

What are the chances? How PhD candidates perceive their employment chances for different sectors

Auteurs: Tinneke Van Hecke¹, Lien Wille¹, Katia Levecque¹, Anneleen Mortier¹

¹ ECOOM–Ghent University, Department of Work, Organisation and Society

The PhD Career survey conducted by ECOOM Ghent University in 2017 shows that PhD holders in Flanders follow different career paths. Some of them stay in academia, but the vast majority are employed in the non-academic labor market (ECOOM-Brief 25). On the non-academic labor market, PhD holders are mainly employed by private companies doing Research & Development (R&D), the government, private companies without R&D, and research institutes (ECOOM-Brief 42). A minority of PhD holders works in higher education outside university, a hospital, the non-profit sector or other sectors.

How do PhD candidates in Flanders view their career (opportunities) after the PhD? Although two in three PhD candidates in Flanders consider a PhD in their field of study as an added value for future employers outside university (ECOOM-Brief 41), only four in ten PhD candidates are (very) satisfied with the career opportunities on the non-academic labor market (ECOOM-Brief 31). We also note low satisfaction levels for the academic career opportunities: only three in ten PhD candidates are (very) satisfied (ECOOM-Brief 37).

Zooming in on specific sectors of employment, we know that PhD candidates in Flanders are mainly interested in the university, the private sector and the government as a future workplace and less interested in higher education outside university, non-higher education, the non-profit sector or a hospital (ECOOM-Brief 36). However, we do not yet know how PhD candidates perceive their chances of working in the specific employment sectors after obtaining their PhD. Therefore, we answer the following questions in this letter:

1. *How do PhD candidates perceive the chances that they will work in specific sectors after their PhD?*
2. *Do the perceived employment chances differ according to gender?*
3. *Do the perceived employment chances differ according to doctoral phase?*
4. *Do the perceived employment chances differ according to science cluster?*

5. *Do the perceived employment chances differ according to nationality?*

To answer these questions, we use the *Survey of Junior Researchers (SJR)* 2018 (see ECOOM-Brief 17). This survey was organized by ECOOM Ghent University and addressed all junior researchers at the five Flemish universities. For the current analyses, we limit ourselves to those junior researchers who are pursuing a PhD at the time of the survey ($N = 3359$).

HOW DO PHD CANDIDATES PERCEIVE THE CHANGES THAT THEY WILL WORK IN SPECIFIC SECTORS AFTER THEIR PHD?

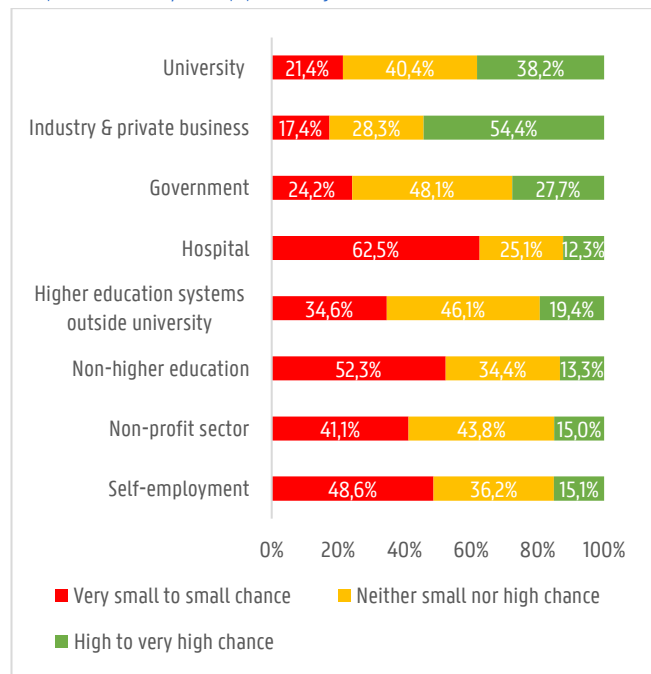
We asked PhD candidates the question "What are the chances that you would work in the following sectors (organisations) in the future?". The response options were 'very small to small', 'neither small nor large', and 'large to very large'. Figure 1 shows the proportion of PhD candidates who indicated each of these response categories per sector. Looking at the **(very) high chances** of employment, we note that half of the PhD candidates consider the chance of ending up in the industry & private business (very) high, while 2 in 5 PhD candidates think they can stay at university. For the government, 1 in 4 PhD candidates rate the likelihood of working in that sector as (very) high. For higher education systems outside university, it is 1 in 5 PhD candidates. For the hospital, non-higher education, non-profit and self-employed sectors, only 1 in 7 to 1 in 8 PhD candidates perceive the chances as (very) high.

