

# A comparison of the labour market position of university graduates in the Netherlands

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# Summary

This study analyses the labour market position of 43,500 graduates of master's degree programmes in the Netherlands. First of all, it focuses on the entry position, or the labour market position in 2018 for those who graduated in 2016-2017. 72 Clusters of master's degree programmes are compared, considering the time required to secure substantial work, permanent work, hourly pay and annual income from work. Furthermore, the career perspectives of those who graduated in 2007-2008 have been studied. Ten years after graduation, so in 2018, the labour market position for this group has been analysed by comparing master's degree programmes.

These analyses are based on the 'Studie & Werk 2019' study of SEO/Elsevier-Weekblad, published on the websites of [SEO](#) and [Elsevier Weekblad](#). (in Dutch). In this study, anonymised and linked administrative data of CBS (Statistics Netherlands) have been used. The method of graduate tracking that has been used offers the advantage that it is very reliable and that graduates may be tracked over a longer period of time. In the future, the labour market may change, however, due to fluctuations in demand and supply of labour. It is therefore not a prognosis. A similar publication for higher professional education (HBO study programmes) appeared in February 2020: [A comparison of the labour market position of HBO graduates](#) (only in Dutch available).

Both for higher professional education and university education, the most important conclusion is that the labour market position differs strongly for each study area: both upon the entry on the labour market and ten years later. Degree programmes offering a relatively good entry position on the labour market continue to perform well in the labour market; degree programmes offering a moderate entry position generally remain on this moderate level. In the case of university education, there is no catching-up phenomenon. The differences in labour market position between the various degree programmes have even become bigger ten years later.

At the start, the hourly pay and the annual income after having completed a master's degree programme are only slightly higher than after having completed a degree programme in higher professional education. It turns out that university graduates even hold permanent jobs slightly less often than those graduated in higher professional education. Career perspectives are generally better, however. Ten years after graduation, the hourly pay, for example, is 34% higher than after having completed a degree programme of higher professional education. There are, however, lasting differences in the labour market position of university studies.

At the start, the dentistry alumni have the best labour market position, followed by fiscal economics and econometrics. Ten years after graduation, the top 3 still consists of dentistry and fiscal economics, along with finance. Graduates of master's degree programmes for teaching make a good start - partly due to the fact that graduates are slightly older - but the career development path is less steep. Their hourly pay and annual income increase less than hourly pay and annual income of graduates from other master's degree programmes. Also, educational studies, pedagogical sciences and health sciences show a career development path which is less favourable in the ten years following graduation.

Usually, there is no catching-up phenomenon in the case of degree programmes with a (very) moderate entry position and sometimes the situation even gets worse compared to other degree programmes when the longer term is considered. This applies, for example, to archaeology and theology. Ten years after graduation, archaeology, neuroscience and literature have the most unfavourable labour market position. There are only two master's degree programmes with a moderate entry position where the career development of its graduates is above-average in the ten years following their graduation: international relations and international and European law. Ten years after graduation, both studies have an average labour market position.

This publication has been compiled in order to improve the information supplied to prospective students. In addition to interests and competences, labour market information may play a role in making study choices. A more transparent market will contribute to a better match between education and labour market. It may lead to less students choosing degree programmes offering a moderate labour market position and more students choosing degree programmes offering a good labour market position. It will probably improve the return on investment in education. In addition, better information supply may lead to fewer regrets afterwards.

## *Note for the reader*

*The annual 'Studie & Werk' study of Elsevier Weekblad and SEO Economic Research offers prospective students and other interested people essential information on over 1,200 degree programmes at universities for applied sciences and universities. If you wish to use the results of 'Studie & Werk', you require the permission from both Elsevier Weekblad and SEO Economic Research. To view all results of over 1,200 degree programmes, please visit Elsevier Weekblad: [www.elsevier-weekblad.nl/studiewerk](http://www.elsevier-weekblad.nl/studiewerk) (in Dutch and against payment)*

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# 1. Entry position on the labour market

## 1.1. Entry position

In order to analyse the entry position of graduates of clusters of master's degree programmes, the following four aspects of the cohort that graduated in 2016-2017 have been considered:

1. The median duration<sup>1</sup> in months from the moment of graduation until substantial work was secured (paid employment, a minimum of three days a week, no on-call/temporary contracts, hourly pay a minimum of 150% of the statutory minimum wages for adults). Composition effects have been allowed for;
2. The percentage of employees having permanent employment one year after graduation;
3. The gross hourly pay of employees one year after graduation;
4. The annual income from work in 2018 of both employees and self-employed persons.

These four aspects have been combined into a composite entry position indicator (see appendix I for further explanation of definitions and methodology). Together, these aspects indicate the chance of work, job security and income. The clusters of master's degree programmes are compared to each other, so it is the relative position. These data do not provide any insight into what type of jobs graduates hold, nor do they show if they work on an academic level or in the area for which they have been trained. The employer's branch is known, however, but has not been included in this analysis. When graduates are mismatched to their jobs, this may possibly be expressed by lower wages, even though lower wages do not necessarily indicate a mismatch. It is a common fact that wages are lower in certain occupations and sectors.

The study shows that graduates from the 2016-2017 cohort generally have favourable labour market perspectives. In the past years, the chance of a permanent employment contract has increased, the starting income has increased and graduates succeed more quickly in obtaining substantial work. However, there are large differences in the labour market position of graduates.

