

The salary of PhD holders inside and outside academia: something to be satisfied with?

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PHD HOLDERS AND SALARY

Do PhD holders earn more than employees with a master's degree? That is the question many potential PhD candidates ask themselves and to which we formulated an initial answer in ECOOM brief 9. Based on the data of the Labour Force Survey for Belgium, we found that PhD holders earned 490 euros more net per month than those with a masters' degree. We also found significant gender differences: the pay slip of male PhD holders indicated a net salary of 586 euro/month more than that of female PhD holders. This gender difference is greater for PhD holders than for employees with a master's degree. This study took into account various characteristics of the labour market position of the employees, including professional category, seniority, supervision responsibility, sector, working hours, (unpaid) overtime and type of contract (see ECOOM brief 9). Research based on the survey "Career of Doctorate Holders" also provides evidence that male PhD holders earn more gross than female PhD holders (Boosten, Vandeveld, Derycke, in Kaat, Van Rossem, 2014).

Are the salaries of PhD holders employed within academia significantly different from the salaries of PhD holders who left academia? The Flemish Council for Science and Innovation (VRWI) and HayGroup (2016) made the comparison between Belgian academic salaries with similar positions on the non-academic labour market. Jobs were divided into four categories: pre-doctoral job positions or *first stage researcher* (up

established researcher (8 - 10 years of experience) and *leading researcher* (10+ years of experience). This comparison showed that for *first stage researchers* and *recognized researchers* the academic salaries are in line with the non-academic salaries. For *established researchers* this was to a lesser extent the case: non-academic salaries are higher.

SALARY AND SATISFACTION WITH SALARY

A lot of research indicates that the link between salary level and the satisfaction with that salary is not so strong (Judge, Piccolo, Podsakoff, Shaw, & Rich, 2010). A possible explanation is the reference group thinking: the employee does not solely judge the salary, but does this in comparison to the salary of his/her colleagues. The degree to which employees are satisfied with salaries appears to be a strong predictor of important work outcomes, such as turnover (intentions), absenteeism and work performance (Heneman & Judge, 2000; Williams et al., 2006).

What do we already know from previous research about the satisfaction with salaries of academics in Flanders? Research by Boosten et al (2014), based on data collected in 2010, shows that PhD holders employed at the university are generally satisfied with their salary. According to other research satisfaction varies across careers: *first stage researchers* reported the highest salary satisfaction, *recognized researchers* on the other hand reported the lowest salary satisfaction. *Established* and *leading researchers* reported a salary satisfaction that was in between the two other groups (VRWI, 2016).

Are PhD holders employed in academia more or less satisfied compared to PhD holders employed in other sectors? The research of Boosten et al. (2014) shows that there are hardly any differences in satisfaction between PhD holders employed at the university compared to other sectors. However, these results date from 2010 and are not broken down by gender. We will look for an answer and also look at the role of gender in the story.

More specifically, we ask ourselves the following questions:

1. How satisfied are PhD holders with their salary?
2. Does satisfaction with salary differ according to gender?
3. Does satisfaction with salary differ according to science cluster?
4. Does satisfaction with salary differ according to career path?

ANSWERS BASED ON THE PHD CAREER SURVEY

We answer the questions above based on the PhD Career Survey conducted by ECOOM in 2017. For a detailed discussion we refer to ECOOM Brief 25. For a visual presentation we refer to the website <https://www.phdcareersflanders.com/en/>. In short: the PhD Career Survey maps the career paths of PhD holders who obtained their PhD at one of the Flemish universities. In what follows we analyze the answers of 2982 PhD holders. The central question they answered concerning salary satisfaction was formulated as followed: "In your current job, please indicate how you feel about your salary". The answers could vary from "very dissatisfied" (=1) to "very satisfied" (=5).

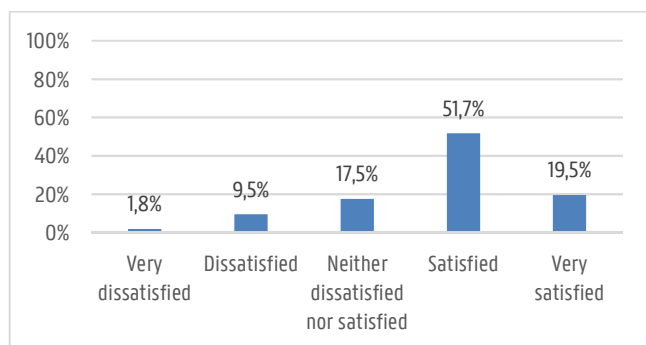
In the analyses we differentiate according to gender, science cluster and career path. We use the Chi square test and Cramer's V. Results are considered significant at $p < .05$. Both tests check whether the results differ significantly from each other. Cramer's V is less dependent on the sample size than Chi square. In science cluster and career path, post hoc comparisons were made using Chi square and Cramer's V where each category is compared to one other. Because of an increased chance of a Type 1 error, a stricter significance level was used for the post hoc comparisons (namely $p < .01$). These post-hoc comparisons provide insight into which categories differ significantly from each other.