Regarding the proportion of PhD candidates who perceive their employment chances as **(very) small**, we see the opposite pattern: this proportion is highest for the hospital sector (3 in 5) and lowest for the industry & private business (1 in 5).

Finally, we find that for most sectors there is a relatively large proportion of PhD candidates who experience **neither small nor large**

employment chances. This share is the largest for the government (1 in 2) and the smallest for the hospital (1 in 4).

Figure 1. PhD candidates and their perceived employment chances in different sectors, Flanders 2018 ($N_{\text{university}} = 2975$, $N_{\text{industry \& private business}} = 2972$, $N_{\text{government}} = 2972$, $N_{\text{hospital}} = 2949$, $N_{\text{higher education systems outside university}} = 2952$, $N_{\text{non-higher education}} = 2959$, $N_{\text{non-profit sector}} = 2958$, $N_{\text{self-employed}} = 2963$)

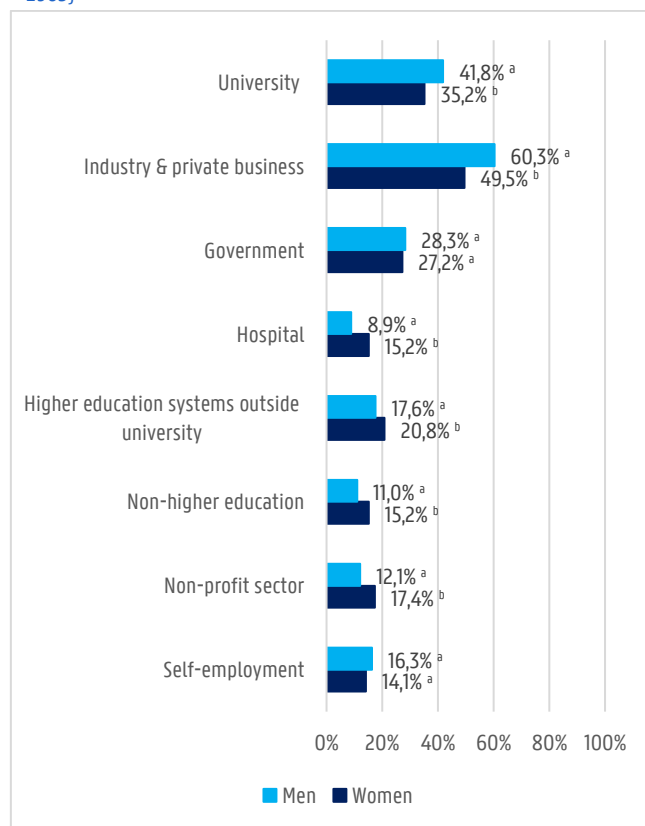


DO THE PERCEIVED EMPLOYMENT CHANCES DIFFER ACCORDING TO GENDER?

To answer this and the following research questions, we look at the proportion of PhD candidates who perceived their chance to be employed in a particular sector as 'large to very large'. We compare this group with PhD candidates who perceived their chance to be employed in a particular sector as 'very small to small' or 'neither small nor large'. Figure 2 shows the proportion of male and female PhD candidates who rate the chances of working in a specific sector in the future as (very) large. For both males and females, the top three sectors with the highest perceived chances of employment are (1) the industry & private business, (2) the university, and (3) the government.

