of doctorate holders on whom data were received from Dutch Universities	49,689
Number of doctorate holders for whom no name, date of birth and place of birth were retrieved from the Dutch Municipal Population Register	23,218 -/-
Number of doctorate holders for whom no current address could be retrieved from the Dutch municipalities	5,156 -/-
Number of persons invited to take part in survey	21,315
Non-response	10,127 -/-
Respondents	11,188
Respondents not in target population	826 -/-
Respondents in target population	10,326

Weighting process

As the survey conducted by Statistics Netherlands is a sample survey, the collected data have to be weighted to be able to generate estimates for the population as a whole. The weighting process corrects for selectivity caused by non-response. The variables for which this selectivity is adjusted are included in the weighting model. These variables are:

- sex
- age at date of doctorate degree
- ethnicity
- income
- year of doctorate degree
- university

The weighting process was conducted for the dataset excluding response from the University of Amsterdam and Tilburg University.

2.6 Longitudinal Municipal Population Register (MPR-L) and other registrations

The Dutch Longitudinal Municipal Population Register (Gemeentelijke Basisadministratie – GBA) is one of the administrative sources used for this survey. First, only doctorate holders recorded in this register were included in the target population. Moreover, data from this register, such as sex, date and country of birth, have an objective and formal status. They overrule information given by respondents in case of discrepancy. Under the national statistical law, Statistics Netherlands has full access to registrations. Therefore income data were not collected via the survey, but from the Dutch tax authority.

2.7 Previous CDH data

Statistics Netherlands has published data on the careers of doctorate holders before. Recent publications are *Careers of Doctorate Holders 2005* [2] and *2007* [3] as well as articles by Van Beuningen [4] and Traag and Dirven [5].

In 2005 and 2007, the Dutch Labour Force Survey (LFS) and registrations were the main data sources used to complete pre-defined tables in the International Survey on Careers of Doctorate Holders. The LFS is a year-round sample survey that covers the population aged 15 years and older resident in the Netherlands, excluding the institutional population. The LFS asks mainly for information about previous and present education, employment situation and household characteristics. The LFS included some 367 thousand respondents from 2004 to 2007.

The LFS was used to identify doctorate holders and to establish in which field they had completed their degrees. All other information requested for the tables was taken from registrations.

2.8.1 CDH publications and their methodological differences

<i>Title of publication</i>	CDH 2005	CDH 2007	CDH 2009
<i>Reference year</i>	Average of 2004, 2005 and 2006	2007	2009
<i>Data sources</i>	Dutch Labour Force Survey (LFS) and registrations	Dutch Labour Force Survey (LFS) and registrations	CDH survey and registrations
<i>Survey mode</i>	CAPI (face-to-face)	CAPI (face-to-face)	CAWI (on-line survey)
<i>Questionnaire</i>	LFS questionnaire	LFS questionnaire	CDH model questionnaire
<i>Target population</i>	All doctorate holders younger than 70 living in the Netherlands in 2005, excluding institutional population.	All doctorate holders living in the Netherlands on 31 December 2007, excluding institutional population.	All doctorate holders younger than 70 with a PhD from a Dutch university in 1990 or later, living in the Netherlands on 1 August 2010
<i>Universities covered</i>	All universities	All universities	All Dutch universities, except Tilburg University and University of Amsterdam
<i>Identification of doctorate holders</i>	Sample survey	Sample Survey	Dutch universities' registrations
<i>Number of doctorate holders in survey (unweighted)</i>	1,760	2,104	10,326 ¹
<i>Number of doctorate holders in survey (weighted)</i>	72,000	67,000	43,100
<i>Doctorate holders with foreign PhD</i>	Included	Included	Not included
<i>Income definition</i>	Annual fiscal wage	n/a	Annual primary personal income ²
<i>Data delivery to Eurostat</i>	Project Careers of doctorate holders 2006		Project Careers of doctorate holders 2010

Table 2.8.1 shows that methodological differences exist between the study described here and the previous ones, the method of the former being more customised to this particular subject. The study described here resulted in more tables than the previous ones.