HOW SATISFIED ARE PHD HOLDERS WITH THEIR SALARY?

Figure 1 shows that the majority of PhD holders are (very) satisfied with their salary (71.2%) while 11.3% indicated to be (very) dissatisfied. About 17.5% indicated that they were "neither satisfied nor dissatisfied".

In what follows, we disregard the group "neither satisfied nor dissatisfied" and look at who is most satisfied with their pay slip. We do this by grouping the PhD holders who indicated to be "very dissatisfied" or "dissatisfied" in the category "(very) dissatisfied" ($N=335$). The PhD holders who indicated to be "satisfied" or "very satisfied" were grouped in the category "(very) satisfied" ($N=2107$).

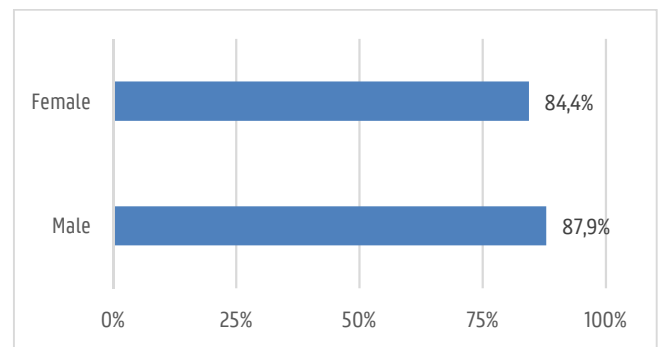
Figure 1: Distribution of salary satisfaction among PhD holders ($N= 2962$)



DOES SATISFACTION WITH SALARY DIFFER ACCORDING TO GENDER?

Looking only at gender ($N=2442$), the share of (very) satisfied male PhD holders (87.9%) is significantly larger compared to the share of (very) satisfied female PhD holders (84.4%) ($X^2(1)=6.09$, $p < .05$; Cramer's $V = .0$, $p < .05$).

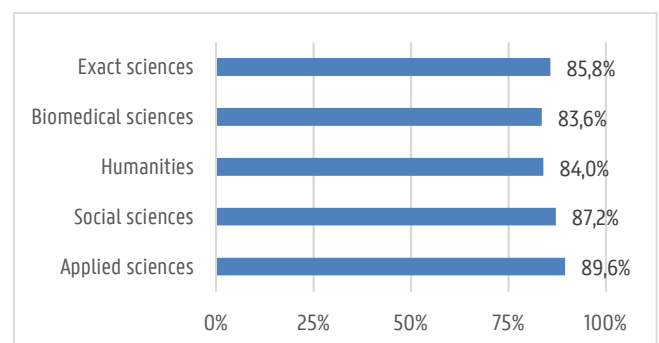
Figure 2: Share of PhD holders who are (very) satisfied with their salary for men and women ($N = 2442$).



DOES SATISFACTION WITH SALARY DIFFER ACCORDING TO SCIENCE CLUSTER?

Figure 3 shows that the share of PhD holders who are (very) satisfied with their salary varies between 83.6% for holders of a PhD in biomedical sciences and 89.6% for holders of a PhD in applied sciences. If the PhD was successfully defended in human sciences, 84.0% are (very) satisfied with the salary, whereas 85.8% with a PhD in exact sciences are satisfied, and 87.2% with a PhD in social sciences are satisfied. Significance tests indicate a significant relationship between science cluster on the one hand and salary satisfaction on the other hand ($X^2(4)=10.74$, $p < .05$; Cramer's $V = .07$, $p < .05$). Additional post-hoc comparisons with a stricter significance level ($p < .01$, see above) showed that the share of (very) satisfied PhD holders in applied sciences is significantly larger compared to the share of (very) satisfied PhD holders in biomedical sciences ($X^2(1)=8.7$, $p < .01$; Cramer's $V = .09$, $p < .01$). The difference in the share of (very) satisfied PhD holders was marginally significant for the human and applied sciences ($X^2(1)=6.56$, $p = .01$; Cramer's $V = .08$, $p = .01$).

Figure 3: Share of PhD holders who are (very) satisfied with their salary broken down by science cluster in which the PhD was obtained ($N= 2441$).



DOES SATISFACTION WITH SALARY DIFFER ACCORDING TO CAREER PATH?