We also note that significantly more male PhD candidates than female PhD candidates perceive a (very) high probability of working at the *university* or in the *industry & private business* in the future. For the *hospital*, *higher education outside university*, *non-higher education*, and the *non-profit sector*, there are significantly more female PhD candidates who rate the probability of working there in the future as (very) high. Male and female PhD candidates do not differ in their perceived employment chances for the *government* and *self-employed* sectors.

Figure 2. Percentage PhD candidates who perceive their employment chances as high to very high per sector, according to gender, Flanders 2018 ($N_{\text{university}} = 2975$, $N_{\text{industry \& private business}} = 2972$, $N_{\text{government}} = 2972$, $N_{\text{hospital}} = 2949$, $N_{\text{higher education systems outside university}} = 2952$, $N_{\text{non-higher education}} = 2959$, $N_{\text{non-profit sector}} = 2958$, $N_{\text{self-employed}} = 2963$)

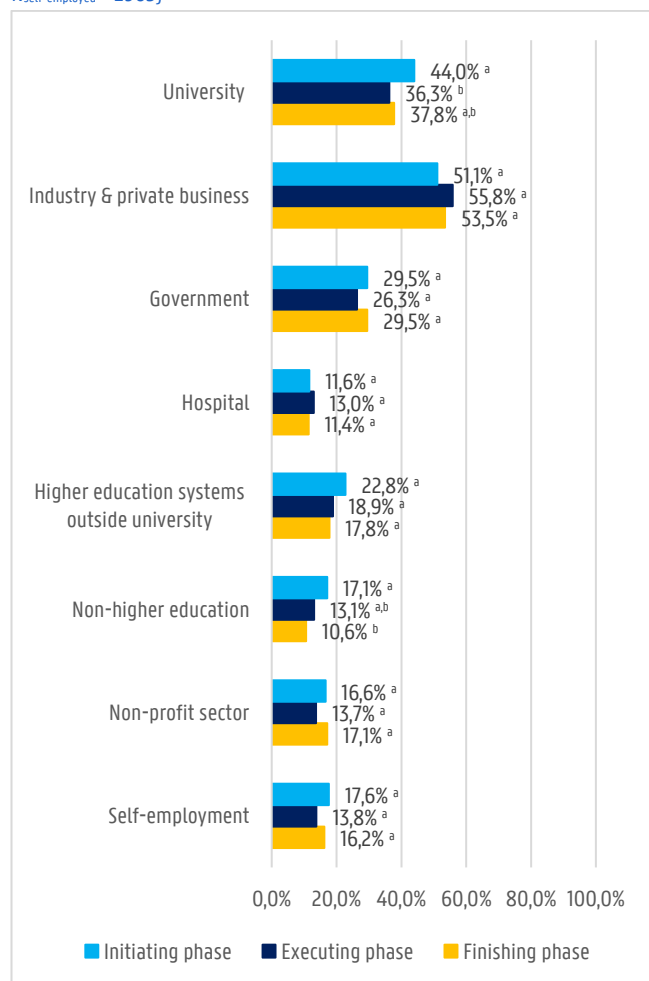


Note. Significance based on Chi²-test. For each sector the percentages with the same superscript letter do not differ from each other. For instance, for the sector government both the percentages of men and women have the superscript letter a. This means that the percentage of men who perceived their chance to be employed in the sector government as (very) large is as large as that percentage of women. In contrast for the sector university the percentages of men and women have a different superscript: men have the superscript letter a, while women have the superscript letter b. This means that the two percentages differ significantly from each other. In this example it means that the percentage of men who perceived their employment chances as large in a university is larger than that percentage of women.