The new results do not indicate that the 2005/2007 data are unreliable, however. Take for example the total number of doctorate holders. The 2007 LFS data showed a total of 60,000 doctorate holders younger than 70 years. This is more than the number presented here, 43,100, but the 2009 target population differs from those in previous studies. This difference can be explained by methodological differences.

¹⁾ This number consists of the number of respondents in the target population who participated in the web-survey.

²⁾ The 2005 study used the annual fiscal wage to establish the gross annual income of doctorate holders. In the study described here, primary personal income was used. This is the sum of an individual's income from labour and from own enterprise. Income from labour consists of wages and salary including pension and social security contributions. Social security and pension contributions are not included in the fiscal wage. Therefore, the income data of 2005 and 2009 are not comparable.

First, doctorate holders who received their PhD before 1990 are not included in the study presented here. LFS data for 2007-2010 indicate that around 16 thousand people in the Netherlands aged 15 to 65 years received their doctorate before 1990, but this includes people who received their degree from a foreign university. The number of these doctorate holders belonging to the CDH 2009 target population will therefore be smaller than 16 thousand.

Secondly, the study presented here does not include data on graduates from Tilburg University and the University of Amsterdam. Registrations³⁾ show that in the period between academic years 1990/'91 and 2008/'09 around 7,500 people received their doctorate degree from one of these two universities. These numbers also include doctorate holders over 70 years of age and people no longer living in the Netherlands.

For other differences, like the differences in weights used in the three studies and the fact that persons with a doctorate from a foreign university are not included in the latest study, a quantification is not available. However, this partial quantification indicates that the gap between the number of doctorate holders according to the study described here and the number measured in 2007 may very well be explained by the methodological differences mentioned above.

³⁾ Statistics Netherlands collects data from the Dutch universities on the number of PhDs awarded and publishes these on an aggregate level in the PhD statistics: <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=71247NED&D1=o&D2=o&D3=o&D4=a&VW=T>

3 Results

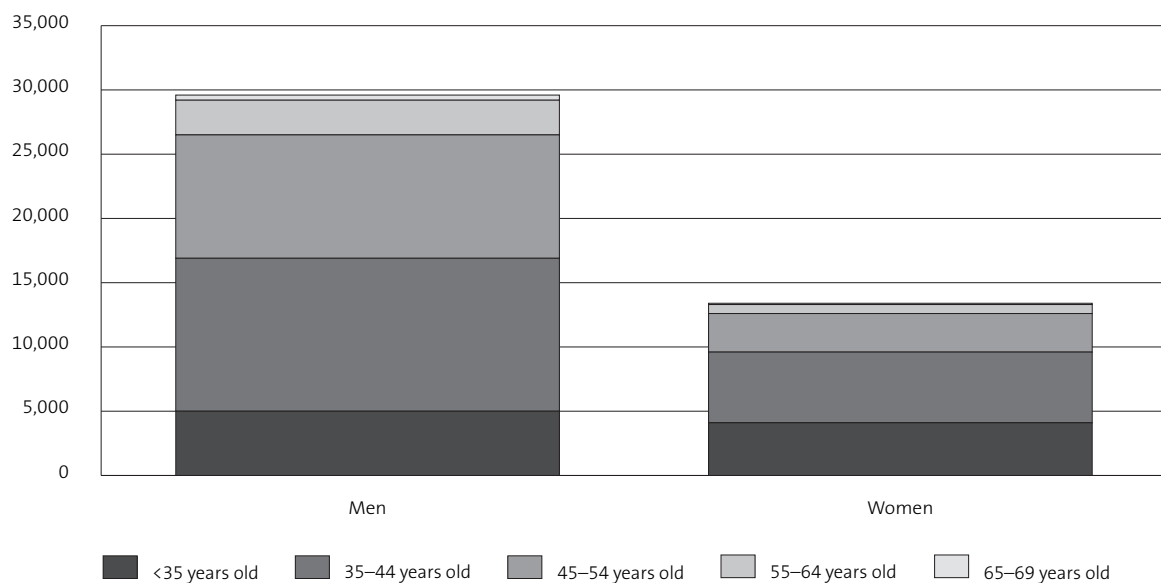
3.1 Age class and sex

Just over 43 thousand persons younger than 70 years, living in the Netherlands and registered in the Longitudinal Municipal Population Register on 1 August 2010, had been awarded a doctorate by a Dutch university⁴⁾ in 1990 or later.