## 1.2. Degree programmes with a (very) good entry position

The best entry position on the labour market is held by the dentistry graduates (table 1). Of all master's degree programmes, dentistry graduates have the highest gross hourly pay and the highest annual income. The average annual income (including self-employed persons) after having graduated in dentistry is €61,000 one year after completion of the degree programme as against an average of €38,900 for all universities graduates together. The only aspect of dentistry which negatively contributes to the entry position is the measure of job insecurity. Only 1 out of 3 graduates in dentistry who work on the basis of a labour contract, have managed to secure a permanent job after 1 year. The time to find substantial work, which is 8.1 months, is relatively high. It should be noted, however, that about seven out of ten dentistry graduates opt for self-employment, due to which the indicators with regard to employees are less relevant.

After dentistry, graduates from the fiscal economics degree programme have the best entry position. The median duration before obtaining substantial work, being 2.5 months, is relatively short while also a large group (67%) has permanent employment and a relatively high annual income. Graduates from econometrics, which takes up a third place, also find a job rather quickly and a large group (57%) has a permanent employment contract after 1 year. The accounting degree programme (4th place) has the highest number of graduates holding permanent jobs (68%) after 1 year. Also, fiscal economics (67%) has a high score in that respect. This deviates strongly from medicine graduates. Only 8% have permanent jobs after one year. Graduates from this programme, however, do manage to obtain substantial work most quickly. 50% Of the medicine graduates have found substantial work within 1.2 months. Furthermore, graduates from science degree programmes and computer science find work relatively quickly. A good entry position also applies to the master's degree programmes for teaching science subjects, languages and social studies. It must be noted however, that graduates of master's degree programmes for teaching are five years older than the average graduate and that they sometimes combine the master's degree programme with their job.

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<sup>1</sup> The median duration means that 50% of the graduates have found substantial work within that period.

**Table 1: Degree programmes with a (very) good entry position on the labour market in 2018 for the 2016-2017 cohort**

Ranking	Master's degree programme	Months until substantial work employees	Permanent job employees after 1 year	Gross hourly pay employees (€)	Annual income (€)	Rating entry position
1	Dentistry	8.1	32%	25.20	61,200	very good
2	Fiscal economics	2.5	67%	18.80	46,300	very good
3	Econometrics	2.9	57%	19.90	48,400	very good
4	Accounting	2.4	68%	17.90	44,100	very good
5	Fiscal law	3.5	57%	19.00	45,800	very good
6	Teaching science subjects	3.9	54%	21.10	39,800	very good
7	Computer science	2.6	50%	19.00	46,000	very good
8	Teaching languages	3.5	56%	20.30	36,100	very good
9	Offshore engineering	3.4	41%	18.80	49,400	good
10	Electrical engineering	3.5	48%	18.50	45,000	good
11	Medicine	1.2	8%	22.10	50,900	good
12	Information studies	3.1	51%	18.20	41,900	good
13	Automotive and maritime technology	4.3	44%	18.60	46,300	good
14	Aviation and space technology	3.9	44%	18.80	44,200	good
15	Teaching social studies	5.7	50%	20.60	36,900	good
16	Mechanical engineering	4.1	43%	18.40	44,600	good
17	Mathematics	4.7	46%	18.20	43,700	good
18	Finance	4.3	43%	18.60	42,800	good
19	Civil engineering	3.6	43%	17.60	41,600	good
20	Technology and management	3.9	48%	18.20	43,800	good
21	Economics	4.6	45%	17.60	40,900	good
22	Innovation management	5.5	39%	17.40	41,000	good
	All MD-programmes	5.0	32%	17.50	38,900	average

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

### 1.3. Degree programmes with a (very) moderate entry position

There are 8 degree programmes offering a (very) moderate entry position on the labour market (table 2). The 3 degree programmes with the least favourable entry position are literature, archaeology and art and culture. After completion of these degree programmes, it takes a relatively long time before substantial work is secured and gross hourly pay and annual income are relatively low. Especially with literature (25.9 months) and art and culture (20.3 months), it takes a long time before substantial work is found. Also, cultural anthropology, cultural studies and media studies have a very moderate entry position as well as linguistics. This latter aspect is remarkable since graduates from a master's degree programme for teaching languages have a good labour market position 1 year after graduation.

There are 14 degree programmes with a moderate entry position of which psychology, communications and international and European law deliver the highest number of graduates (see also paragraph 4). The healthcare psychology degree programme (including clinical psychology, medical psychology and forensic psychology) shows a better entry position than psychology.

Fewer than 1 out of 3 graduates who have graduated in degree programmes with moderate to very moderate perspectives, have secured permanent employment one year after graduation with the exception of graduates in theology and ideologies and language studies. After having graduated in theology and ideologies however, it takes a long time to find substantial work.

Appendix II contains a survey of all clusters of master's degree programmes whose graduates have an average entry position on the labour market.