DO THE PERCEIVED EMPLOYMENT CHANCES DIFFER ACCORDING TO DOCTORAL PHASE?

Would PhD candidates rate their chances of employment differently depending on their doctoral trajectory stage? Figure 3 illustrates that the top three of sectors for which PhD candidates perceive the probability of working there in the future as (very) high, consists of the industry & private business, the university, and the government for the initiating phase, the executing phase as well as the finishing phase. Comparing the different phases, we find significant differences only for the university and non-higher education. Post-hoc analyses with a more strictly applied significance level ($p < 0.01$) show that the proportion of PhD candidates who consider it (very) likely that they will be able to keep working at the *university* in the future is higher in the initial phase than in the executing phase. For the *non-higher education sector*, this share is larger in the initial phase than in the finishing phase. For both sectors, there is no difference between PhD candidates in the executing phase and PhD candidates in the finishing phase.

Figure 3. Percentage PhD candidates who perceive their employment chances as high to very high per sector, according to doctoral phase, Flanders 2018 ($N_{\text{university}} = 2975$, $N_{\text{industry \& private business}} = 2972$, $N_{\text{government}} = 2972$, $N_{\text{hospital}} = 2949$, $N_{\text{higher education systems outside university}} = 2952$, $N_{\text{non-higher education}} = 2959$, $N_{\text{non-profit sector}} = 2958$, $N_{\text{self-employed}} = 2963$)



Note. Significance based on Chi²-test and post-hoc comparisons. For each sector the percentages with the same superscript letter do not significantly differ from each other

DO THE PERCEIVED EMPLOYMENT CHANCES DIFFER ACCORDING TO SCIENCE CLUSTER?

Figure 4 shows the proportion of PhD candidates who perceive the chances of working in a specific sector after their PhD as (very) high, according to science cluster.

For PhD candidates in exact and applied sciences, the top three sectors with (very) high perceived chances of employment are (1) industry & private business, (2) university and (3) government. The top three among PhD candidates in the social sciences consists of the same three sectors, but industry & private business and government swap places. Among PhD candidates in biomedical sciences, the third place is not the government but the hospital sector. Finally, in the top 3 of PhD candidates in the human sciences, the university ranks 1, the government ranks 2, and higher education outside university ranks 3. Comparing science clusters, we find that there are no differences in perceived employment chances for the *university*, but there are differences for all non-academic sectors.

Post-hoc analyses ($p < 0.01$) show that for the *industry & private business* the proportion of PhD candidates who perceive employment chances as (very) high, is highest in the applied sciences, followed by the exact sciences, biomedical sciences, social sciences and humanities. In the *government*, *higher education systems outside university*, and the *non-profit sector*, the proportion of PhD candidates who rate the probability (very) high of working in these sectors in the future is higher in the humanities and the social sciences than in the exact, biomedical and applied sciences. Furthermore, for the higher education systems outside university, this proportion of PhD candidates is greater in the humanities than in the social sciences, while the reverse is true for the non-profit sector.

Looking at the *hospital*, we note two important differences. First, the proportion of PhD candidates who consider it (very) likely to be able to work there in the future is higher in the biomedical sciences than in the four other clusters. Second, this share is higher among PhD candidates in the social sciences than in the humanities.

For *non-higher education*, we observe three significant patterns. First, the proportion of PhD candidates who perceive the probability of working there in the future as (very) high is higher in the humanities than in the other four science clusters. In addition, the proportion also appears to be higher among PhD candidates in the social sciences than in the applied sciences. Finally, the proportion of PhD candidates who rate the probability of being employed in education outside higher education as (very) high appears to be higher in the exact sciences than in the biomedical and applied sciences.