More than two-thirds of doctorate holders are men. In each age class the number of men is more than twice the number of women, except in the age class younger than 35 years, where 5 thousand men and just over 4 thousand women have a PhD.

A clear majority (62 percent) of all doctorate holders are younger than 45 years. Most (over 17 thousand) are between 35 and 45 years old, the remainder (9 thousand) younger than 35 years.

3.1.1. Doctorate holders by sex and age class, 2009

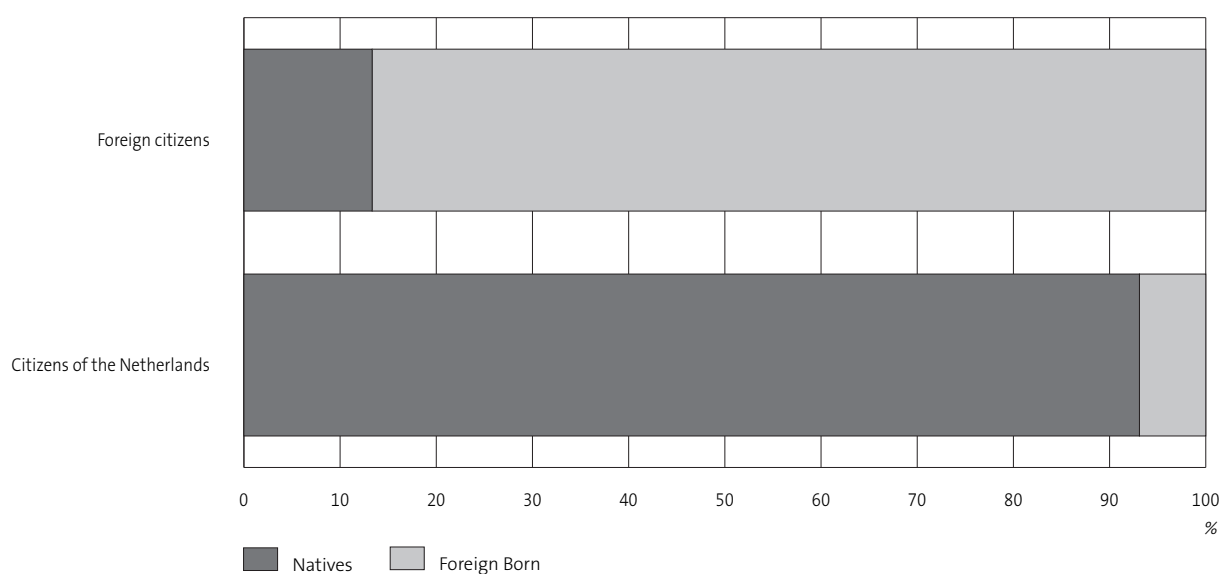


⁴⁾ Excluding Tilburg University and University of Amsterdam

3.2 Citizenship

Of all doctorate holders with a known citizenship, 92 percent (41 thousand) are citizens of the Netherlands. Most of these are native Dutch (38 thousand), others have a foreign background. Foreign citizens from EU countries account for 40 percent of all non-Dutch citizens. With a doctorate degree. Over eight out of ten non-Dutch citizens with a doctorate are permanent residents of the Netherlands.