**Table 2: Degree programmes with a (very) moderate entry position on the labour market in 2018 for the 2016-2017 cohort**

Ranking	Master's degree programme	Months until substantial work employees	Permanent job employees after 1 year	Gross hourly pay employees (€)	Annual income (€)	Rating entry position
72	Literature	25.9	30%	15.00	25,200	very moderate
71	Archaeology	18.8	29%	13.70	23,600	very moderate
70	Art and culture	20.3	29%	14.30	25,400	very moderate
69	Cultural anthropology	12.6	23%	14.70	23,800	very moderate
68	Cultural studies	16.6	22%	15.70	27,800	very moderate
67	Media studies	13.8	24%	14.90	29,100	very moderate
66	History	15.9	29%	15.10	28,500	very moderate
65	Linguistics	12.7	24%	15.40	25,800	very moderate
64	Neuroscience	7.0	8%	15.40	31,100	moderate
63	Biology	10.8	26%	14.90	29,200	moderate
62	Sociology and social studies	10.2	22%	15.40	30,600	moderate
61	International relations	11.4	25%	15.70	29,600	moderate
60	Political science	10.2	18%	16.00	31,200	moderate
59	Communications	10.6	27%	15.10	30,900	moderate
58	Language studies	11.7	34%	15.80	27,000	moderate
57	Psychology	9.4	23%	16.20	30,200	moderate
56	Human movement sciences	10.2	30%	15.60	31,100	moderate
55	International and European law	9.0	21%	16.60	31,200	moderate
54	Philosophy	13.0	27%	17.40	31,700	moderate
53	Criminology	8.6	23%	16.10	33,200	moderate
52	Environmental studies	8.6	32%	15.60	32,200	moderate
51	Theology and ideologies	15.3	38%	18.50	29,000	moderate
	All MD-programmes	5.0	32%	17.50	38,900	average

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

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## 2. Career development

### 2.1. Career development in the first ten years after graduation

A comparison between the labour market position of the 2007-2008 cohort 1 year after graduation (entry position) and 10 years after graduation of that same cohort gives an idea of the development of the labour market position of graduates of the various master's programmes. This analysis expresses career development in terms of development of hourly pay, monthly pay and the percentage of employees who have permanent jobs.

### 2.2. Highest and lowest increase

Of all university graduates of the 2007-2008 cohort who have an employment relationship ten years later (so in 2018), 76% have permanent employment contracts. One year after graduation, only 37% of this cohort had permanent employment contracts. So, the difference between numbers having permanent employment after 1 year and after 10 years is quite significant. The biggest difference (top 5) can be observed in medicine, biology, biomedical sciences, mechanical engineering and international and European law (see table 3, 4 and appendix III). The smallest difference can be seen in accounting, theology and ideologies, fiscal economics, information studies and fiscal law. With the exception of theology and ideologies, graduates in these areas already have a high degree of job security 1 year after graduation.

The average gross hourly pay of university graduates of the 2007-2008 cohort was € 19.00 and, after 10 years € 31.00. This is an increase of 63% in nine years' time. The highest increase can be seen in offshore engineering (+94%), followed by innovation management (+91%), medicine (+89%), marketing (+86%) and technology and management (+85%). Also, in the case of financially and economically oriented degree programmes such as finance, fiscal economics, econometrics, accounting and business administration, the increase may be considered high. Furthermore, technical degree programmes such as artificial intelligence, mathematics, physics and astronomy and aviation and aerospace technology are doing well. Pharmacy also belongs to the degree programmes showing the highest increase. The rate of increase of hourly pay is low for archeology (+29%), theology and ideologies (+31%), educational studies (+35%), health science (+36%) and philosophy (+37%). Also, for areas such as master's degree programme for teaching science subjects, pedagogical sciences, master's degree programme for teaching languages, and art and culture, the increase in pay is relatively low.

The average gross monthly pay of the 2007-2008 cohort has increased from € 2.917 (1 year after graduation) to € 4.608 (10 years after graduation). This is an increase of 58% in nine years' time. The highest increase in monthly pay can be found in dentistry (+92%), finance (+84%) and offshore engineering (+83%), followed by medicine (+81%) and innovation management (+80%). The lowest increase of monthly pay can be found in entrepreneurship (+21%), educational studies (+22%), pedagogical sciences (+23%), health science (+27%) and archaeology (+30%). Furthermore, there are degree programmes which have done relatively well after 10 years but lead to a monthly pay that is still below average. This is the case for cultural studies, political science, plant sciences, physics and astronomy and industrial design.

### 2.3. Career development with respect of degree programmes offering graduates a (very) good entry position

Table 3 again shows the master's degree programmes which offer the 2016-2017 graduates a (very) good entry position in 2018 (table 1), now also including the development in the first ten years after graduation. For this purpose, the 2007-2008 cohort was tracked. The overall conclusion is that the master's degree programmes offering its graduates a (very) good entry position on the labour market, usually develop at an average or above-average pace. In the case of the master's degree programme for teaching and fiscal law, the development with respect to the three abovementioned aspects remains below average, however.

The strongest increase in gross hourly pay in the period between 1 year and 10 years after graduation has occurred in offshore engineering (+94%), followed by innovation management (+91%) and medicine (+89%). Of all study areas, dentistry has the highest increase in gross monthly pay. The gross monthly pay 10 years after graduation has increased by 92% as compared to the monthly pay 1 year after graduation. Dentists who work on the basis of an employment contract mostly have permanent jobs after 10 years. It should be remarked, however, that nine out of ten dentists are self-employed and do not have an employment relationship 10 years after graduation. Also, the degree programmes of finance, offshore engineering and medicine show a high increase in the development of monthly pay. The labour market position of the master's degree programmes for teaching only improves to a small extent if job security, gross hourly pay and gross monthly pay are considered. As compared to most other master's programmes, these programmes have less favourable prospects. This applies both to the master's degree programmes for teaching sciences, languages and social studies. The master's degree programme for teaching social studies does show, however, a strong positive devel-

opment with respect to securing permanent employment. For fiscal law, the career path is slightly less favourable. However, 12 out of 22 clusters of degree programmes offering its graduates a (very) good entry position, show favourable career development paths.