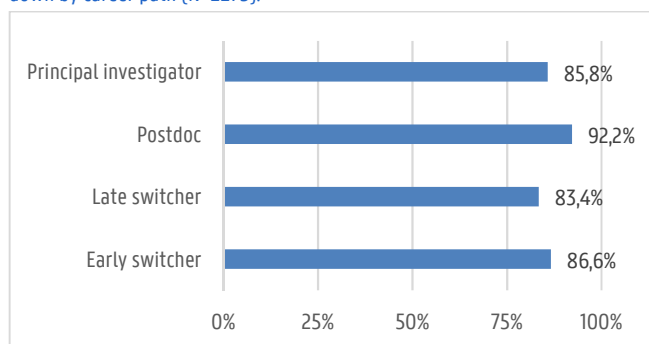
Does the salary satisfaction of PhD holders within the academic sector differ from the salary satisfaction of PhD holders employed in other sectors? Do those who first had a post-doc appointment differ from those who immediately exchanged the academic world for a job outside academia in terms of salary satisfaction? In what follows we distinguish four different career paths: (1) the "early switcher": PhD holders in a non-academic job who left academia immediately after their PhD (33%); (2) the "late switcher": PhD holders in a non-academic job who still had an academic appointment after their PhD (29%); (3) "postdoc": postdoctoral researchers (16%); (4) "principal investigator": Independent Academic Personnel or Professors (ZAP) (22%). For more details on the different career paths we refer to ECOOM brief 25.

Figure 4 shows the share of PhD holders who are (very) satisfied with their salary according to the different career paths. Statistical tests indicate significant differences in satisfaction depending on the career path ($X^2(3) = 16.15, p < .01$; Cramer's $V = .08, p < .01$). Post hoc comparisons with a stricter applied significance level ($p < .01$, see above) show that the share of (very) satisfied "postdocs" is significantly larger than the share of (very) satisfied "early switchers" ($X^2(1) = 7.69, p < .01$; Cramer's $V = .08, p < .01$), and "late switchers" ($X^2(1) = 16.09, p < .001$; Cramer's $V = .13, p < .001$). Also, the share of (very) satisfied "principal investigators" was significantly larger than that share among "late switchers" ($X^2(1) = 8.77, p < .01$; Cramer's $V = .10, p < .01$).

DOES SATISFACTION WITH SALARY DIFFER ACCORDING TO CAREER PATH AND GENDER?

Table 1 shows the shares of satisfied male and female PhD holders with their salary for the different career paths. There appear to be significant differences by gender ($X^2(3) = 16.15, p < .001$, Cramer's $V = .01, p < .01$). In Table 1 we show for each career path the share of men and women that is (very) satisfied with their salary.

Figure 4: Share of PhD holders who are (very) satisfied with their salary broken down by career path ($N=2273$).



First we will focus on the difference between career paths for both men and women. For male PhD holders, we do not find any differences in percentages ($X^2(3) = 7.44, p > .05$; Cramer's $V = .08, p > .05$). For female PhD holders, we see differences in salary satisfaction according to the chosen career path ($X^2(3) = 22.73, p < .001$; Cramer's $V = .15, p < .001$). The

post hoc comparisons among women show that some of the differences noted are indeed significant. For example, for women the share of satisfied "early switchers" is significantly smaller than the share of satisfied "postdocs" ($X^2(1) = 9.69, p < .01$; Cramer's $V = .14, p < .01$). Also the share of satisfied "late switchers" is significantly smaller than the share of satisfied "postdocs" ($X^2(1) = 18.88, p < .001$; Cramer's $V = .19, p < .001$) and "principal investigators" ($X^2(1) = 8.92, p < .01$; Cramer's $V = .13, p < .01$). If we compare men and women within each career path, post hoc comparisons show that there is only a significant gender difference in salary satisfaction among the "late switchers" ($X^2(1) = 10.68, p < .001$; Cramer's $V = .13, p < .001$). Within the other career paths, there is no significant gender difference in the share of PhD holders who are satisfied with their salary.

Table 1. Satisfaction with salary among PhD holders broken down by career path and gender ($N=2273$)

	Early switcher	Late switcher	Postdoc	Principal investigator	Total
Gender					
Male	89.2%	87.9%	91.5%	83.9%	87.9%
Female	83.5%	78.4%	92.9%	88.9%	84.7%
Tota	86.6%	83.4%	92.2%	85.8%	86.4%

DISCUSSION

Our findings show that more than 4 out of 5 PhD holders who obtained their PhD from a Flemish university are satisfied or very satisfied with their salary. The share of (very) satisfied PhD holders is the largest in applied sciences, a significant difference with the share of (very) satisfied PhD holders in biomedical sciences. The chosen career path also appears to be associated: for example, the share of (very) satisfied PhD holders is larger among postdocs compared to the other three career paths. A possible explanation for this - in line with the reference group thinking - is that a postdoc will see few differences in salary when (s)he compares his or her own salary with that of other postdocs or PhD holders in a comparable position outside the university. In other words, there is little reason for relative deprivation. From VRWI research from 2016, we remember that the salaries of postdocs, especially in the first 7 years of their careers, are quite in line with the market, but after that they become relatively lower compared to salaries in non-academic jobs. There is no room to negotiate wages within the academic world. Research into the added value of a PhD on the Flemish labor market showed that many PhD holders start a non-academic job at a lower salary level than their peers without a PhD (Stassen, Levecque, & Anseel, 2016). Often, a sub-optimal preparation for the application and salary negotiations are partly the cause. For those who wish to prepare better for finding work as a PhD student or PhD holder, we refer to San Giorgi and Van Daele (2016). Platforms such as Glassdoor and Loonwijzer (<https://www.jobat.be/nl/loonwijzer>) can provide information about the functioning of an organization or of current salaries.

