HEA | HIGHER EDUCATION AUTHORITY
AN tÚDARÁS um ARD-OIDEACHAS

# Findings from CSO Analysis of Doctoral Graduate Outcomes

**HEA Research Policy Section in collaboration with HEA Statistics Section and statistics provided by the Central Statistics Office**

# Contents

# Context: Data On Doctoral Graduate Outcomes

In recent times, there has been discussion on the amount of data available on Doctoral graduate outcomes and the importance of tracking the careers of Doctoral graduates[1] to illustrate the 'value-added' dimension of a postgraduate research qualification. In November 2022, as part of the work of the National Framework for Doctoral Education (NFDE) Advisory Forum (Co-Chaired by the Higher Education Authority & Quality Qualifications Ireland), a Career Tracking Working Group (CTWG) was setup to investigate the potential for a longitudinal national Doctoral career tracking system.

Early discussions that took place in the CTWG focused on what data could be utilised in a potential national Doctoral career tracking system. In March 2023, Valerie Harvey (Head of Performance Evaluation) from the HEA and Brian Stanley (Statistician) representing the Central Statistics Office (CSO) on behalf of Kieran Culhane (Senior Statistician) presented to the CTWG on the data currently captured in the **HEA Graduate Outcomes Survey** and the **CSO Higher Education Outcomes Report**. The presentations provided insights on and a helpful baseline from the data currently captured on Doctoral outcomes and provoked discussion as to whether more data gathered through the **CSO's Educational Longitudinal Database (ELD)** could be used to further illustrate research graduate outcomes.

Following the CTWG meeting held in March 2023, the HEA and CSO met several times to discuss how further exploration of data on Doctoral graduate outcomes in the ELD could assist in informing the work of the CTWG. From these meetings, it was proposed that the CSO's Data Science and Statistical support team would provide analytical support to the project team and CSO statistician, Paddy Furlong, would carry out analysis with the aim of identifying what Doctoral graduate outcomes data is currently available in the ELD that is not being captured in existing reports.

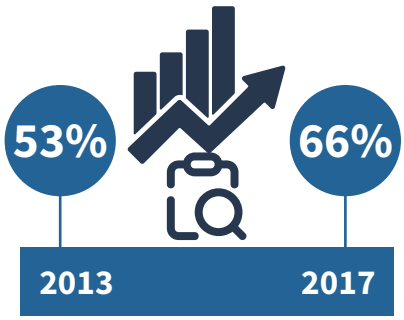
1 *National Review of State Supports for Doctoral Researchers* at https://www.gov.ie/pdf/?file=https://assets.gov.ie/261655/13774a0b-e8c9-4956-bb62-336250ad6038.pdf#page=null, 27–30.

In 2021,

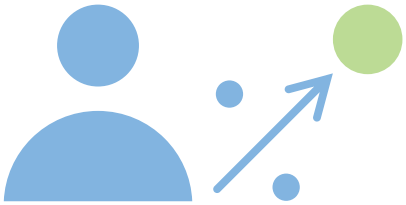
**82%**

of all Doctoral graduates had a valid PPSN in the ELD and for Irish nationals specifically there was 97% coverage.

Employment only levels 5 years post-graduation from 2013 to 2017 have grown significantly. For example, in 2017, 5 years after graduation **66%** of Doctoral graduates were in employment only, while in 2013, **53%** were in employment only.




Doctoral graduates successfully enter the labour market with higher earnings than those with lower levels of educational qualification.



The CSO data indicates that up to 7 years after graduation, **33%** of Doctoral graduates are assumed to be working abroad. It was found that **49.3%** of doctoral graduates who were assumed to be working abroad were Irish nationals.


The CSO data identified that 7 years after graduation males were more likely to have a weekly salary of more than **€1,600 per week** compared to females (**35%** of males compared to **25%** of females).

One year after graduation there is greater parity between males and females for those making over **€1,600 per week** with 9% of males and 7% of women making over €1,600 per week.

**€1,600**

# Key Points in Summary

1. **PPSN Coverage** – In 2021, 82% of all Doctoral graduates had a valid PPSN in the ELD and for Irish nationals specifically there was 97% coverage. This enhanced coverage means that administrative data outcomes for the majority of Doctoral graduates will be available for a future longitudinal tracking mechanism. This will, undoubtedly, provide a rich evidence base for policy makers to utilise in informing research policy formation. The challenge of tracking international Doctoral students who qualify in Ireland but who may not have a PPSN and/or leave post qualification to return to their home countries or elsewhere remains an issue for Ireland. Research completed by the CTWG, and which is evidenced in the report of the CTWG report 2024 shows that this is a challenge being experienced by other countries implementing career tracking systems for Doctoral students.

2. **Employment Levels** – Positive signs can be seen in the CSO data related to employment levels of Doctoral graduates. Employment only levels 5 years post-graduation from 2013 to 2017 have grown significantly. For example, in 2017, five years after graduation 66% of Doctoral graduates were in employment only, while in 2013, 53% were in employment only. Given the strong competition for roles in academia[2], it is reassuring that the skills developed by Doctoral graduates in their studies are being utilised in other roles and could also suggest that the skillset of Doctoral graduates is being more recognised by employers.

3. **Comparative Earnings** – All national and international evidence indicates that Doctoral graduates successfully enter the labour market with higher earnings than those with lower levels of educational qualification.

4. **Researcher Mobility** – The CSO data indicates that up to seven years after graduation, 33% of Doctoral graduates are assumed to be working abroad. It was found that 49.3% of doctoral graduates who were assumed to be working abroad were Irish nationals. This finding suggests that the standard of an Irish doctoral degree has equipped Doctoral graduates with the necessary knowledge, skills and abilities to forge careers outside of Ireland. The encouraging aspect of this is that experience gathered by Doctoral graduates while abroad can deliver a positive impact upon returning to Ireland by both enriching the research ecosystem and providing economic benefits. The CSO data is also of relevance to Impact 2030 and its aim to support international mobility by giving an indication of the number of Irish Doctoral graduates who have worked abroad.

5. **Differences in Pay by Gender** – The CSO data identified that seven years after graduation males were more likely to have a weekly salary of more than €1,600 per week compared to females (35% of males compared to 25% of females). This could indicate that there may still be barriers to females compared to their male counterparts in progressing their careers and obtaining senior positions. One year after graduation there is greater parity between males and females for those making over €1,600 per week with 9% of males and 7% of women making over €1,600 per week. However, it is important to caveat this by saying that pay band figures

2 *The Scientific Century, securing our future prosperity* at https://royalsociety.org/-/media/policy/publications/2010/4294970126.pdf 14.

can be affected by a number of things, such as the sector of the economy in which graduates work and current market conditions etc. The pay bands in this analysis also only reflect the average weekly earnings and do not take into account the number of hours worked.

# Approach to Analysis

This report supplements the evidence base already available on Doctoral graduates and is intended to be used to better inform the HEA and its stakeholders on the career outcomes of Doctoral graduates from the Irish system; and to assist in demonstrating trends in employment, including how that employment may diversify over time. In doing so it can enhance our understanding of how these graduates adapt to the evolution of the labour market and respond to broader societal and environmental challenges.

This report should be read in conjunction with information published by the HEA, reports such as the CSO Higher Education Outcomes series and CSO Household Surveys (which are general and specific surveys of households and individuals which assist the CSO in the accurate measurement of employment and unemployment in Ireland), and the OECD's Education at a Glance (EAG) survey (which can provide internationally comparable data).

Any future enhancement of qualitative analysis of the career outcomes of these graduates will provide more contextual information for the statistics provided here and insights into reasons Doctoral graduates may move, change and adapt in their employment. A substantial amount of Doctoral graduate outcomes data was analysed and aggregated statistical tables were shared with the CTWG to provide an overview of the administrative data currently available on Doctoral graduate outcomes in the ELD and where it could be potentially used further to understand graduate career outcomes. The HEA would like to thank the CSO for the time and resources made available for the completion of the analysis.

The CSO analysed the data over the course of three months while the work of the CTWG was being progressed. The HEA and CSO agreed on the categories of data from the ELD to be analysed and which are listed below:

## General Distributions

- Number of Doctoral graduates
- PPSN coverage
- Doctoral graduate age
- Nationality

## Doctoral Graduate Outcomes

- High level outcomes after graduation
- Employment outcomes after graduation
- Detailed breakdown of employment within education classes
- Doctoral graduates returning to Irish employment
- Salaries after graduation
- Job churn analysis of Doctoral graduates
- Employment sectors for graduates with both P35 and self-employment in different sectors

The CSO's role was limited to the provision of aggregated statistics to the CTWG and it is important to note that any analysis, conclusions or recommendations made in this report are the HEA's alone. It should also be noted that methodology and definitions applied to the data are those used by the CSO for their usual reporting purposes.

The pilot project was extremely valuable to the CTWG in the development of its recommendations for its report on "Developing a National System for Understanding Career Outcomes of Postgraduate Researchers from the Irish System". As well as informing the CTWG with its work, the data analysed in the pilot project builds on data that is currently publicly available through its provision of enhanced insights into the career outcomes of Doctoral graduates.

Key findings from the CSO's statistics are presented in the following report with an aim to help build the evidence base around longitudinal Doctoral career outcomes, to aid in policy development and to inform decision making around doctoral education. It is the intention for this report to be used to suggest how administrative data sources could be further leveraged to augment insights into career outcomes for Level 10 graduates and to enhance the information available on learning outcomes over time.

# Comparative Insights

As noted above, this report should be read in conjunction with data and information already published by the HEA, CSO and other sources. For a better understanding of comparative levels of employment for graduates from levels 6–10 we can use data available from the CSO[3] which indicates that NFQ levels 9–10 graduates have higher levels of employment, and employment and education, than graduates from NFQ levels 6–8 as set out in the chart below for 2019.

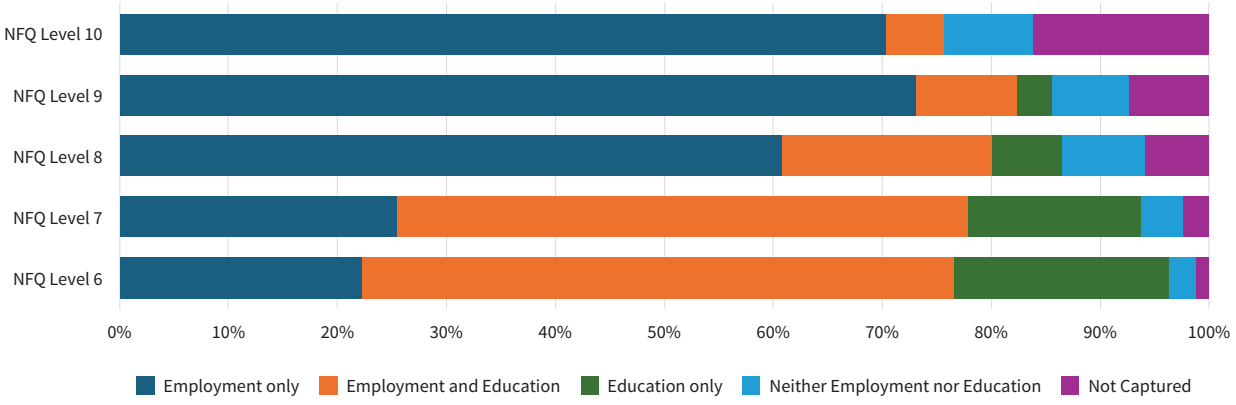



*Figure 1: Destination outcomes of 2019 graduates in first years after graduations by NFQ level.*

The data below shows that Doctoral graduates are more likely to be working in education (pink), professional, scientific and technical activities (purple), industry (brown) and public administration and defence (dark green) than other award level.