**Table 3: Development of labour market indicators in 2018 for the 2007-2008 cohort 1 year and 10 years after graduation, with respect to degree programmes offering graduates a (very) good entry position**

Ranking	Master's degree programme	Rating entry position 2016-2017	Development % permanent job employees	Development gross hourly pay employees	Development gross monthly pay employees	Career Development first 10 years after graduation
1	Dentistry	very good		70%	92%	+++
2	Fiscal economics	very good	slightly higher	79%	64%	++
3	Econometrics	very good	slightly higher	78%	73%	+++
4	Accounting	very good	slightly higher	77%	64%	++
5	Fiscal law	very good	slightly higher	58%	49%	+
6	Teaching science subjects	very good	slightly higher	39%	39%	+
7	Computer science	very good	higher	59%	53%	++
8	Teaching languages	very good	slightly higher	39%	34%	+
9	Offshore engineering	good		94%	83%	+++
10	Electrical engineering	good		68%	60%	+++
11	Medicine	good	much higher	89%	81%	+++
12	Information studies	good	slightly higher	71%	69%	++
13	Automotive and maritime technology	good	slightly higher	65%	54%	++
14	Aviation and aerospace technology	good		74%	66%	+++
15	Teaching social studies	good	higher	44%	47%	+
16	Mechanical engineering	good	much higher	65%	63%	+++
17	Mathematics	good		75%	74%	+++
18	Finance	good	higher	79%	84%	+++
19	Civil engineering	good	slightly higher	60%	51%	++
20	Technology and management	good	higher	85%	79%	+++
21	Economics	good	slightly higher	77%	73%	+++
22	Innovation management	good		91%	80%	+++
	All MD-programmes	average	higher	63%	58%	++

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

## 2.4. Career development with respect to degree programmes offering graduates a (very) moderate entry position

Table 4 again shows the clusters of master's degree programmes which offer the 2016-2017 graduates a relatively (very) moderate entry position position on the labour market in 2018 (table 2), now also including the development in the first ten years after graduation. To give an indication of the career development paths, the development of the labour market position for the 2007-2008 cohort 1 year and 10 years after graduation has been included. The overall conclusion is that the master's degree programmes offering graduates a (very) moderate entry position on the labour market, usually develop at an average or under-average pace. There are only two exceptions: international relations and international and European law.

Many of the 22 master's degree programmes offering a (very) moderate entry position on the labour market show highly increased job security. Eight out of the 22 degree programmes show a much higher percentage of permanent jobs after 10 years as compared to 1 year after graduation. A number of degree programmes only show a limited percentage increase. This is the case for archaeology, communications and theology and ideologies. The degree programmes of international relations and international and European law show a strong increase in gross hourly pay and gross monthly pay. But most degree programmes show a moderate career development path. This includes archaeology, theology and ideologies and philosophy. For the first two degree programmes, the gross monthly pay ten years after graduation is about 30% higher than 1 year after graduation whereas this is 58% for all master's degree programmes together.

Appendix II shows the remaining degree programmes with an average entry position on the labour market and career development in the first ten years after graduation. University master's programmes with an average entry position on the labour market and a favourable career development path with respect to the indicators defined are: pharmacy, marketing, artificial intelligence, physics and astronomy, business administration and private law. Master's degree programmes with an average entry position on the labour market and a less favourable career development path are: educational studies, health sciences, pedagogical studies, animal sciences and veterinary medicine.



In general, the labour market position improves with work experience. There is an increase in work and job security and in income. The degree of this increase also depends on personal characteristics, work experience and environmental factors. An analysis shows that the correlation between the labour market indicators upon entry on the labour market and ten years after graduation is very high. A good 81% of the differences in monthly pay after ten years appear to be connected to monthly pay upon entry on the labour market<sup>2</sup>. This figure is 69% for the hourly pay. As regards master's degree programmes, the differences with respect to labour market position increase during the ten years following graduation<sup>3</sup>.

**Table 4: Development of labour market indicators in 2018 for the 2007-2008 cohort 1 year and 10 years after graduation, with respect to degree programmes offering graduates a (very) moderate entry position on the labour market**