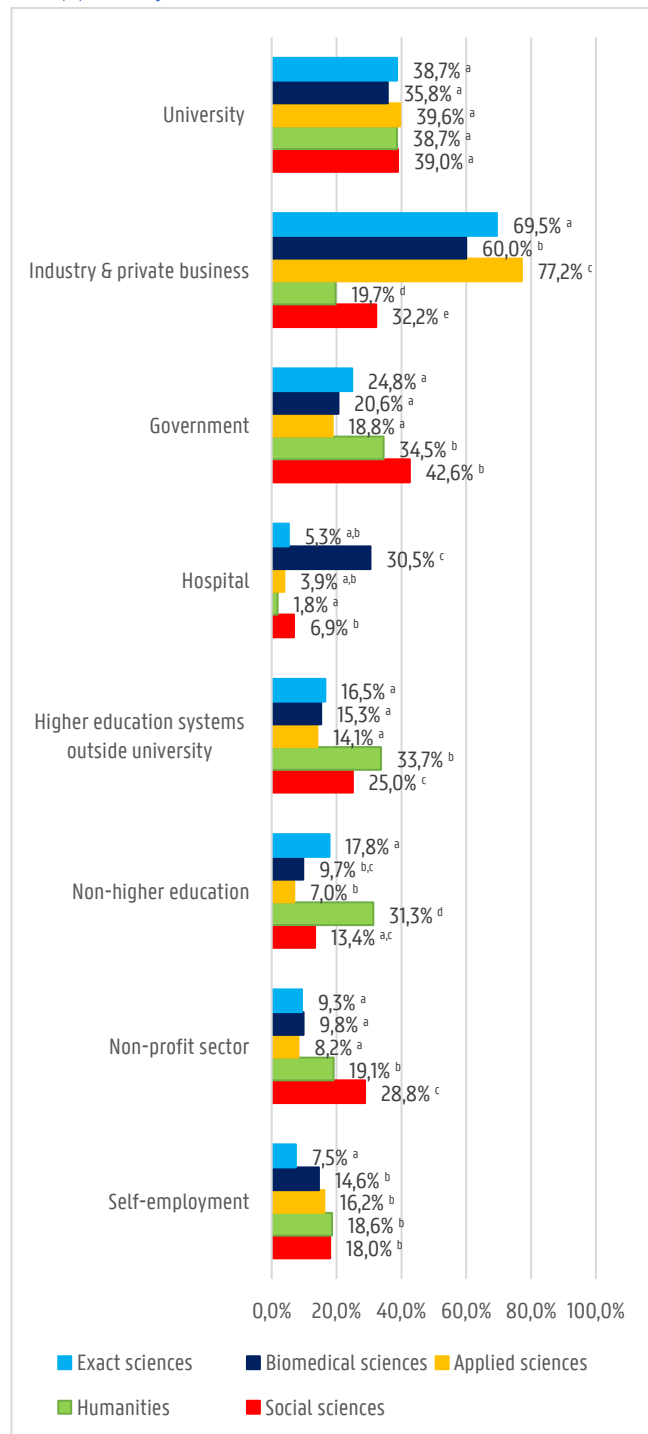
Finally, we find that the proportion of PhD candidates who perceive the likelihood of being *self-employed* after their PhD as (very) high is smaller in the exact sciences than in the four other science clusters.

DO THE PERCEIVED EMPLOYMENT CHANCES DIFFER ACCORDING TO NATIONALITY?

Do Belgian PhD candidates rate the chances of employment in specific sectors differently than international PhD candidates? Figure 5 shows the proportion of PhD candidates who consider the probability of working in a specific sector in the future as (very) high for Belgian PhD candidates, PhD candidates from EU-28 countries, and PhD candidates from non-EU countries.