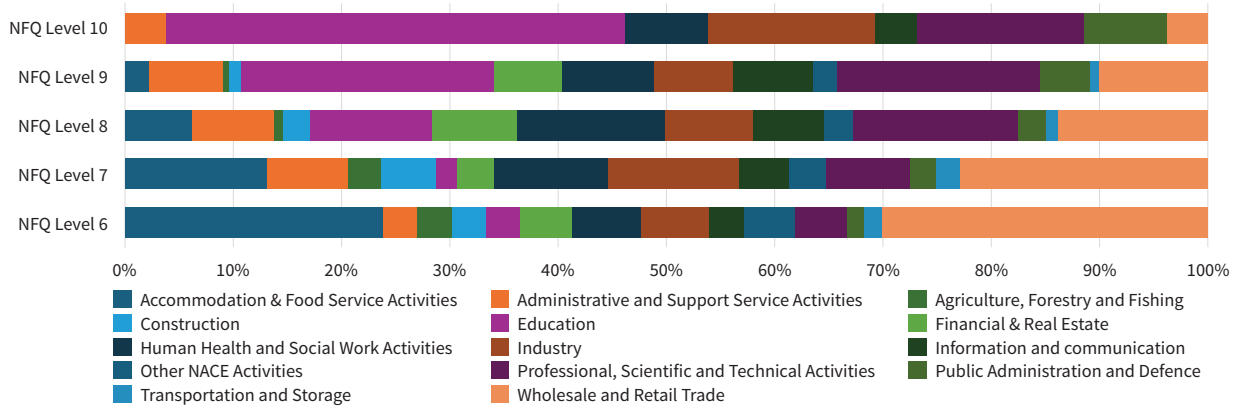



*Figure 2: NACE sectors of substantially employed 2019 graduates in first year after graduation, by NFQ level.*

3 https://www.cso.ie/en/releasesandpublications/ep/p-heo/highereducationoutcomes-graduationyears2010-2019/

The following CSO chart shows that doctoral graduates earn more one year after graduation than any other award level, and that this finding has stood for a decade.

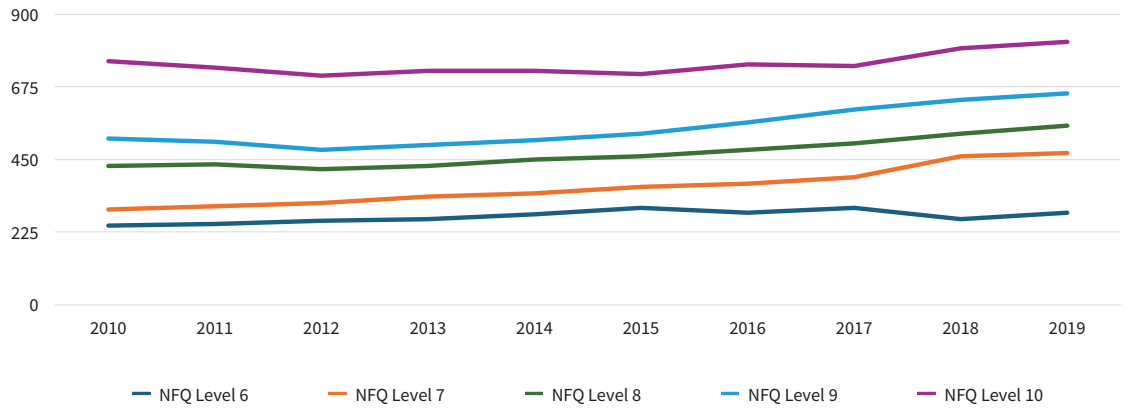



*Figure 3: Median weekly earnings for graduates in first year after graduation by NFQ level (Real values, base= Dec 2016.*

A direct comparison of Level 8 and Level 10[4] earnings taking time in the labour force into account shows that one year after graduation at level 10, median weekly earnings are €755 and five years after graduation at level 8, median weekly earnings are €670. Five years after graduation at level 10, median weekly earnings are €980 and nine after graduation at level 8, median weekly earnings are €905.

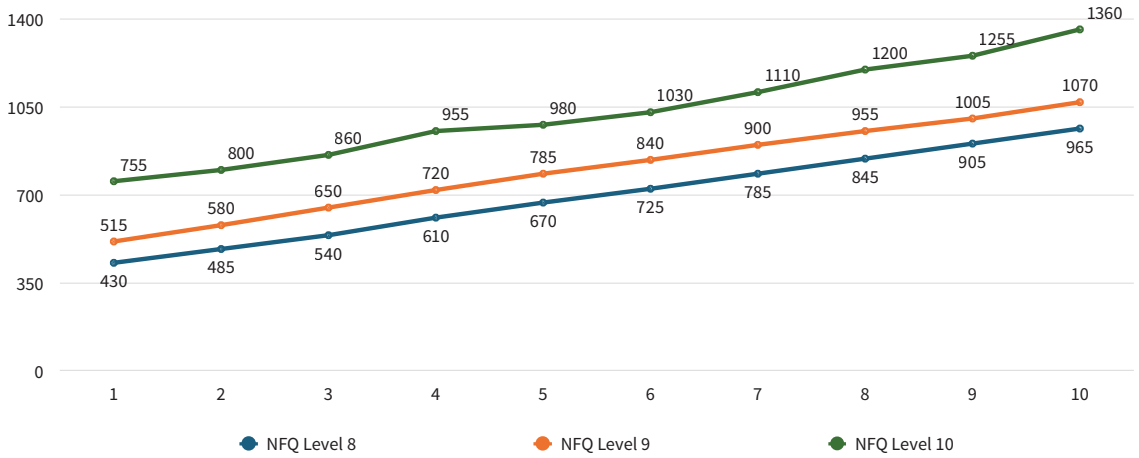



*Figure 4: Median Weekly Earnings of Graduates, up to 10 years after graduation.*

The Graduate Outcomes Survey also collects information on employment and the occupations of graduates.

4 https://data.gov.ie/dataset/heo12-graduate-earnings

Figures from the HEA's Graduate Outcomes Survey Class of 2022[5] shows that 89.7% of Postgraduate Research graduates (levels 9–10) were employed nine months after graduation with a total of 72.9% earning more than €40,000 per annum. In total, 13.1% of this cohort earned over €80,000 in comparison with 10.5% of Postgraduate Taught Graduates and 1.7% of Undergraduate Honors Degree Graduates.

The Class of 2022 survey shows that Professional Occupations were the most common occupation type for Doctoral graduates (64.7%). Additionally, nearly two in three graduates were on permanent or open-ended contracts (63.5%). While this report will show variations across disciplines it broadly demonstrates that doctoral graduates from the Irish higher education system are in a strong position in terms of opportunity uptake in the labour market.

Turning to international data, the OECD Education *At a Glance 2022* report shows that those 25–64 year olds with Doctoral or equivalent education have an employment rate of 94% which is the highest employment rate of all levels of educational attainment.[6] Data for Ireland similarly shows that Doctoral graduates have the highest employment rates of all levels of education.

5 https://hea.ie/statistics/graduate-outcomes-data-and-reports/graduate-outcomes-survey-2022/

6 https://www.oecd-ilibrary.org/education/employment-rates-of-25-64-year-olds-by-educational-attainment-2022_4896b858-en

# Analysis of General Distributions

## Number of Doctoral Graduates

The number of Doctoral graduates for the years 2010 to 2021 is captured in the CSO data with 18,068 Doctoral students graduating from 2010 to 2021 and 1,530 graduating in 2021. The average number of Doctoral graduates per year from 2010 to 2021 was 1,506. When looking at gathering longitudinal data on Doctoral Outcomes, it is important to know the number of Doctoral Graduates in the system as this will influence the meaningful conclusions that can be drawn from the data. Figure 5 presents an overview of the total number of Doctoral graduates from 2010–2021.

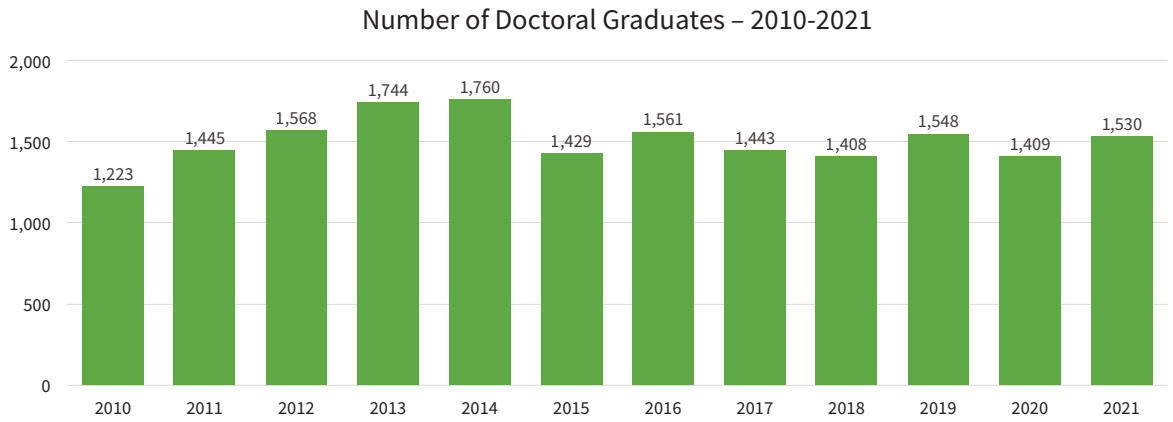



*Figure 5: Number of Doctoral Graduates – 2010-2021.*

The CSO data on the number of Doctoral graduates also provides longitudinal outcomes for each yearly cohort of Doctoral graduates that will be analysed further in this report. Accumulative longitudinal outcomes are available across the following ranges:

- Up to 7-year outcomes available for those who graduated between 2010 and 2015
- Up to 5-year outcomes for those who graduated in 2016 & 2017
- One-year outcomes for graduates between 2018 and 2021

Figure 6 presents the Doctoral longitudinal outcomes available by year from 2010 – 2021 and the number of graduates without any recorded PPSN, for whom outcomes could not be tracked, is also shown.