Ranking	Master's programme	Rating entry position 2016-2017	Development % permanent job employees	Development gross hourly pay employees	Development gross monthly pay employees	Career development first ten years after entry
72	Literature	very moderate		48%	46%	+
71	Archaeology	very moderate	slightly higher	29%	30%	+
70	Art and culture	very moderate	higher	41%	43%	+
69	Cultural anthropology	very moderate	higher	42%	36%	+
68	Cultural studies	very moderate	higher	52%	61%	++
67	Media studies	very moderate	higher	53%	50%	++
66	History	very moderate	higher	44%	51%	+
65	Linguistics	very moderate	much higher	42%	35%	+
64	Neuroscience	moderate		58%	39%	++
63	Biology	moderate	much higher	51%	49%	++
62	Sociology and social studies	moderate	higher	50%	44%	+
61	International relations	moderate	much higher	71%	73%	+++
60	Political science	moderate	much higher	58%	61%	++
59	Communications	moderate	slightly higher	54%	50%	+
58	Language studies	moderate	higher	42%	39%	+
57	Psychology	moderate	much higher	53%	45%	++
56	Human movement sciences	moderate	much higher	47%	43%	+
55	International and European law	moderate	much higher	71%	70%	+++
54	Philosophy	moderate		37%	41%	+
53	Criminology	moderate	much higher	49%	45%	++
52	Environmental studies	moderate		54%	46%	++
51	Theology and ideologies	moderate	slightly higher	31%	33%	+
	All MD-programmes	average	higher	63%	58%	++

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

<sup>2</sup> The percentages are the squared correlation coefficients ( $R^2$ ) i.e. the explained variation, without any corrections being made for other factors. There is no causal link but correlation.

<sup>3</sup> This is based on the coefficient of variation: the ratio between the standard deviation and the average hourly pay. With regard to university education, this is 10% upon entry on the labour market and 15% after 10 years. With regard to monthly pay, the coefficient of variation is 13% upon entry on the labour market and 19% after 10 years. When considering higher professional education, only the coefficient of variation increases for monthly pay.

### 3. Labour market position after 10 years

The labour market position may change over time. Most graduates have found work, but they do not always have permanent jobs. But job security increases and hourly pay and annual income from work are much higher. Depending on work experience, personal characteristics and other influences, this favourable development will vary on an individual level. By means of administrative data, the labour market position of the 2007-2008 graduation cohort after 10 years has been determined (table 5 and 6 and appendix IV).

On average, university graduates have a better labour market position than graduates from higher professional education (in Dutch HBO), certainly so ten years after graduation. At that time, gross hourly pay is around € 31.00 which is 34% higher than the hourly pay of HBO graduates. The annual income from work is € 71,700 which is 40% higher than the average income of HBO graduates. The percentage of permanent employment is slightly lower after university education (79% for HBO and 76% for university education).

Table 5 contains the master's degree programmes offering a (very) good entry position on the labour market 10 years after graduation for the 2007-2008 cohort. Dentistry is at the top of this list. A very high percentage (90%) of the employees<sup>4</sup> have permanent jobs and they have the highest gross hourly pay and annual income of all degree programmes. The labour market position of degree programmes in the financial-economic field is also very good. Fiscal economics, finance en econometrics are in the top 5, which is completed by fiscal law. Offshore engineering (with a very high annual income) and automotive and maritime technology (with a large share of permanent jobs) may also be labelled "very good". The list furthermore includes other technical studies together with a number of law studies (law, private law, public law).

**Table 5: Degree programmes with a (very) good labour market position after ten years in 2018 for the 2007-2008 cohort**

Ranking	Master's degree programme	Permanent job employees	Gross hourly pay employees (€)	Annual income (€)	Labour market position after 10 years
1	Dentistry	90%	47.20	132,100	very good
2	Fiscal economics	88%	37.80	88,400	very good
3	Finance	84%	36.00	100,700	very good
4	Econometrics	84%	36.60	94,900	very good
5	Fiscal law	87%	35.90	85,000	very good
6	Offshore engineering	81%	35.10	98,900	very good
7	Automotive and maritime technology	90%	32.00	87,400	very good
8	Accounting	84%	34.90	87,600	good
9	Business administration	84%	34.20	87,000	good
10	Economics	83%	34.40	88,100	good
11	Mechanical engineering	92%	30.80	79,300	good
12	Aviation and space technology	85%	33.00	85,400	good
13	Pharmacy	81%	35.40	77,700	good
14	Information studies	85%	31.40	82,100	good
15	Electrical engineering	89%	30.40	75,700	good
16	Private law	82%	33.00	81,100	good
17	Public law	89%	30.20	68,700	good
18	Marketing	84%	30.70	76,700	good
19	Innovation management	83%	32.30	72,800	good
20	Law	84%	31.20	72,000	good
	All MD-programmes	76%	31.00	71,700	average

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

<sup>4</sup> Ten years after graduation, however, nine out of ten dentistry graduates are self-employed.

Table 6 contains the degree programmes with a (very) moderate position on the labour market after ten years for the 2007-2008 cohort. Archaeology is at the top of this list and has a very moderate position. Of all degree programmes, this programme has the lowest gross hourly pay and annual income. The annual income from work after graduation in dentistry is over three times higher. Also, the share of permanent jobs is low, especially in neuroscience (54%).