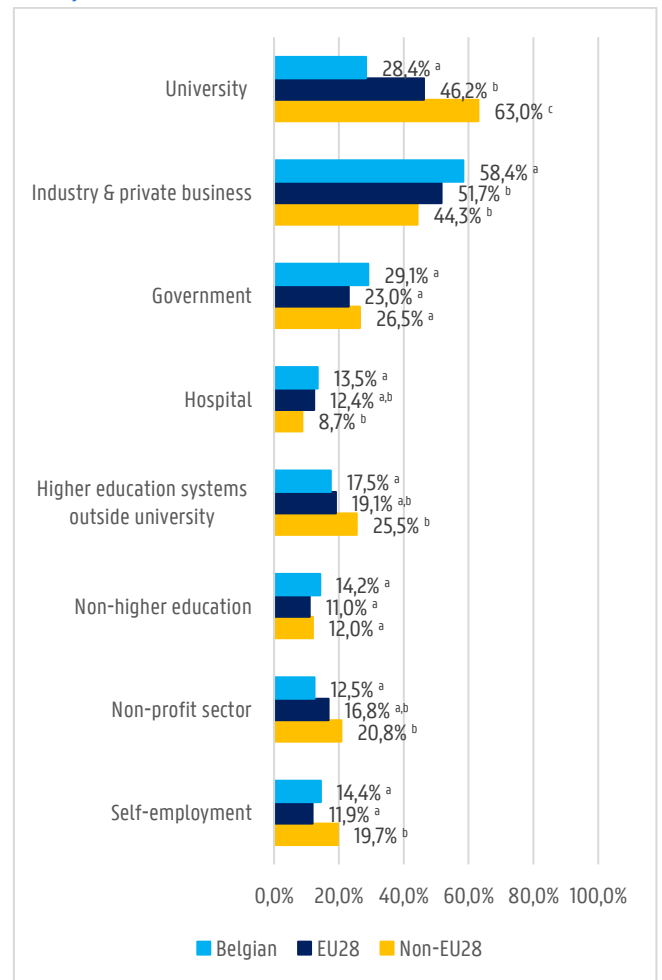
Regardless of nationality, the top 3 sectors for which PhD candidates rate the likelihood as (very) high to work there in the future are university, industry & private business and government. The order of the sectors however differs. For Belgian PhD candidates, the top 3 is as follows: (1) industry & private business, (2) government and (3) university. Among PhD candidates from EU-28 countries, university and government swap places. Looking at PhD candidates from non-EU countries, the order is: (1) university, (2) industry & private business and (3) government.

Figure 4. Percentage PhD candidates who perceive their employment chances as high to very high per sector, according to science cluster, Flanders 2018 ($N_{\text{university}} = 2975$, $N_{\text{industry \& private business}} = 2972$, $N_{\text{government}} = 2972$, $N_{\text{hospital}} = 2949$, $N_{\text{higher education systems outside university}} = 2952$, $N_{\text{non-higher education}} = 2959$, $N_{\text{non-profit sector}} = 2958$, $N_{\text{self-employed}} = 2963$)



Note. Significance based on Chi²-test and post-hoc comparisons. For each sector the percentages with the same superscript letter do not significantly differ from each other

Figure 5. Percentage PhD candidates who perceive their employment chances as high to very high per sector, according to nationality, Flanders 2018 ($N_{\text{university}} = 2952$, $N_{\text{industry \& private business}} = 2949$, $N_{\text{government}} = 2949$, $N_{\text{hospital}} = 2926$, $N_{\text{higher education systems outside university}} = 2929$, $N_{\text{non-higher education}} = 2937$, $N_{\text{non-profit sector}} = 2935$, $N_{\text{self-employed}} = 2940$)



Note. Significance based on Chi²-test and post-hoc comparisons. For each sector the percentages with the same superscript letter do not significantly differ from each other.

Comparing nationalities, we found that there are no differences for the *government* and *non-higher education* sectors. There are differences for all other sectors.

Post-hoc analyses ($p < 0.01$) show that the proportion of PhD candidates who perceive (very) high chances of continuing to work at the *university* in the future is larger for PhD candidates from countries outside the EU-28 than for PhD candidates from EU-28 countries, which in turn is larger than that proportion of Belgian PhD candidates.