3.2.1. Doctorate holders by citizenship and place of birth, 2009



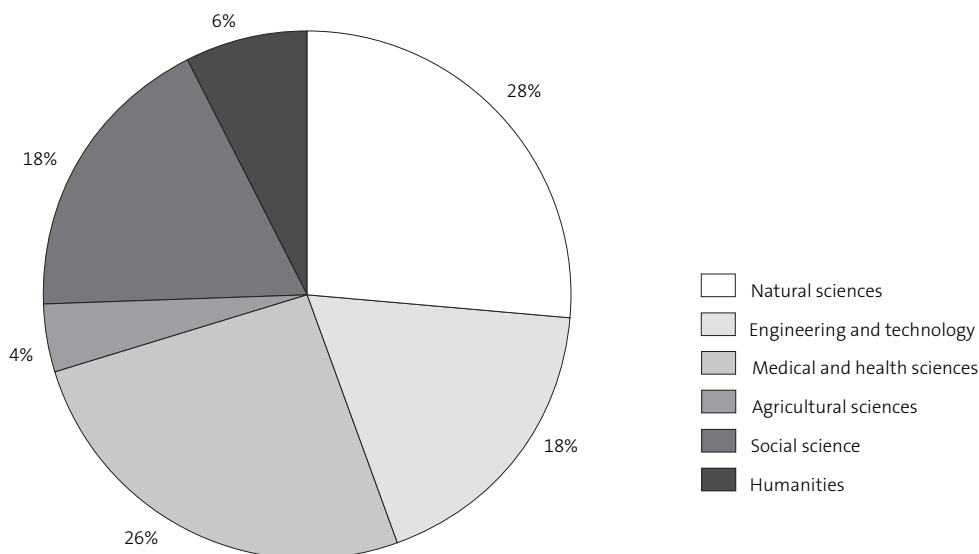
Fewer than 10 percent of the over 2 thousand doctorate holders who are foreign citizens, have an unknown country of citizenship. The remainder come from many different countries. The most common countries of citizenship of non-citizens with a doctorate in the Netherlands are German and Chinese.

3.3 Field of doctorate

Most doctorates are awarded in the natural sciences (over 11 thousand) and medical and health sciences (11 thousand). Natural sciences include, for example, mathematics, computer and information sciences and biological sciences. Foreign citizens and citizens of the Netherlands differ in their field of degree. Among foreign citizens, engineering and technology and natural sciences are the most popular fields, while most Dutch citizens have a degree in natural sciences or medical and health sciences.

On average doctorate holders are 33 years old when they receive their degree. Those with a PhD in humanities (e.g. history and archaeology, languages, arts) are 40 years old on average when

3.3.1. Doctorate holders by field of doctorate degree, 2009



they receive their doctorate. The average age in the other fields of science varies between 31 and 34 years. Doctorate holders in the humanities also need the most time to complete their programme: 83 months. This is 25 months longer than the average completion time for graduates in the field of engineering and technology, who need the least time to complete their research.