**Table 6: Degree programmes with a (very) moderate labour market position after 10 years in 2018 for the 2007-2008 cohort**

Ranking	University master's programme	Permanent job employees	Gross hourly pay employees (€)	Annual income (€)	Labour market position after 10 years
67	Archaeology	70%	20.20	39,900	very moderate
66	Neuroscience	54%	25.90	55,500	very moderate
65	Literature	67%	22.80	45,000	very moderate
64	Cultural anthropology	66%	23.90	45,600	very moderate
63	Art and culture	71%	23.50	41,600	very moderate
62	Media studies	69%	24.70	48,400	very moderate
61	Language studies	74%	23.80	43,700	moderate
60	Theology and ideologies	70%	26.50	46,000	moderate
59	Linguistics	77%	24.30	43,300	moderate
58	Biology	73%	24.50	50,200	moderate
57	Veterinary medicine	72%	25.90	51,300	moderate
56	Communications	71%	26.20	56,400	moderate
55	Plant sciences	63%	27.60	69,400	moderate
54	Philosophy	70%	27.70	55,000	moderate
53	Health care psychology	76%	26.90	46,600	moderate
52	Biotechnology	70%	26.00	64,400	moderate
51	Psychology	76%	26.50	49,600	moderate
50	Human movement sciences	74%	26.40	54,300	moderate
49	Cultural studies	73%	26.60	57,200	moderate
48	History	76%	25.60	53,800	moderate
	All MD-programmes	76%	31.00	71,700	average

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

Appendix IV contains a survey of all clusters of master's degree programmes whose graduates have an average labour market position after ten years for the 2007-2008 cohort.

## 4. Degree programmes with the highest number of graduates

Table 7 contains a survey (top 10) of master's degree programmes with the highest number of graduates for the 2016-2017 cohort. These 10 master's degree programmes together form 43% of the total number of graduates. The labour market position in 2018 has been indicated for these ten master's degree programmes ('entry position'). With regard to these ten master's degree programmes, the labour market position in 2018 has also been indicated for the cohort that graduated in 2007-2008, i.e. the labour market position after 10 years.

The business administration programme supplies the highest number of graduates. Over 4,000 students of the 2016-2017 cohort completed this master's degree programme with a university diploma. Its entry position is classified as average. If the 72 master's degree programmes are compared on the basis of their entry position on the labour market, business administration can be ranked as 26th. Ten years after graduation, 67 master's degree programmes can be compared, including business administration. This master's degree programme may be classified as "good" since it achieves a 9th place as regards labour market position.

The master's degree programmes of psychology and communications have a moderate entry position on the labour market and ten years later, this position is still moderate. Graduates in economics have a good entry position and after ten years, this is still the case. Four master's degree programmes have an average labour market position both at the entry and ten years after graduation. It is striking that health sciences and its number of graduates have more than doubled in nine years' time.

The number of graduates of university studies have considerably increased in the past ten years whereas the number of graduates in medicine have declined by 27% to over 2,700 graduates in 2016-2017. After having graduated in medicine, the entry on the labour market can be labelled as 'good' but ten years after graduation, however, this position is slightly adjusted downward to average. When comparing the labour market position of 67 university studies, medicine takes up the 29th place. It should be noted that this may be fully ascribed to the low percentage of graduates having permanent jobs. Ten years after graduation in medicine, only 51% of people in employment have permanent jobs. Gross hourly pay and annual income from work on the other hand, are much higher than average after having completed a university study. So, these are well-paid jobs, while there is also job insecurity. When compared to other master's degree programmes, this job insecurity increases at a slower pace in the ten years after graduation, which implies a downgrade of relative labour market position.

**Table 7: Top 10 master's degree programmes with the highest number of graduates 2016-2017, with entry position (2016-2017 graduation cohort) and labour market position after 10 years (2007-2008 graduation cohort) in 2018**

Master's degree programme	Number of Graduates 2017	Increase graduates 2008-2017	Ranking entry position	Rating entry position	Ranking position after 10 years	Rating position after 10 years
Business administration	4,093	37%	26	average	9	good
Medicine	2,743	-27%	11	good	29	average
Psychology	2,695	19%	57	moderate	51	moderate
Law	2,072	4%	39	average	20	good
Economics	1,533	27%	21	good	10	good
Public administration and management	1,354	60%	38	average	27	average
Communications	1,215	28%	59	moderate	56	moderate
Pedagogical sciences	1,135	5%	40	average	45	average
Health sciences	1,124	105%	34	average	41	average
Building	911	40%	45	average	42	average

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

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## 5. Conclusion

The position on the labour market varies strongly for each degree programme. This applies both to the entry position, 1 year after completion of the degree programme, and to the labour market position 10 years after graduation. The annual income 10 years after graduation in dentistry is over three times higher as the annual income 10 years after graduation in archaeology. Easily finding substantial work, hourly pay, annual income and job security are strongly related to type of study. These differences continue to have an effect. The same degree programmes which offer their graduates a good entry on the labour market also have a relatively strong labour market position after ten years.

The dentistry alumni have the best entry on the labour market, followed by fiscal economics and econometrics alumni. Ten years after graduation, the top 3 still consists of dentistry and fiscal economics, along with finance. Graduates of the master's degree programmes for teaching have a good start - partly due to the fact that graduates are older - but the career development path is less steep. Their hourly pay and annual income increase less than hourly pay and annual income of graduates of other master's degree programmes. Also, educational studies, pedagogical sciences and health sciences show a career development path which is less advantageous in the ten years following graduation.

Usually, graduates of degree programmes with a (very) moderate entry position do not catch up and, sometimes, the situation even gets worse compared to other study programmes when the longer term is considered. This applies, for example, to archaeology and theology. Ten years after graduation, archaeology, neuroscience and literature have the most unfavourable labour market position. There are only two master's degree programmes with a moderate entry position where the career development of its graduates is above-average in the ten years following their graduation: international relations and international and European law. Ten years after graduation, both studies have an average labour market position.