For the *industry & private business*, we note that the proportion of PhD candidates who perceive (very) high employment chances for this sector is larger for Belgian PhD candidates than for international PhD candidates.

For the *hospital*, *non-university higher education*, and *non-profit sectors*, we observe in each case a significant difference between Belgian PhD candidates and PhD candidates from countries outside the EU-28. For the hospital sector, the proportion of PhD candidates who estimate the probability of working there as (very) high is higher for Belgian PhD candidates than for PhD candidates from countries outside

the EU-28. For higher education systems outside university, and the non-profit sector, the proportion of PhD candidates who perceive the probability to be (very) high is higher for PhD candidates from non-EU countries than for Belgian PhD candidates.

The proportion of PhD candidates who perceive the probability of being *self-employed* in the future as (very) high is higher for PhD candidates from countries outside the European Union than for PhD candidates from Belgium or EU-28 countries.

DISCUSSION

The purpose of this brief was to map the perceived employment chances for eight sectors, specifically university, industry & private business, government, hospital, higher education systems outside university, non-higher education, non-profit sector, and self-employment. Our findings show that the top three sectors with (very) high perceived employment chances are industry & private business, university and government. Even when we disaggregate by gender, doctoral phase, science cluster and nationality, we always observe the same top three, with the exception for the biomedical sciences and the humanities. Instead of the government, the hospital sector wraps up the top three among PhD candidates in the biomedical sciences. Among PhD candidates in the humanities, the industry & private business is replaced by higher education systems outside university. These perceived employment chances are in line with the sectors in which PhD candidates show the most interest to work in after obtaining their PhD (ECOOM-Brief 36) and the sectors in which PhD holders are employed (see [PhD Careers in Flanders](#)).

Looking at **gender**, the findings are in line with how PhD holders advance at the university and move to the non-academic labor market. For example, more male than female PhD candidates perceive (very) high employment chances at the *university* and more men than women become a professor (ECOOM-Brief 39). Regarding the non-academic sectors, more male than female PhD candidates perceive the probability as (very) high of working in the *industry & private business* after the PhD, while the opposite is true for *hospital*, *higher education systems outside university*, *non-higher education*, and the *non-profit sector*. Consistent with this, ECOOM-Brief 42 reports that more male than female PhD holders are employed in the private sector with R&D and more female than male PhD holders are employed in higher education systems outside university and the non-profit sector among the PhD holders whose first job after the PhD is a non-academic job.

Regarding the **doctoral phase**, we only observe a difference in perceived employment chances for the university and non-higher education. More PhD candidates in the initiating phase perceive (very) high employment chances at the *university* than in the executing phase. Our survey offers no answer as to why this is the case. A hypothesis could be that the proportion of PhD candidates showing interest in a career at the university is higher in the initial phase than in the other phases (ECOOM-Brief 36). In addition, there are several initiatives that inform PhD candidates about different career options, like the [Interuniversity Job Market for Young Researchers](#) or the new VLIR-initiative [Job Shadowing for PhD Candidates and Postdocs](#) that allows PhD candidates to

experience a non-academic job for a couple of days. These initiatives potentially ensure that PhD candidates not only receive accurate information about the limited opportunities for an academic career (ECOOM-Brief 39), but also that they get a better idea of the range of non-academic career opportunities (see ECOOM-Brief 42 and [PhD Careers in Flanders](#)), like entrepreneurship (see ECOOM-Brief 23 and the [interview series 'A PhD and entrepreneurship'](#)). For *non-higher education*, there are more PhD candidates in the initiating phase than in the finishing phase who consider the probability of being able to work there in the future as (very) high. We note no differences in perceived employment chances between PhD candidates in the executing phase and PhD candidates in the finishing phase.