In general, we see that the share of PhD holders who are (very) satisfied is larger among men than women. We note 87.9% and 84.4% respectively, a significant difference that is actually caused by the

gender difference recorded among late switchers. This gender difference in salary satisfaction may partly reflect the gender difference in realized salary: male PhD holders receive an average net salary of 586 euros more per month compared to female PhD holders (see ECOOM brief 9). For gender differences in wages, various explanations are put forward (Charness & Gneezy, 2012), including differences in the sector of employment, promotion opportunities or job requirements. Research also shows time and time again that women assume that their talents will be noticed on the job, and therefore negotiate less strongly on their starting salary (Baron, 2003). A recent study by SD Worx (2019) showed that women not only have a lower starting salary more often, but also benefit less from other extra-legal benefits. For example, more men have a salary bonus or a profit bonus (De Smet, 2019). In some cases, this is the result of a conscious choice to forego a salary bonus in exchange for more vacation days. In many cases, however, this is the result of lower pay for equal work. In ECOOM brief 9, we already reported on the continuing salary difference between male and female PhD holders even though crucial factors such as sector, professional category, seniority, supervision responsibility, sector, working hours, (unpaid) overtime and contract type were taken into account. Also in the current research, we find that the difference in salary satisfaction between male and female PhD holders remains if we take into account the number of working hours (analyses not shown). These analyses once again show that the salary satisfaction of male PhD holders does not differ according to the career path followed. However, this was the case for female PhD holders: the share of satisfied female postdocs is significantly larger than the share of satisfied female PhD holders who left the academic world (both "early and later switchers"). Also the share of satisfied female "principal investigators" is significantly larger than the share of satisfied female "late switchers".

REFERENCES

- Baron, L.A. (2003). Ask and you shall receive? Gender differences in negotiators' beliefs about requests for a higher salary. *Human Relations, 56*(6), 635-662. doi: 10.1177/00187267030566001
- Boosten, K., Vandevelde, K., Derycke, H., te Kaat, A., Van Rossem, R. (2010). Careers of Doctorate Holders Survey 2010. In K. Boosten & K. Vandevelde (Eds.) *Research Series in R&D and Innovation in Belgium*. Brussels, Belgium.
- Charness, G., & Gneezy, U. (2012). Strong Evidence for Gender Differences in Risk Taking. *Journal of Economic Behavior & Organization, 83*(1), 50-58. doi: 10.1016/j.jebo.2011.06.007
- De Smet, D. (2019, 16 juli). *Salariswagen is mannenzaak*. De Standaard. Retrieved from [op www.destandaard.be](http://www.destandaard.be)
- Heneman, H. G., & Judge, T. A. (2000). Compensation attitudes. In S. L. Rynes, & B. Gerhart (Eds.), *Compensation in organizations* (pp. 66-103). San Francisco: Jossey-Bass.
- Judge, T.A., Piccolo, R.F., Podsakoff, N.P., Shaw, J.C., & Rich, B.L. (2010). The relationship between pay and job satisfaction: a meta-analysis of the literature. *Journal of Vocational Behavior, 77*(2), 157-167. doi: 10.1016/j.jvb.2010.04.002
- Levecque, K., Baute, S., Van Rossem, R., Anseel, F. (2014). *Money, money, money... Over doctorate, lonen en gender*. ECOOM Brief 9.
- San Giorgi, C., & Van Daele, J. (2016). *Wat nu? Werk vinden dat bij je past: een praktische gids*
- SD Worx, 2019. *Flexibele verloning zit in de lift*. Retrieved from: <https://www.sdworx.be/nl-be/pers/2019/2019-03-19-flexibele-verloning-zit-in-de-lift>
- Stassen, L., Levecque, K., & Anseel, F. (2016). *PhDs in transitie: wat is de waarde van een doctoraat buiten de universiteit?*
- Williams, M. L., McDaniel, M. A., & Nguyen, N. T. (2006). A meta-analysis of the antecedents and consequences of pay level satisfaction. *Journal of Applied Psychology, 91*, 392-413.
- VRWI (2016). *Studiereeks 27: Doorstroom van doctoraathouders naar de arbeidsmarkt*.

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