Although there is a high correlation between the entry position and the position on the labour market after ten years, there are some exceptions however. For these programmes, the relative position improves or worsens in the first ten years. This trend could continue in the following years. That is why degree programmes with the highest and lowest increase should also be considered.

In the future, the labour market may change due to fluctuations in demand and supply of labour. There are, for example, periods of economic slowdown and upswing. In so far as these are generic shifts which apply to all degree programmes (for example, a longer time needed to secure a job), this has no impact on the outcomes since relative labour market positions have been assumed as starting point. However, when it concerns specific developments - for example, a duplication of the number of students for study programme X or less demand for programme Y - relative labour market positions will start to shift. Therefore, forecasting research and regular updates of this kind of research continues to be necessary. The method of graduate tracking that has been used in this study has the advantage of being very reliable and complete. Hard data on the basis of registered data have been used. This also means that conclusions may be drawn on a detailed level. Because of the high correlation between the entry position and the position ten years after graduation, there is a justified confidence that differences between degree programmes are fairly robust.

We therefore think that these outcomes are quite suitable for use in study information aimed at prospective students. In addition to interests and competences, labour market information may play a role in making study choices. Openness and honesty contribute to a better match between education and the labour market. It may lead to less students choosing degree programmes offering a moderate labour market position and more students choosing degree programmes offering a good labour market position. It will probably improve the return on investment in education. In addition, better information supply may lead to fewer regrets afterwards.

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## Appendix I Methodical explanation

In order to analyse the labour market position of graduates, anonymised administrative data from the microdata provided by CBS (Statistics Netherlands) have been used. The microdata consist of various data which may be linked on an individual level. The analysis uses educational data from the Education Executive Agency (DUO), income data (wages and benefits) supplied by UWV and the Tax and Customs Administration and personal data from the Personal records Database (BRP). The data refer to graduates living in the Netherlands. These microdata of CBS (Statistics Netherlands) have been processed (including multivariate analysis) by Elsevier and SEO Economic Research and published in *Studie & Werk 2019*. This study presents the data pertaining to 72 clusters of master's degree programmes, provided there are enough observations (at least 10). These 72 clusters of degree programmes have been composed on the basis of all existing master's degree programmes. Five clusters of degree programmes yield insufficient data after 10 years: entrepreneurship, mathematics, computer science, technology and management and sustainability and technology. Because of this, 67 clusters of degree programmes remained to be analysed for this study.

In order to determine the entry position on the labour market of graduates of master's degree programmes, the following four aspects have been considered:

1. The median duration in months from the moment of graduation until substantial work was secured (paid employment, a minimum of three days a week, no on-call/temporary contracts, hourly pay a minimum of 150% of the statutory minimum wages for adults). Composition effects (personal characteristics and some educational features) have been allowed for;
2. Holding a permanent job one year after graduation;
3. The gross hourly pay of employees one year after graduation;
4. The annual income from work in 2018 of both employees and self-employed persons.

Together, these aspects indicate the chance of work, job security and income. Both the hourly pay and the total annual income have been included. The hourly pay is only available for employees and this also applies to holding a permanent job. Graduates from some degree programmes often opt for self-employment, such as dentistry. In this way, the annual income (both for employees and self-employed persons) is more representative for the generated income than the hourly pay for employees. The annual income is also important to the extent that the number of hours worked is an involuntary choice. Many recent graduates would possibly opt for a higher number of hours laid down in their contracts but are unable to obtain them due to lack of work. Hourly pay has also been included in the entry position composite indicator. In so far as the number of hours worked reflect a voluntary choice of the employee, hourly pay is a better representation than total income. The four aspects have been combined into one composite variable through four Z scores. The ranking has been determined on the basis of this composite variable. The composite variable and the four aspects have been qualitatively classified through the quantile method. Doing so, the following limits have been used:

- 10% of the degree programmes are classified as 'very good';
- 20% of the degree programmes are classified as 'good';
- 40% of the degree programmes are classified as 'average';
- 20% of the degree programmes are classified as 'moderate';
- 10% of the degree programmes are classified as 'very moderate';

For the 2007-2008 cohort, three labour market indicators have been considered ten years after graduation:

- The percentage of employees holding permanent jobs in September 2018;
- The gross hourly pay of employees in September 2018;
- The annual income from work in 2018 of both employees and self-employed persons.

To determine career development, the 2007-2008 cohort has been tracked, both 1 year and 10 years after graduation, so in 2018. It concerns the development of hourly pay, monthly pay and the percentage of permanent jobs. The annual income is available in the microdata as from 2011 and can therefore not be determined for the 2007-2008 cohort with regard to the income 1 year after graduation. In the case of hourly and monthly pay, the variation in percentage terms is considered; in the case of permanent employment, the odds ratio has been calculated. On the basis of this odds ratio, the improvement in the percentage of permanent work has been divided into three categories: 30% much higher, 40% higher and 30% slightly higher. To indicate overall career development, the three indicators have been standardised, added up and divided into three categories on the basis of the quantile method: 30% with a slight improvement (+), 40% with an average improvement (++) and 30% with a strong improvement (+++).

Foreign students who return to their native countries after graduation or Dutch students who move abroad after graduation have not been accounted for in the analyses. For these categories, no observations can be made as to employment and earnings.