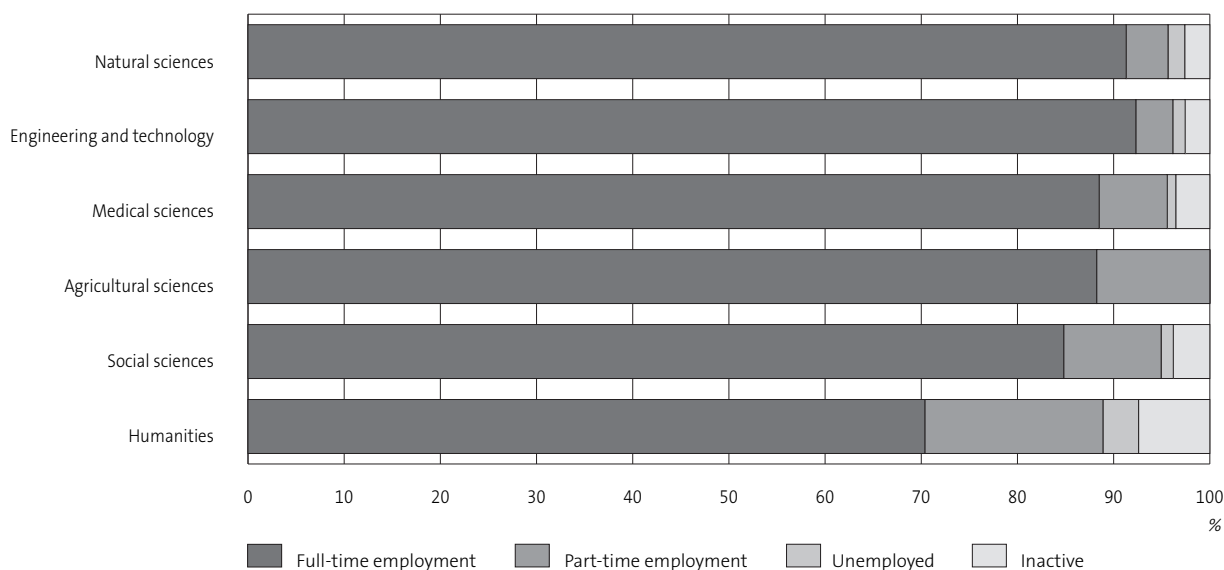
3.4 Employment status

A large majority of doctorate holders were employed in 2009. Only 600 of the more than 43 thousand doctorate holders reported they were unemployed. A total of 1,500 were not active and the remaining 41 thousand were either employed (91 percent) or self-employed (9 percent).

Almost 38 thousand doctorate holders were in full-time employment (30 or more hours per week). Part-time workers were a minority, at only just over 3 thousand. Most doctorate holders working part-time had a PhD in the humanities (approx. 20 percent). Workers with a PhD in engineering and technology are least likely to work part-time: only about 4 percent have part-time employment. The share of part-time workers rises with the age of the doctorate holder: only about 5 percent of those younger than 35 work part-time while over 15 percent of doctorate holders older than 54 years are part-time employees.

⁵⁾ Researchers are defined as professionals concerned with designing and developing new knowledge, products, processes, methods and systems and the management of these activities. The numbers present-ed here differ from those in previous Dutch studies as a result of methodological differences. In the current survey, respondents were asked whether they were employed as a researcher as defined above. In the previous surveys based on the LFS, respondents were not explicitly asked whether they were researchers. Instead, research occupations were identified on the basis of Statistics Netherlands' standard classification of occupations.

3.4.1. Doctorate holders by field of doctorate degree and employment status



Almost two-thirds of all employed doctorate holders are employed as a researcher⁵⁾, 10 thousand of them in higher education. Doctorate holders in the fields of medical sciences and humanities are least likely to be employed in research: around 55 percent. Over 70 percent of people with a PhD in engineering and technology or agricultural sciences are researchers. Men (66 percent) are more likely than women (58 percent) to work as a researcher.