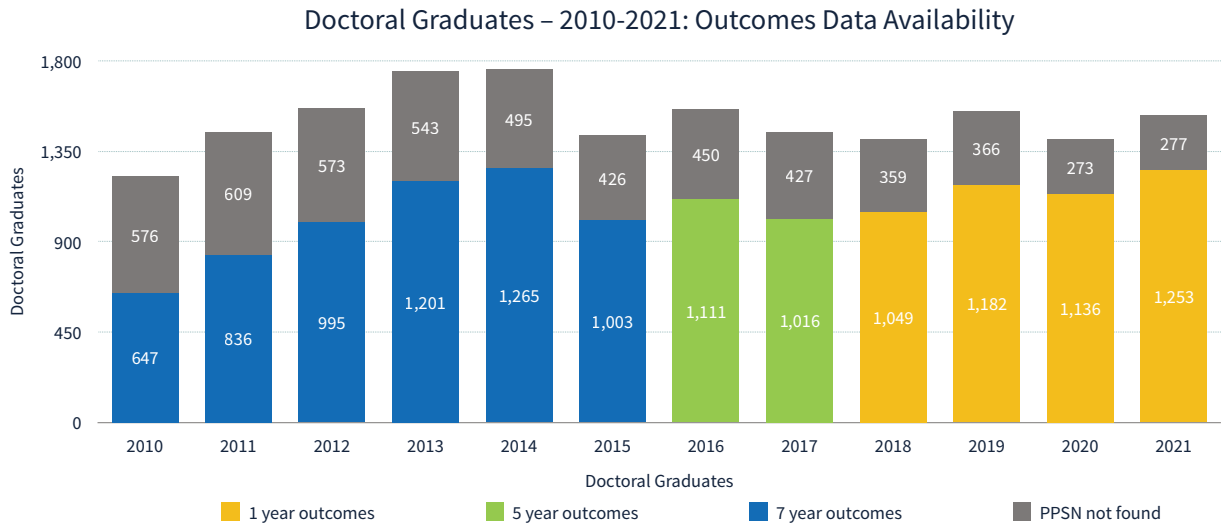


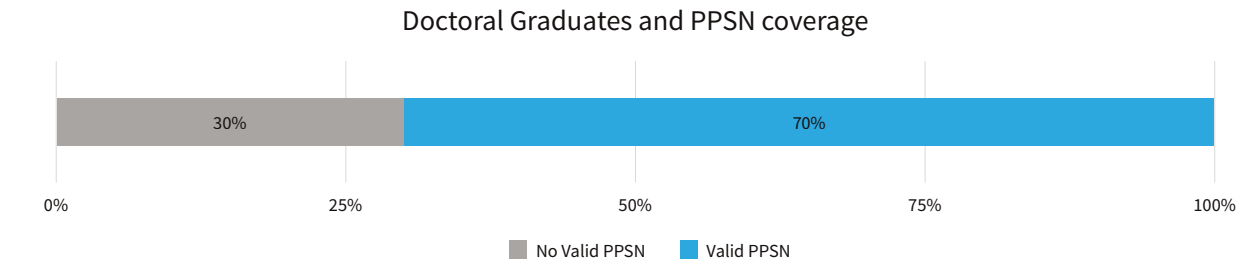

*Figure 6: Doctoral Graduates – 2010-2021: Outcomes Data Availability.*

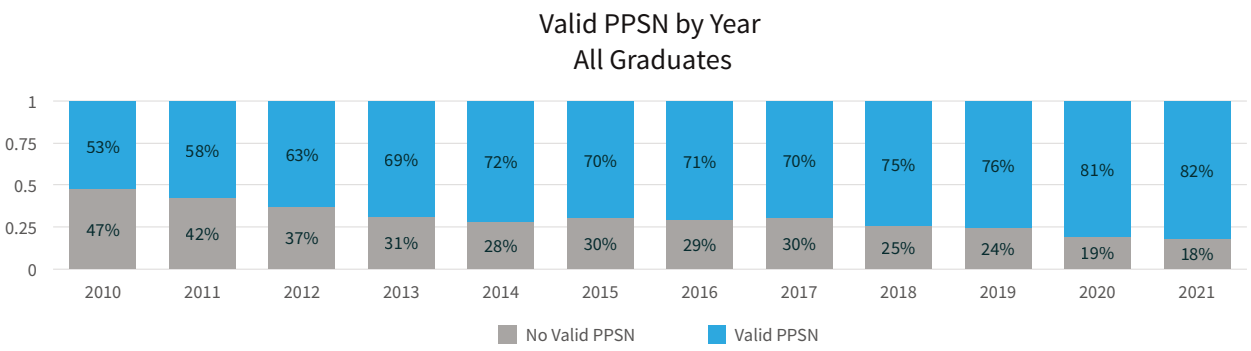
## PPSN Coverage

The analysis of PPSN coverage, (i.e., if a PPSN is attached to Doctoral graduates in the ELD) confirmed earlier findings that there is low PPSN coverage for Doctoral graduates from 2010–2012. This coverage has vastly improved in the intervening years; for instance, in 2010 a PPSN was not found for 47% of Doctoral graduates in the ELD, while in 2021 only 18% of Doctoral graduates in the ELD did not have a valid PPSN attached. Work completed by higher education institutions and the HEA Statistics Section has contributed to this rise in coverage.

The level of PPSN coverage is significant as it is not possible to determine post-graduation outcomes in the CSO administrative data for Doctoral graduates who do not have a valid PPSN included in the ELD. For students recorded as being of Irish nationality, (i.e. those with Irish citizenship) there has been a significant change in PPSN coverage. In 2010 there was no PPSN found for 41% of Irish graduates and this dropped dramatically to 3% in 2021.

In the report of the CTWG, it is outlined that any proposed national Doctoral career outcomes tracking system will include the ongoing longitudinal collection Doctoral graduate outcomes data. Data available in the ELD currently facilitates analysis 1, 5 and 7 years post-graduation. Taking into account the levels of PPSN coverage, it was recommended by the CSO that the analysis of longitudinal outcomes should begin in 2013 when PPSN coverage is near 70%. Figure 7 presents an overview of the PPSN coverage for Doctoral graduates from 2010–2021.



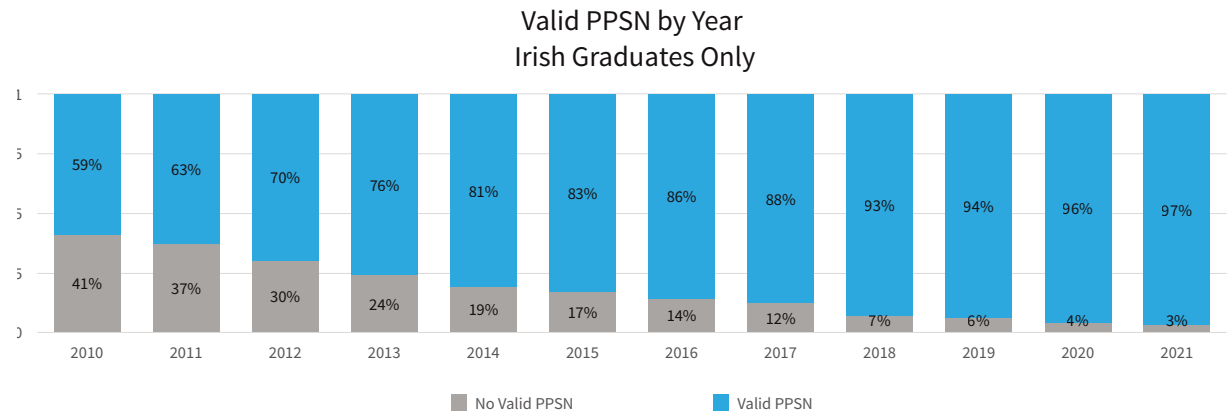




*Figure 7: PPSN coverage of Doctoral Graduates (2010–2021).*

## Doctoral Graduate Age

The age of Doctoral graduates who graduated from 2010 to 2021 was examined in the CSO analysis, with graduates over 30 being considered 'mature' students by the CSO. The data provides information on the age of Doctoral graduates at the time of their graduation across the main areas of study. Figure 8 provides the age profile of Doctoral graduates who graduated from 2010 to 2021.

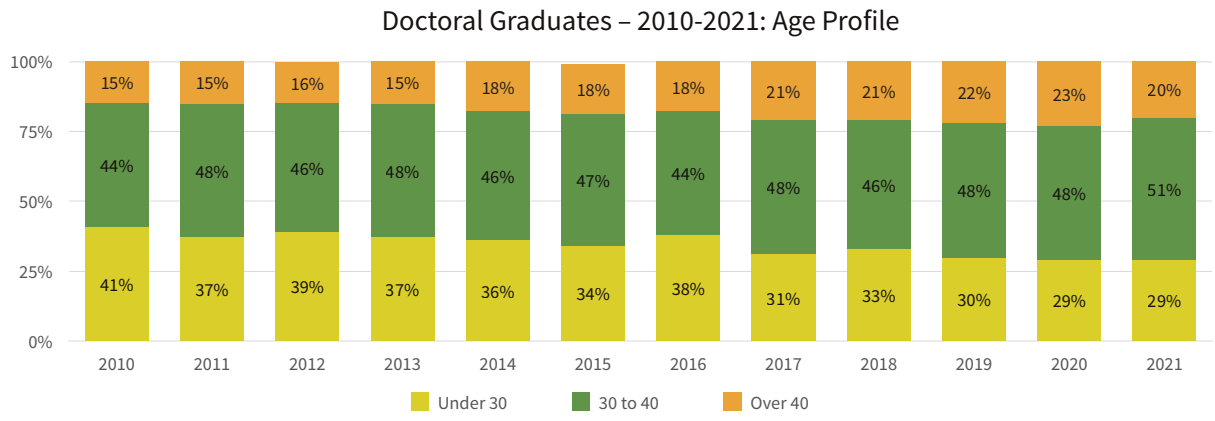



*Figure 8: Doctoral Graduates – 2010-2021: Age Profile.*

Analysis of the age range data indicates that the more mature a Doctoral student is, the more likely they are to study in areas such as the Arts & Humanities; Education; and Social Sciences, Journalism & Information. It also showed there is a significant difference in the age profile of those studying Natural Sciences, Mathematics & Statistics with only 8% of over 40s studying in this area compared to 42% in the under 30 age range. Figure 8.1 provides the age profile of Doctoral graduates who graduated from 2010 to 2021.