When we look at **science cluster**, we note no significant differences among PhD candidates in how they perceive employment chances at the *university*. Regarding the non-academic sectors, PhD candidates' perceptions are in line with the findings of the PhD Career study. For example, more PhD candidates in the humanities and social sciences than in the exact, biomedical, and applied sciences perceive employment chances to be (very) high for the *government*, *higher education systems outside university*, and the *non-profit sector*. Among the PhD holders who have a non-academic job as a first job after their PhD, PhD holders from the humanities and the social sciences are also more employed in these sectors than PhD holders from the exact, applied, and biomedical sciences (ECOOM-Brief 42). In addition, more PhD candidates in the social sciences than the humanities consider themselves (very) likely to work in a *hospital*. Consistent with this, among PhD holders who have a non-academic job immediately after obtaining the PhD, more PhD holders from the social sciences than the humanities work in a hospital (ECOOM-Brief 42). Finally, we note that the probability of being *self-employed* in the future is less often perceived as (very) high by PhD candidates in the exact sciences than PhD candidates in the other four science clusters.

In terms of **nationality**, we mainly observe differences between Belgian PhD candidates and PhD candidates from countries outside the European Union. When we look at the interests of international PhD candidates, they appear to be mainly interested in a career outside of Flanders, both academic and non-academic (ECOOM-Brief 36). In addition, some scholarships that allow international PhD candidates to come to Flanders, require that they return to their country of origin to work after obtaining their PhD. Also, to obtain an academic position in the country of origin, it may be a condition that the PhD was obtained abroad (including Flanders). International PhD candidates may therefore think of the labor market outside Flanders when assessing the chances of employment. This labor market and economy may differ from those in Flanders, possibly leading to differences in perceived employment chances.

The findings regarding perceived employment chances among PhD candidates are in many cases in line with the observed patterns of employment among PhD holders. This suggests that perceived employment chances for different sectors are related to subsequent employment in those sectors. Longitudinal research in which individuals are surveyed during and after the PhD can provide more insight into this

and offer additional tools to further optimize the careers of PhD holders.

REFERENCES

- [ECOOM-Brief 23](#) - Mortier, A., Levecque, K. & Verlinden, L. (2020). Life after ... or next to the PhD: how PhD candidates look at a career of self-employment. ECOOM Ghent University.
- [ECOOM-Brief 25](#) - Mortier, A., Levecque, K. & Debacker, N. (2020). You have a PhD! What's next? The career paths of PhD holders. ECOOM-Ghent University.
- [ECOOM-Brief 31](#) - Legrand, V., Mortier, A., Levecque, K. & Wille, L. (2020). PhD candidates and their satisfaction with non-academic career opportunities. ECOOM Ghent University.
- [ECOOM-Brief 36](#) - Wille, L., Legrand, V., Levecque, K. & Mortier, A. (2021). In which sectors are doctoral candidates interested to work after completing their PhD? A look at Flanders in 2018. ECOOM Ghent University.
- [ECOOM-Brief 37](#) - Mortier, A., Levecque, K., Carletto, E., & Wille, L. (2021). How satisfied are doctoral candidates with their academic career opportunities? ECOOM Ghent University.
- [ECOOM-Brief 39](#) - Debacker, N. (2021). On the academic postdoctoral track in Flanders (Belgium) after obtaining a PhD. ECOOM Ghent University.
- [ECOOM-Brief 41](#) - Van Hecke, T., Wille, L., Levecque, K., & Mortier, A. (2022). Going for gold: How do doctoral candidates perceive the value of a PhD for the non-academic labor market? ECOOM Ghent University.
- [ECOOM-Brief 42](#) - Mortier, A., Levecque, K., Wille, L. (2023). Employment of PhD holders: non-academic sectors mapped. ECOOM Ghent University.

Disclaimer: This ECOOM-brief reports findings of scientific research conducted by ECOOM-Ghent University. Analyses and interpretations are the responsibility of the authors. They are not formal policy positions of the Flemish Government and Flemish authorities.