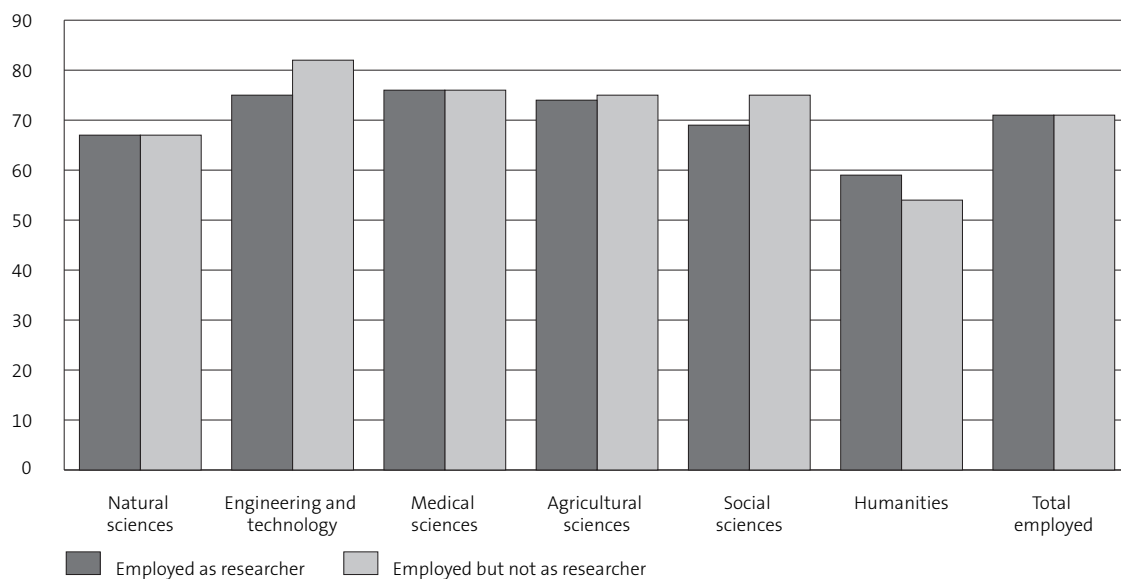
3.5 Salary

Almost 85 percent of employed doctorate holders indicated they were fairly or very satisfied with their salary. This percentage is the same for doctorate holders who are employed as researchers and those who work in different jobs. The median gross annual earnings⁶⁾ are also equal for researchers and doctorate holders with other work: 71 thousand euro. The average gross annual earnings do differ between the two groups, however. The average yearly salary for a researcher in 2008⁷⁾ is 81 thousand euro, for non-researchers it is 92 thousand euro. It can therefore be concluded that the income distribution is more skewed among non-researchers than among researchers. We also see that doctorate holders earn more than high educated people in general. Average gross annual earnings of all persons with a full-time job and a high level of education was 70 thousand euro in 2008.

The median salary is highest for the employed doctorate holders with a doctorate in medical sciences, engineering and technology, and agricultural sciences. The median annual gross salary for these doctorate holders is about 75 thousand euro. Doctorate holders in humanities

⁶⁾ Annual earnings concern the personal primary income. This is the sum of an individual's income from labour and income from own enterprise. Income from labour consists of wages and salary including pension and social security contributions. Income from own enterprise includes profits. 2008 is the reference year for the income data.

3.5.1. Doctorate holders by field of doctorate and median salary in thousand euro



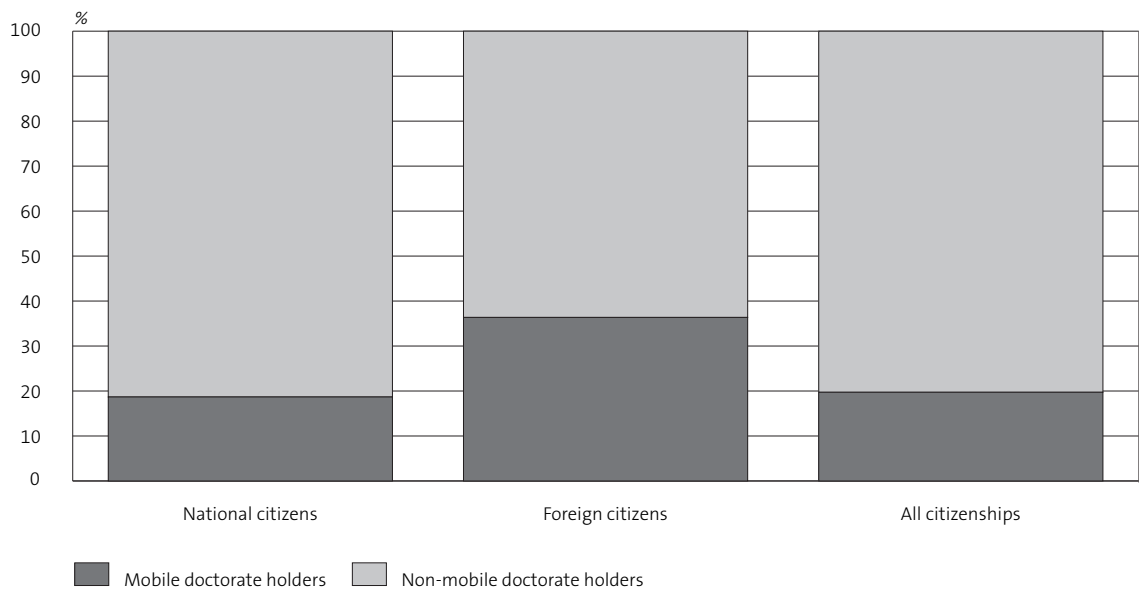
earn less: 57 thousand euro a year. As we saw before, doctorate holders with a degree in humanities account for largest share of part-time workers. The share of part-time workers with a degree in medical sciences, engineering and technology, and agricultural sciences is much smaller, which explains part of the income differences.