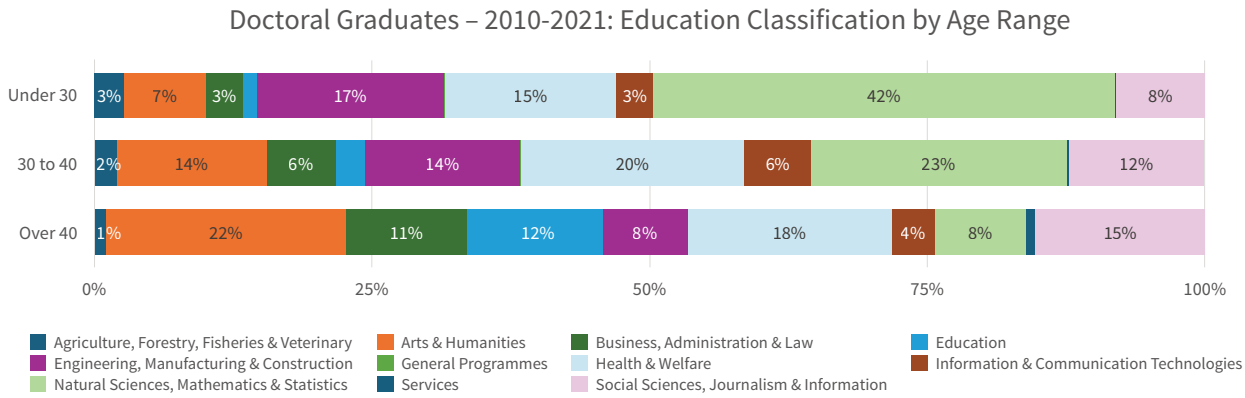



*Figure 8.1: Doctoral Graduates – 2010-2021: Education Classification by Age Range.*

## Nationality

By looking at the nationalities of Doctoral graduates, the CSO was able to provide information on education classification and age range by nationality for graduates between 2010 and 2021. The education by nationality data shows that STEM subjects are the most common areas of study among international Doctoral graduates with 59% of Doctoral graduates in Information and Communication Technology being international and the remaining 41% being from Ireland.

In the nationality by age range data, the majority of international Doctoral graduates are in the under 30 to 40 age range, while for the under 30 and over 40 age ranges, Doctoral graduates are predominately of Irish nationality (75% & 73% respectively). It is of interest to note that in the 30 to 40 age range that there is a 50 – 50 split in Irish and international Doctoral graduates. Data on the age ranges and education classification of Doctoral graduates by nationality is provided in Figures 9.1 and 9.2.

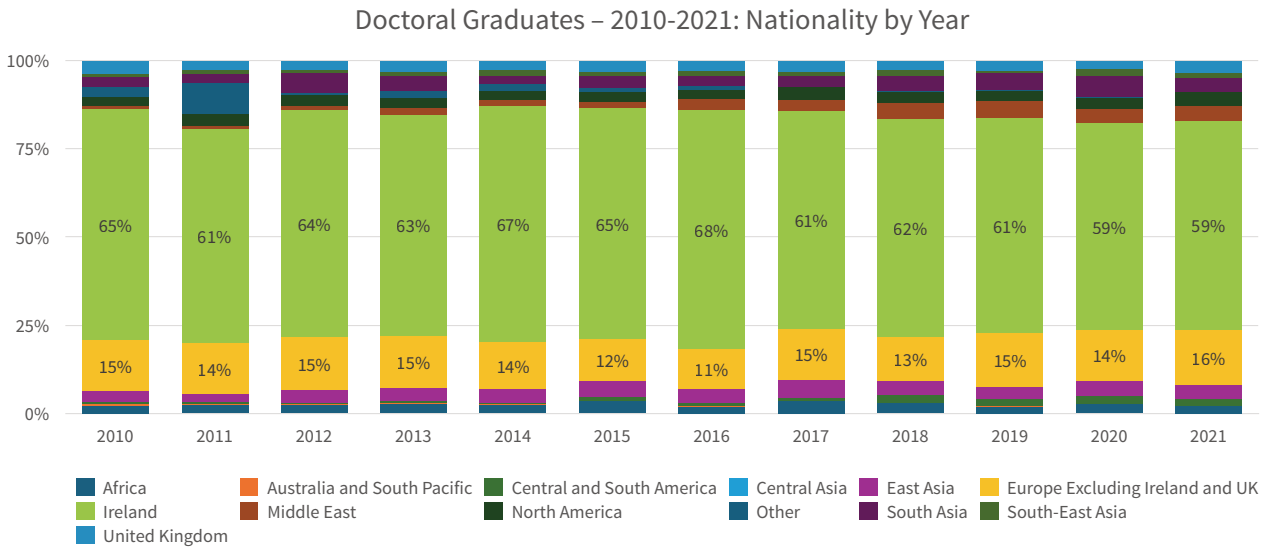



*Figure 9: Doctoral Graduates – 2010-2021: Nationality by Year.*

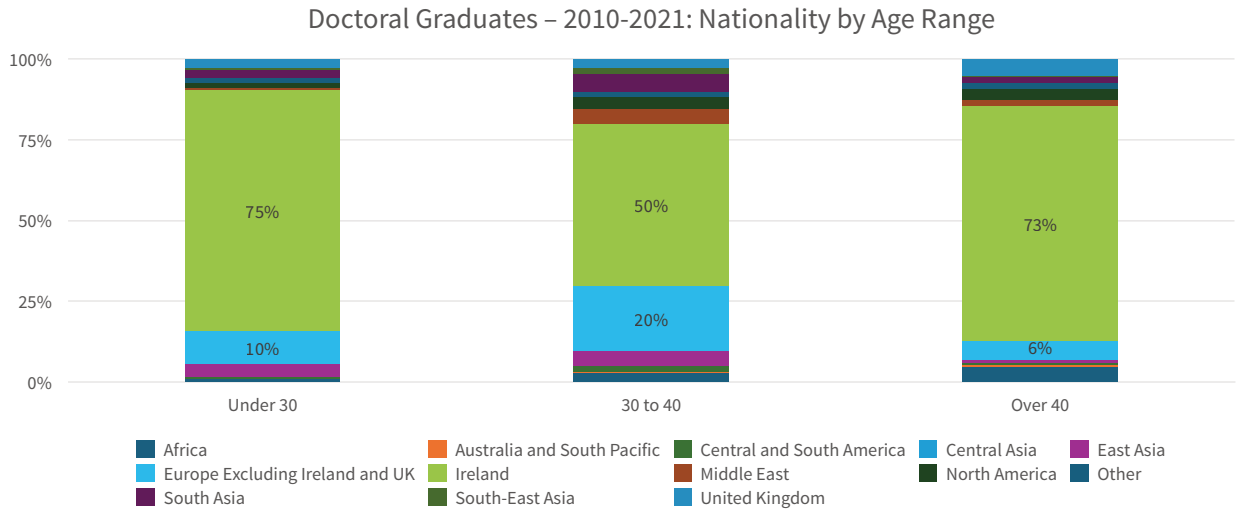



*Figure 9.1: Doctoral Graduates – 2010-2021: Nationality by Age Range.*

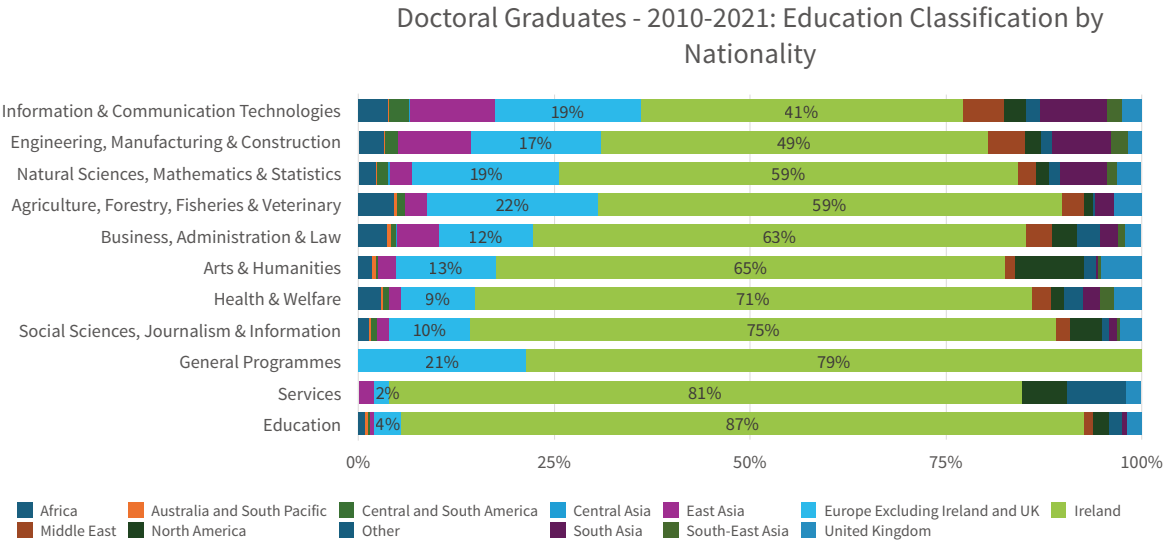



*Figure 9.2: Doctoral Graduates – 2010-2021: Educational Classification by Nationality.*

# Doctoral Graduate Outcomes

## High Level Outcomes After Graduation

High level outcomes for Doctoral graduates 1, 5 and 7 years after graduation from 2013 to 2017 were analysed in the CSO data. For the data provided, substantial employment was defined as having at least 12 weeks of insurable work within the calendar year across all employments and earning at least €100 per week from their main employment and substantial unemployment was counted as at least 12 weeks of jobseeker's payments received. The data was broken down into the following outcome categories:

- **Employment and Education** – Substantial employment and enrolled in higher education
- **Employment Only** – Substantial employment as defined above
- **Education Only** – Enrolled in higher education course
- **Substantial Unemployment** – As defined above
- **Receiving Child Benefit** – A full time parent in receipt of child benefit only (no substantial employment etc.)
- **Zero or No Income Recorded** – No income records found or sum total of all income records is zero
- **Other** – None of the above

Of these categories, Employment Only and Zero or No Income Recorded saw the most significant changes between 1 and 7 years after graduation with all the other categories seeing minimal changes (less than 3%) in this time period. Doctoral graduates in the Employment Only category went from 64% – one year after graduation to 58% – seven years after graduation, while Zero or No Income Recorded went from 23% – one year after graduation to 33% – seven years after graduation. The other employment categories saw the following changes between one and seven years after graduation:

- Employment and Education – 5% to 4%
- Education Only – 1% to 0%
- Substantial Unemployment – 2% to 1%
- Receiving Child Benefit – 1% to 1%

It is interesting to note that Doctoral graduates with zero or no recorded Irish income increases from 23% – one year after graduation to 33% – seven years after graduation. This indicates that there is an increase in graduates who have gone abroad to work between year 1 and year 7 post-graduation. This includes both non-Irish graduates returning to their home country and Irish graduates working abroad. The Doctoral graduate outcomes 1, 5 and 7 years since graduation from 2013–2017 are presented in Figure 10.