## Appendix II Average entry position 2016-2017 cohort

Degree programmes with an average entry position on the labour market in 2018 for the 2016-2017 cohort

Ranking	Master's degree programme	Months until substantial work employees	Permanent job employees after 1 year	Gross hourly pay employees (€)	Annual income (€)
23	Veterinary medicine	2.5	22%	19.30	39,000
24	Educational studies	6.7	41%	18.20	37,900
25	Artificial intelligence	4.2	34%	17.40	40,800
26	Business administration	5.4	41%	17.20	38,500
27	Plant sciences	6.0	46%	16.80	36,000
28	Food technology	5.9	45%	16.70	35,600
29	Private law	5.7	29%	17.80	39,700
30	Physics and astronomy	6.2	31%	17.50	40,900
31	Sustainability and technology	5.2	33%	17.90	36,200
32	Pharmacy	3.2	21%	17.90	39,500
33	Chemistry and chemical technology	6.6	32%	17.10	41,100
34	Health sciences	6.2	33%	17.30	35,400
35	Public law	6.1	29%	17.20	38,400
36	Animal sciences	6.8	49%	15.70	32,500
37	Biotechnology	6.5	39%	16.00	36,100
38	Public administration and management	7.2	28%	17.10	37,800
39	Law	7.3	27%	17.20	36,800
40	Educational studies	7.2	29%	17.70	32,500
41	Industrial design	8.7	34%	16.40	35,700
42	Human resource management	7.4	33%	16.00	35,700
43	Earth sciences	7.4	32%	16.20	35,100
44	Biomedical sciences	5.3	26%	16.10	35,200
45	Building	7.7	34%	15.80	34,400
46	Health care psychology	5.9	19%	17.70	32,300
47	Marketing	8.1	33%	15.80	34,800
48	Town and country planning	7.6	31%	16.10	33,800
49	Social geography	7.6	30%	16.10	32,200
50	Entrepreneurship	8.4	32%	16.20	31,100
	All MD-programmes	5.0	32%	17.50	38,900

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

## Appendix III Career development of graduates having an average entry position

Development of labour market indicators in 2018 for the 2007-2008 cohort 1 year and 10 years after graduation, with regard to degree programmes having an average position for the 2016-2017 cohort

Ranking	Master's degree programme	Development % permanent job employees	Development gross hourly pay employees	Development gross monthly pay employees	Career development first ten years after graduation
23	Veterinary medicine	slightly higher	50%	54%	+
24	Educational studies		35%	22%	+
25	Artificial intelligence		78%	75%	+++
26	Business administration	higher	77%	72%	+++
27	Plant sciences		67%	67%	++
28	Food technology		69%	56%	++
29	Private law	higher	73%	66%	+++
30	physics and astronomy		75%	68%	+++
31	Sustainability and technology				
32	Pharmacy		74%	62%	+++
33	Chemistry and chemical technology		63%	59%	++
34	Health sciences	higher	36%	27%	+
35	Public law		59%	50%	
36	Animal sciences		55%	38%	+
37	Biotechnology		56%	52%	++
38	Public administration and management	higher	57%	51%	++
39	Law	much higher	62%	53%	++
40	Educational studies	higher	39%	23%	+
41	Industrial design	higher	69%	66%	++
42	Human resource management	higher	69%	59%	++
43	Earth sciences		50%	42%	++
44	Biomedical sciences	much higher	62%	51%	++
45	Building	higher	56%	50%	++
46	Health care psychology	much higher	53%	36%	++
47	Marketing	much higher	86%	78%	+++
48	Town and country planning		63%	51%	++
49	Social geography		56%	48%	++
50	Entrepreneurship				
	All MD-programmes	higher	63%	58%	++

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)



## Appendix IV Average labour market position after 10 years 2007-2008 cohort

Degree programmes with an average labour market position after 10 years in 2018 for the 2007-2008 cohort

Ranking	Master's degree programme	Permanent job employees	Gross hourly pay employees (€)	Annual income (€)
21	Chemistry and chemical technology	82%	30.20	78,200
22	Civil engineering	84%	29.50	74,800
23	Food technology	85%	29.60	71,700
24	International and European law	79%	32.00	74,100
25	Teaching social studies	89%	30.00	59,600
26	Human resource management	85%	29.60	66,900
27	Public administration and management	81%	30.50	71,200
28	Physics and astronomy	78%	30.50	76,300
29	Medicine	51%	41.00	88,500
30	Teaching languages	87%	30.00	54,300
31	Teaching science subjects	84%	29.90	58,500
32	Artificial intelligence	74%	31.50	72,300
33	Town and country planning	83%	27.50	64,400
34	Criminology	82%	28.00	63,700
35	International relations	72%	29.70	71,800
36	Social geography	81%	27.60	59,900
37	Political science	74%	29.50	67,700
38	Educational studies	81%	28.00	53,800
39	Industrial design	75%	28.50	61,600
40	Sociology and social studies	77%	27.30	58,500
41	Health sciences	77%	27.40	55,300
42	Building	78%	26.40	57,900
43	Animal sciences	81%	24.80	53,400
44	Earth sciences	78%	26.20	53,400
45	Educational studies	79%	26.40	46,100
46	Environmental studies	75%	26.40	54,800
47	Biomedical sciences	67%	28.60	62,700
	All MD-programmes	76%	31.00	71,700

Source: SEO Economic Research/Elsevier Weekblad on the basis of CBS (Statistics Netherlands) Microdata processed by UWV (2020)

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