Salaries differ greatly between men and women. For men the median annual salary is 79 thousand euro, while female doctorate holders earn 59 thousand euro a year. Naturally, the relatively large share of part-time workers among women (15 percent) compared to men (4 percent) contributes to this income difference.

3.6 Mobility

Twenty percent of all doctorate holders have studied, worked or conducted research abroad in the last ten years. Among foreign citizens this share is even higher: more than one third. A total of 8,500 doctorate holders spent a period abroad in the last ten years. The United States is the most popular destination for mobile doctorate holders: over 2 thousand returned to or arrived in the Netherlands from the US. The United Kingdom (1,000) and Germany (800) were also often home to doctorate holders now living in the Netherlands.

3.6.1. Doctorate holders and mobility



*) Mobile doctorate holders include those having returned to or arriving in the Netherlands in the last 10 years.

4 Tables

This chapter contains the following set of tables:

A Personal characteristics

1. Doctorate holders by sex and age class
2. Doctorate holders by type of Citizenship, resident status and place of birth
3. Doctorate holders by citizenship and resident status
4. Doctorate holders by sex and country of citizenship
5. Doctorate holders by citizenship/resident status and age class
6. Doctorate holders by citizenship and field of doctorate
7. Doctorate holders by sex and country of birth
8. Doctorate holders by place of birth/resident status and age class
9. Doctorate holders by place of birth and field of doctorate degree

B Education characteristics

10. Doctorate holders by citizenship/resident status and region of doctorate award
 11. Doctorate holders by place of birth/resident status and region of doctorate award
 12. Doctorate holders by country of doctorate award and of prior education
 13. Recent doctorate recipients: age at doctorate and time to completion by main field of doctorate
- Doctorate holders by main field of doctorate and primary source of funding during completion of doctorate

C Employment situations and perceptions

15. Doctorate holders by employment status and year of doctorate
16. Doctorate holders by employment status and field of doctorate
17. Doctorate holders by employment status and age class
18. Doctorate holders by employment status and citizenship/resident status
19. Recent doctorate recipients by employment status and primary source of funding during completion of doctorate
20. Employed doctorate holders by field of doctorate and occupation
21. Employed doctorate holders by sector of employment, field of doctorate and sex
22. Employed doctorate holders: median gross annual earnings
23. Employed doctorate holders: average gross annual earnings
24. Employed recent doctorate recipients: gross annual earnings by primary source of funding during completion of doctorate
25. Employed doctorate holders: job mobility in last 10 years by sector of employment
26. Employed doctorate holders: perception of job qualification by sex and year of doctorate
27. Employed doctorate holders: perception of job qualification by sex and field of doctorate
28. Employed doctorate holders: satisfaction with employment situation by sex and criteria of satisfaction
29. Employed doctorate holders: satisfaction with employment situation by research status and criteria of satisfaction

D International mobility: inward and outward

30. Doctorate holders by type of international mobility in last ten years and citizenship
31. Internationally mobile doctorate holders: previous country of work/study in last ten years by citizenship
32. Internationally mobile doctorate holders: reasons for moving to the country in the last 10 years by citizenship

- 33. Internationally mobile doctorate holders: frequency and duration of mobility by citizenship
- 34. Mobility intentions in the next year by country of intended destination (optional table)
- 35. Reasons for mobility intentions in the next year (optional table)

5 References

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