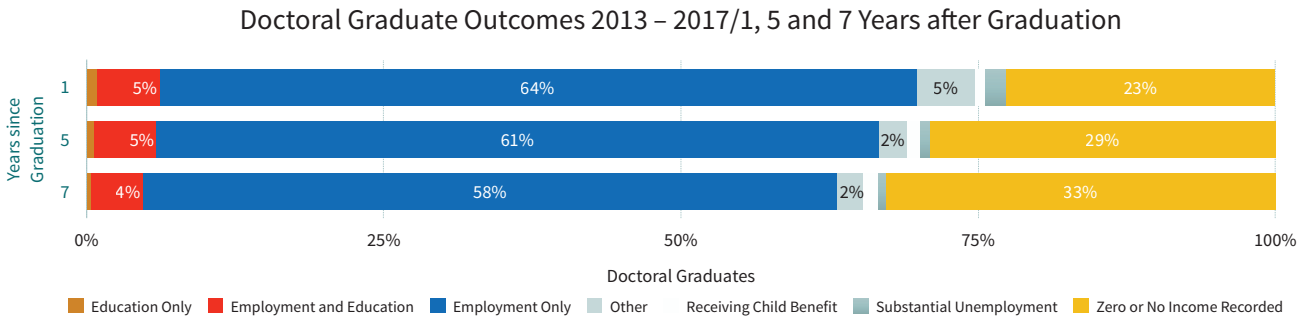



*Figure 10: Doctoral graduate outcomes 1, 5 & 7 years since graduation (2013 – 2017).*

The data shows that employment levels at 1 and 5 years post-graduation from 2013 to 2017 have also grown significantly. For example, in 2017, one year after graduation 69% of Doctoral graduates were in employment only, while in 2013, this figure was only 57%. Similarly, in 2017, five years after graduation 66% of Doctoral graduates were in employment only, while in 2013, 53% were in employment only. The Doctoral graduate outcomes by graduation year from 2013–2017 are presented in Figure 11.

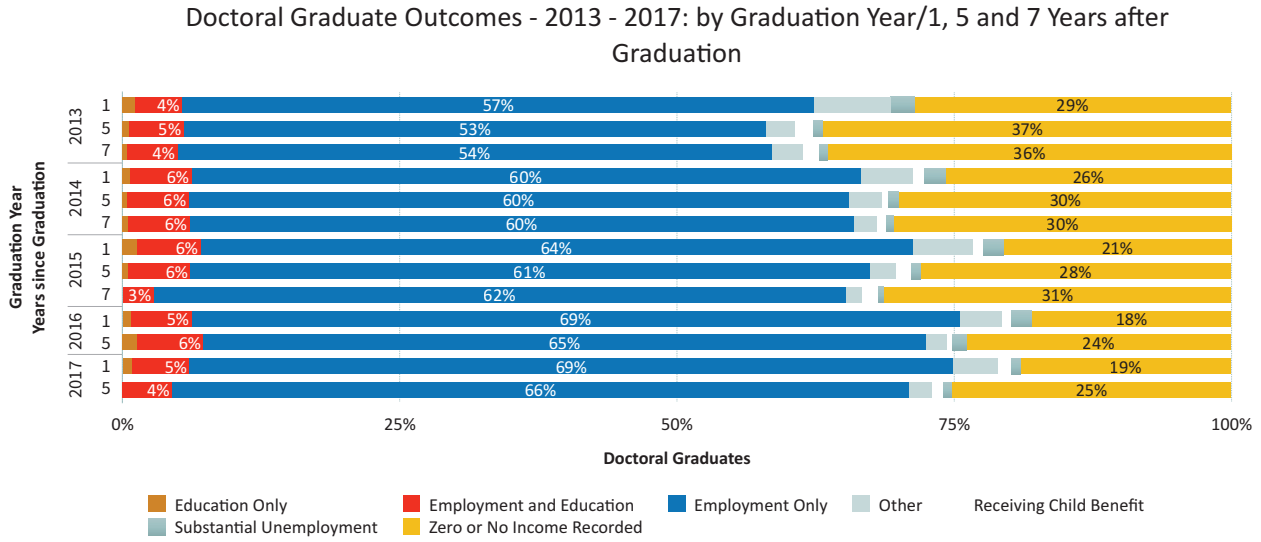



*Figure 11: Doctoral graduate outcomes by graduation year (2013–2017).*

The zero or no recorded Irish income data provided by the CSO for the graduation period 2013 to 2017 was also analysed further by gender. The data suggests that five years after graduation males are more likely to have gone abroad to work compared to females. The data also shows that 32.4% of males had zero or no Irish income recorded while 26% of females had zero or no Irish income recorded. The data also indicates that five years after graduation 2.1% of females receive child benefit as their only source of income, suggesting they are not in employment at that time. Figure 12 provides a breakdown of high-level Doctoral outcomes by gender.

When interpreting the employment only figures, it is important to note that the charts in Figure 11 and Figure 12 also include those who are no longer in Ireland (zero or no income recorded). For example, it may seem that 36.8% of females in Figure 12 are unemployed as 63.2% are in employment only. However, of this 36.8%, 26% have zero or no income recorded (which suggests that they are abroad), 10.1% are involved in other activities, while only 0.7% are classified as being in substantial unemployment.

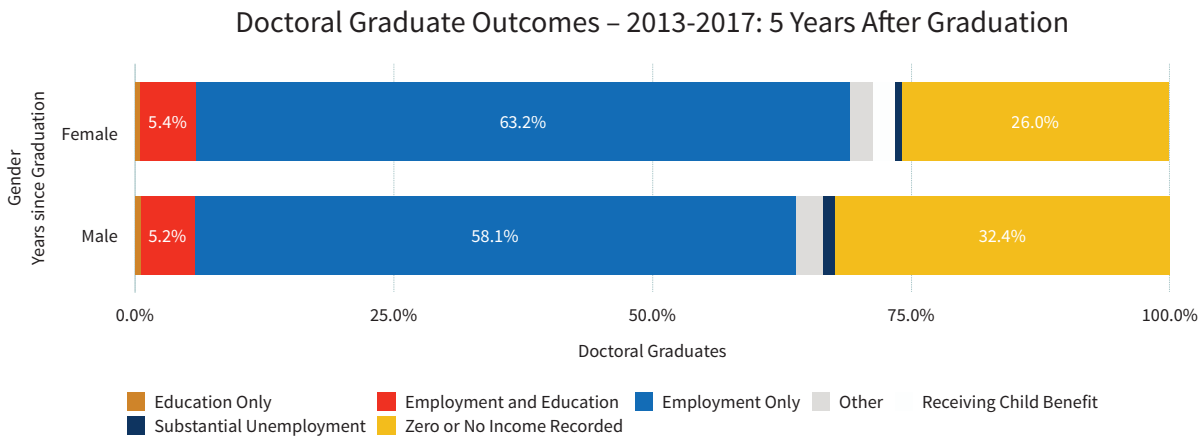



*Figure 12: Doctoral Graduate Outcomes – 2013-2017: 5 Years After Graduation.*

## Doctoral Graduates Working Abroad And Returning To Irish Employment

To investigate further the percentage of Irish Doctoral graduates who were working abroad after graduation, the CSO analysed data on the nationality of those with zero or no income recorded from those who graduated between 2013 to 2022. It was found that 49.3% of the Doctoral graduates who were assumed to be working abroad were Irish nationals, as presented in Figure 13. This finding is also of relevance to Impact 2030 and its aim to support international mobility by giving an indication of the number of Irish Doctoral graduates who have worked abroad.

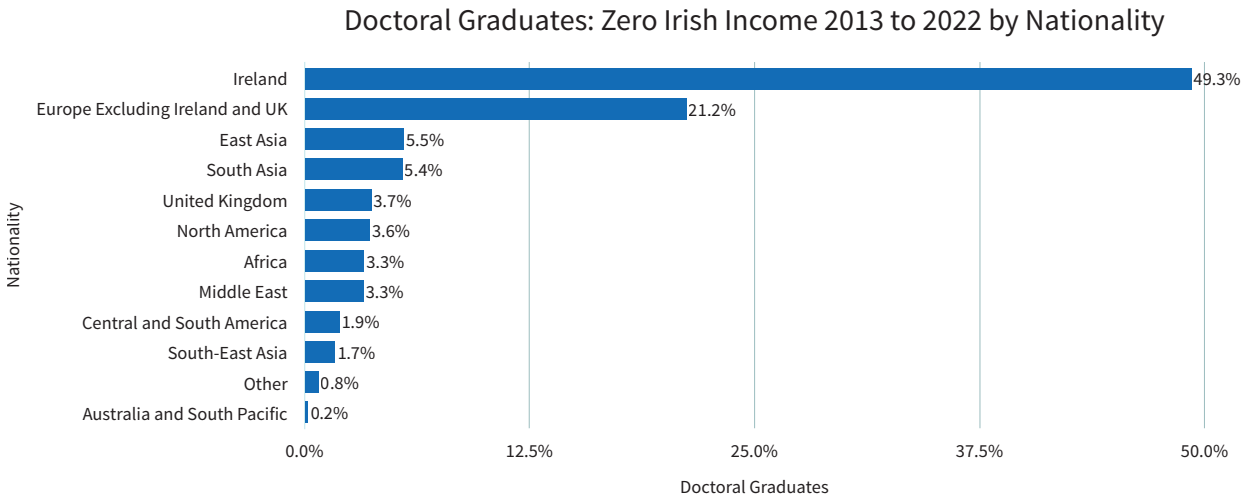



*Figure 13: Doctoral Graduates: Zero Irish Income 2013 to 2022 by Nationality.*

In order to investigate the number of Doctoral graduates returning to Irish employment after one or more years abroad, the CSO analysed graduates from 2013–2017 who were employed five and seven years after graduation and who had at least one year with zero Irish income. The data in Figure 14 shows that five years after graduation, 7% of Doctoral graduates employed after graduation have had at least one year with zero Irish income. It is assumed that graduates with at least one year with zero Irish income most likely spent one or more years abroad before returning to Ireland.

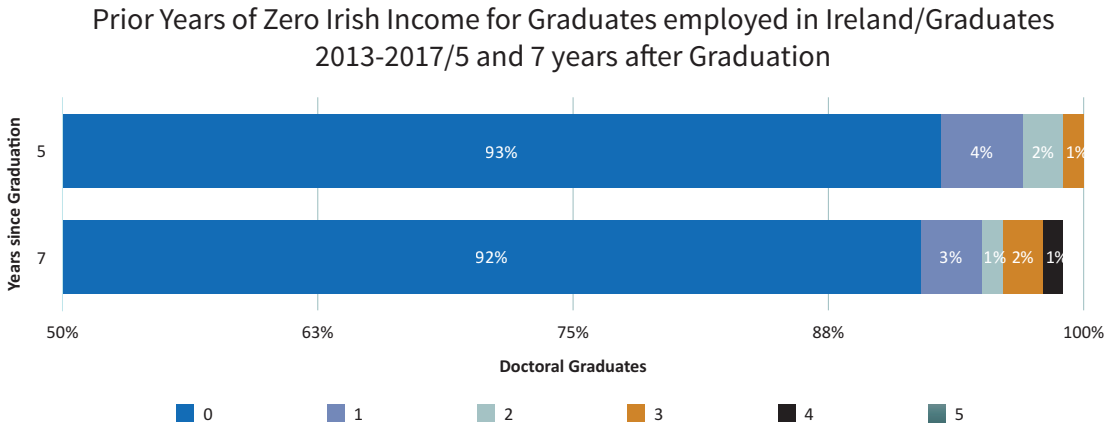



*Figure 14: Prior years of zero Irish income for Doctoral graduates employed in Ireland (2013–2017).*

Further analysis of the nationality of Doctoral graduates returning to Ireland as presented in Figure 15 confirmed that 100% of the graduates who returned to work in Ireland were Irish nationals. This international experience gathered by Doctoral graduates while abroad can deliver a positive impact upon returning to Ireland by both enriching the research ecosystem and providing economic benefits.

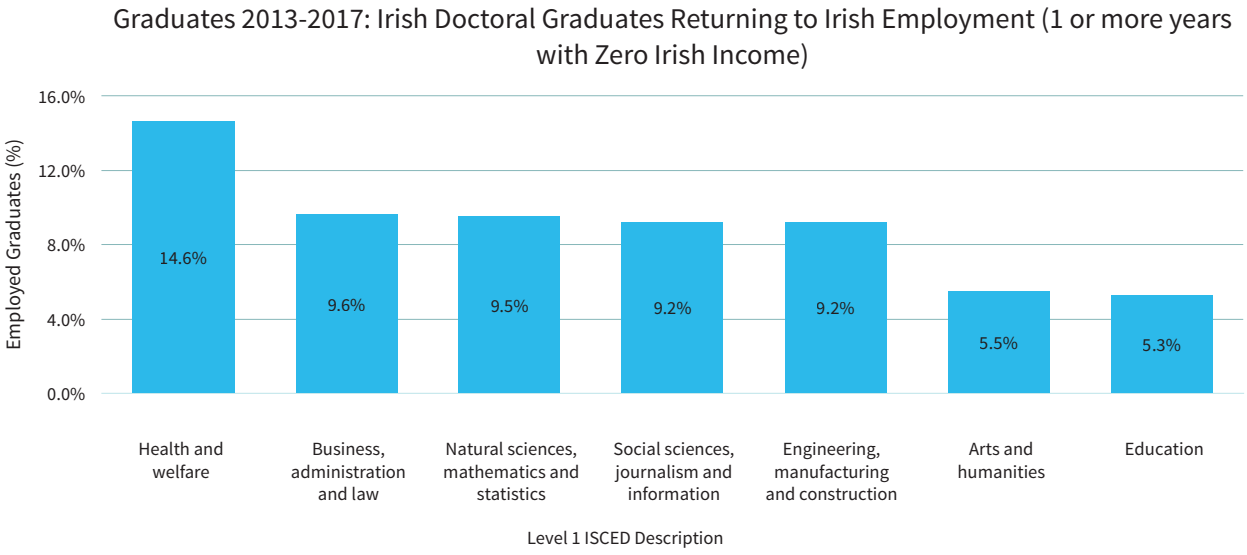



*Figure 15: Doctoral graduates returning to Irish employment by Field of Study (2013–2017).*

In looking at the specific fields of study, the data indicates that seven years after graduation, the Health and Welfare field of study had the highest levels (15%) of Doctoral graduates with at least one year with zero Irish income. Other fields of study with levels higher than the average of 8%, seven years after graduation included:

- Natural Sciences, Mathematics and Statistics (9.5%)
- Engineering, Manufacturing and Construction (9.2%)
- Social Sciences, Journalism and Information (9.2%)

The data above would indicate that the mobility of Doctoral graduates in the Health and Welfare field of study is higher compared to other areas and is significantly more than the overall average of 8%, seven years after graduation. Figure 16 provides an overview of prior years of zero Irish income for Health and Welfare Doctoral graduates from 2013 to 2017.

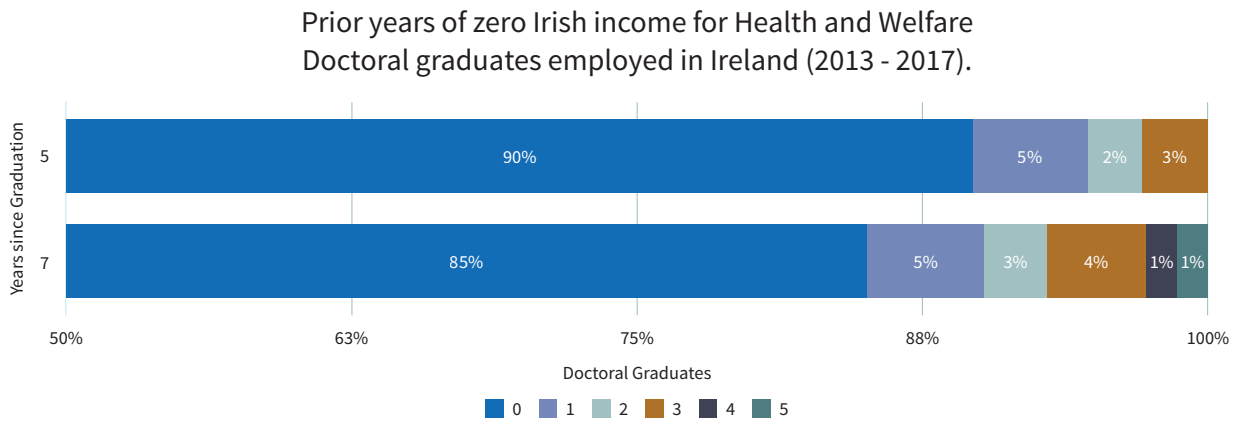



*Figure 16: Prior years of zero Irish income for Health and Welfare Doctoral graduates employed in Ireland (2013 - 2017).*

## High Level Employment Outcomes After Graduation

High level employment outcomes for Doctoral graduates 1, 5 and 7 years after graduation from the graduation period 2013 to 2017 were also examined by the CSO. The data shows the NACE[7] economic sector in which a Doctoral graduate is employed and the area of study in which they graduated. This is helpful to see the flow of Doctoral graduates and can highlight the diverse career pathways of Doctoral graduates. It is important to note when analysing the employment data, that it is purely the sector that is being measured and not the role. For example, a graduate with a doctorate in Information and Communication Technologies who works in IT Support Services in a hospital would be classified as being employed in the Human Health and Social Work Activities sector.

The employment outcomes five years after graduation presented in Figure 17 indicate that Natural Sciences, Mathematics and Statistics Doctoral graduates are more inclined to go into industry compared to other areas of study with 28% of these graduates employed in industry five years after graduation. The data also suggests that a high percentage of Doctoral graduates in areas of study including Education (81%), Business, Administration and Law (61%) and Arts & Humanities (57%) are employed in the education sector and may, therefore, be pursuing a career in academia. This may be reflective of the fact that a Doctorate is required for most academic teaching and researcher roles. However, there may also be many instances where Doctoral graduates could be in various roles in the Education sector, rather than specifically conducting research and/or involved in academic teaching.

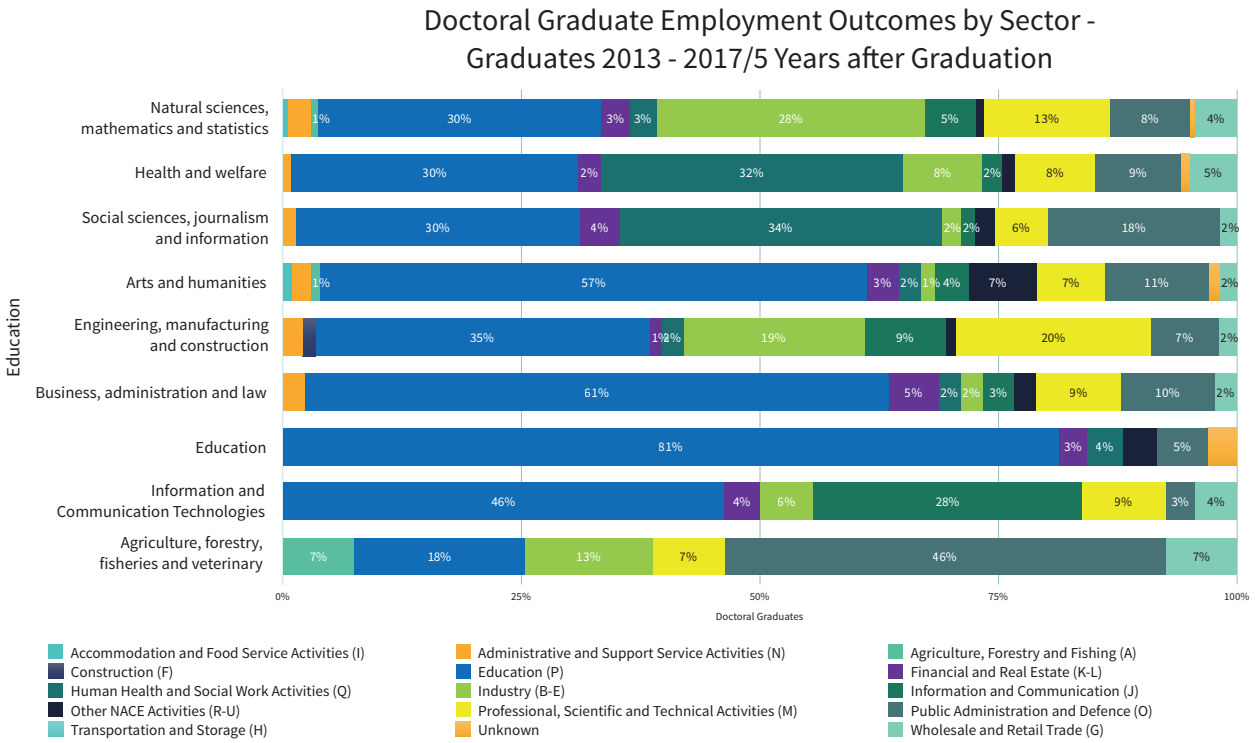



*Figure 17: Doctoral graduate employment outcomes five years after graduation by sector (2013–2017).*

7 Dividing the economy into sectors helps to provide a more detailed analysis of how the various parts are faring. 'Sector' has two meanings in National Accounts: NACE economic activity sector which divides up producers based on the goods or services they output (e.g. manufacturing, education), and institutional sector which divides up producers and consumers based on their internal characteristics (households, government, corporations).

## Detailed Breakdown of Employment within Education Classes

Along with the high-level employment outcomes, it is possible to examine the graduate data within education classifications 1, 5, and 7 years from the graduation period 2013 to 2017. For example, delving deeper into the employment outcomes for Natural Sciences, Mathematics and Statistics Doctoral graduates, it was found that 57% of Chemistry graduates were employed in industry five years after graduation. Figure 18 provides a detailed breakdown of the employment outcomes within the Natural Sciences, Mathematics and Statistics education classification.

Likewise, detailed outcomes for the Engineering, Manufacturing and Construction education classification (Figure 19) shows that 34% of Building and Civil Engineering graduates were employed in Professional, Scientific and Technical Activities. This is higher than graduates in employment in other areas under the Engineering, Manufacturing and Construction education classification. Furthermore, detailed outcomes for the Arts and Humanities education classification (Figure 20) shows that 56% of History and Archaeology of graduates are not employed in education which is the predominant sector of employment for Arts and Humanities graduates. The spread in employment across sectors for History and Archaeology graduates is also greater than other areas in the Arts & Humanities education classification. There is also 20% of graduates employed in the Public Administration sector which is the highest amongst Arts and Humanities education graduates.

The above is only a snapshot of the data available and with suitable resources further deeper analysis of the education classifications is possible with the CSO data.

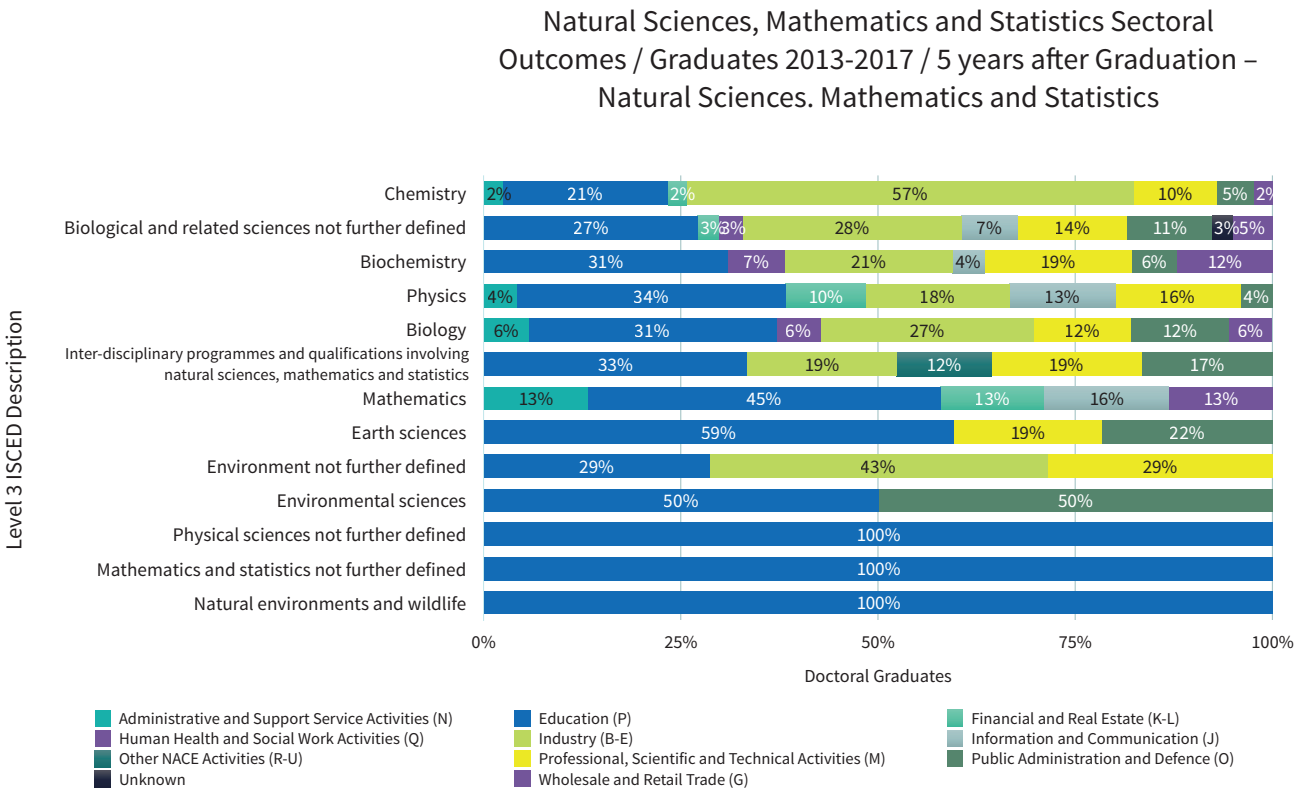



*Figure 18: Doctoral graduate employment outcomes in the Natural Sciences, Mathematics and Statistics Education Classification (2013 - 2017).*

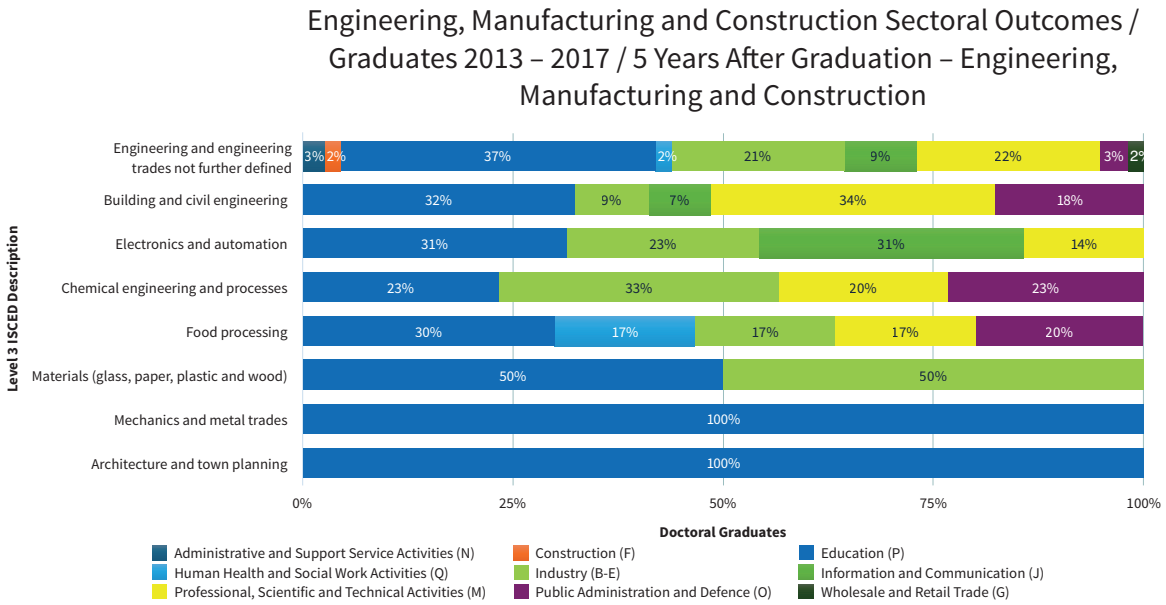



*Figure 19: Doctoral graduate employment outcomes in the Engineering, Manufacturing and Construction Education Classification (2013–2017).*

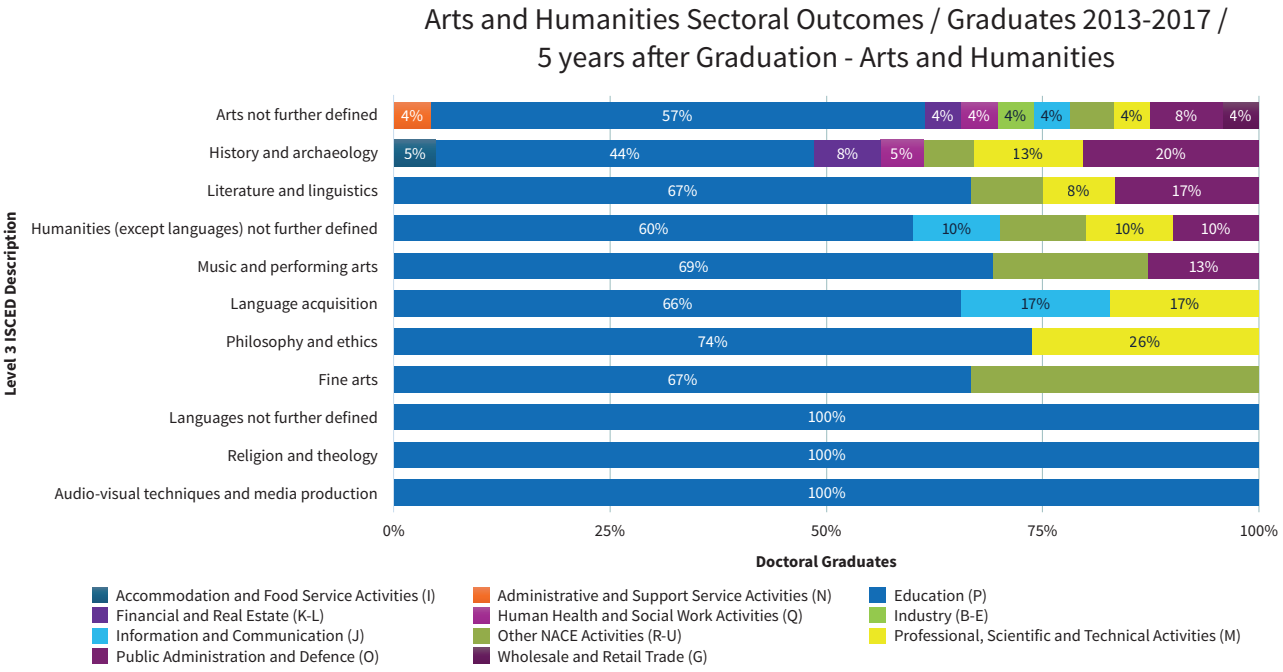



*Figure 20: Doctoral employment in the Arts and Humanities Education Classification (2013–2017).*

## Salaries After Graduation

The CSO analysed the weekly pay bands of Doctoral graduates from 2013–2017 at intervals of 1, 5 and 7 years after their graduation. As seen in Figure 21, five years after graduation the highest percentage of Doctoral graduates (39%) were earning more than €800 and up to €1,200 per week, and 8% of Doctoral graduates earning more than €2,000 per week.

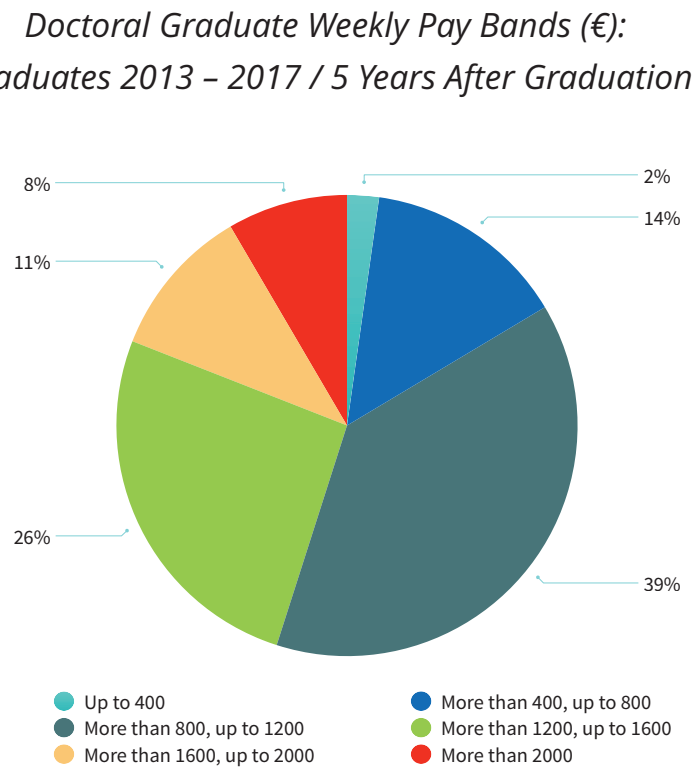



*Figure 21: Doctoral Graduate Weekly Pay Bands (€): Graduates 2013 – 2017 / 5 Years After Graduation.*

In Figure 22, a further breakdown of the CSO weekly pay bands by gender and years since graduation shows that seven years after graduation males were more likely to have a weekly salary of more than €1,600 per week compared to females (35% of males compared to 25% of females). It is important to note that there is a level of complexity behind pay band figures as they can affected by a number of things, such as the sector of the economy in which graduates work and current market conditions.

Furthermore, the pay bands in this analysis reflect the average weekly earnings, they do not indicate the number of hours worked. It may be the case that more females work part time or job share than males and hence have lower earnings. The data available through the CSO offers the opportunity for further analysis of the pay bands.

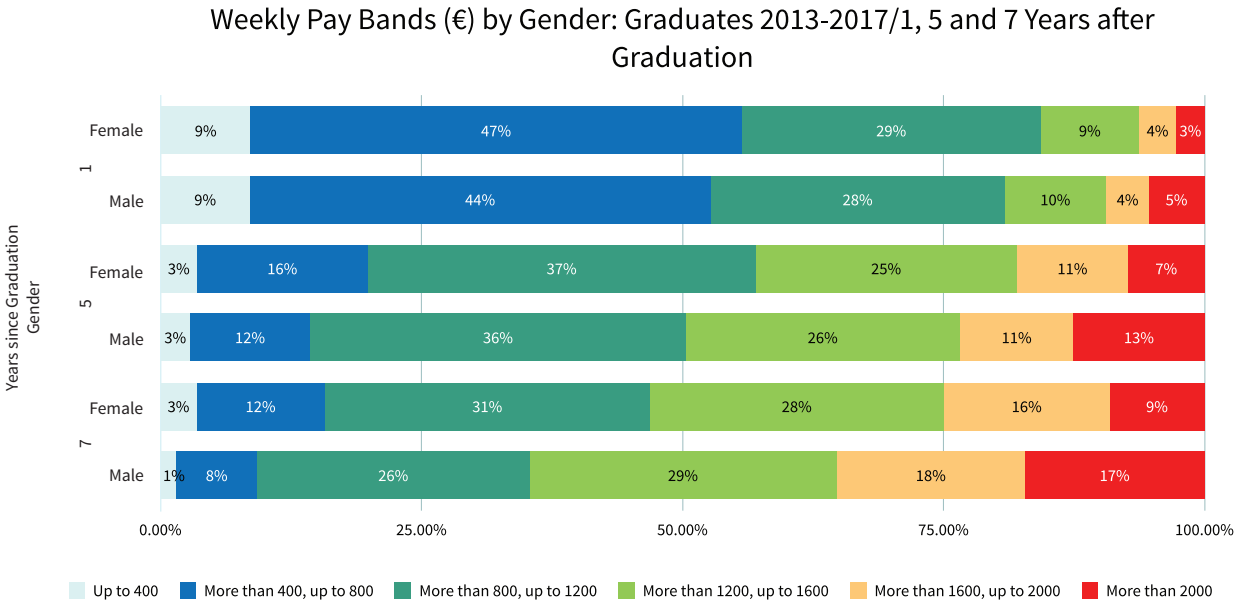



*Figure 22: Doctoral graduate pay bands by gender and years since graduation (2013–2017).*

## Job Churn Analysis of Doctoral Graduates

A job churn analysis was performed by the CSO to find out the number of employer and economic sector changes of Doctoral graduates from 2013-2017 at intervals of 1, 5 and 7 years after graduation. Figure 23 shows that for employer changes seven years after graduation 55% of Doctoral graduates had at least 1 change of employer with 10% of these having three or more different employers.

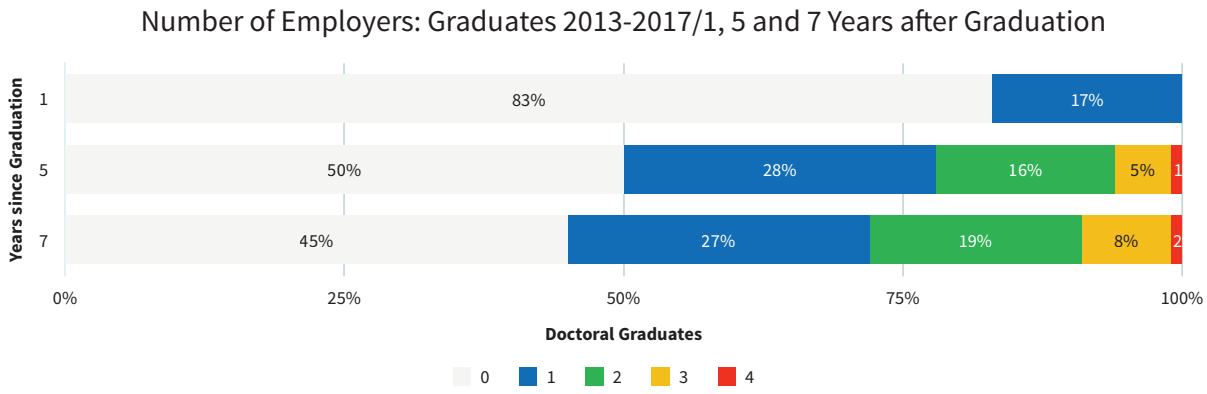



*Figure 23: Doctoral graduate pay bands by gender and years since graduation (2013 – 2017).*

Figure 24 highlights that the changes in the economic sectors across Doctoral graduates were consistent with changes in employer with 48% of graduates having changed the economic sector they were employed in seven years after graduation. Of the 48% who had changed economic sector 6% had changed sector three or more times.

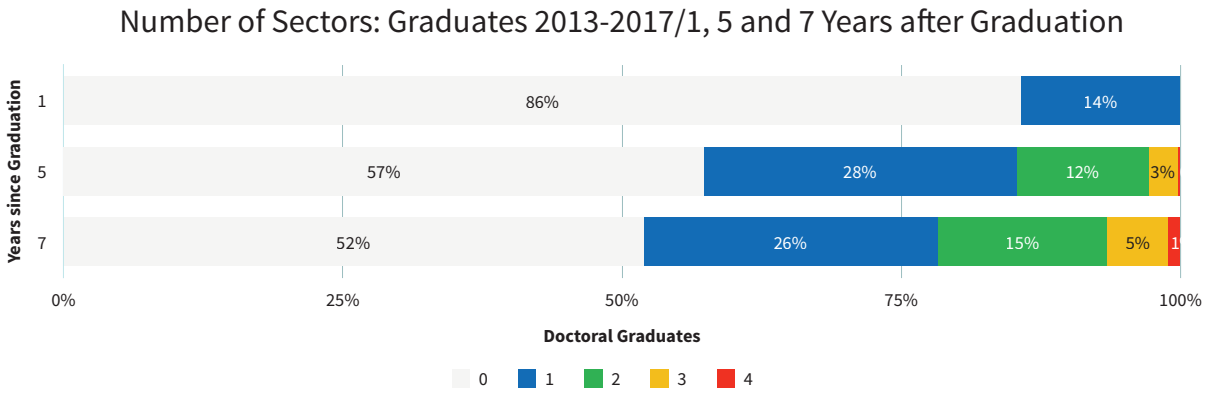



*Figure 24: Sector changes for Doctoral graduates by years since graduation (2013 - 2017).*

## Employment Sectors for Graduates with both P35 and Self Employment in Different Sectors

Employment sectors for Doctoral graduates (who graduated in 2013 & 2014) with both P35 and self-employment in different economic sectors was analysed by the CSO. This was to see the numbers of Doctoral graduates who were also self-employed in a different sector to their main employment sector. In the data analysed, it was shown that graduates whose main employment activity was in Education were those most likely to also be self-employed in the Professional, Scientific and Technical Activities sector. Figure 25 provides findings on Doctoral graduates with different P35 and self-employment sectors.

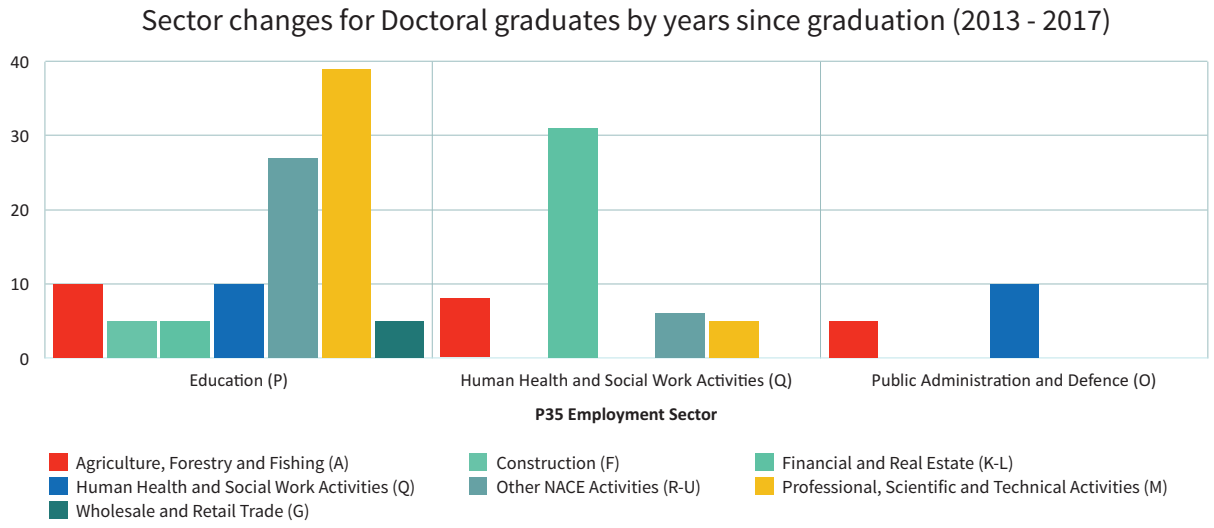



*Figure 25: Doctoral graduates with different P35 and self-employment sectors**

** Values of 5 or below have been rounded to prevent potential identification of individuals.*

# Conclusion

Central to the development of a proposal for a national Doctoral career tracking system has been the need to gain an understanding of what data is currently available in the Irish research system on Doctoral graduate outcomes and is not yet, publicly available. The Doctoral graduate outcomes project undertaken by the CSO has informed this by identifying a substantial amount of additional data available in the ELD that has not yet been captured to date in existing reports on higher education outcomes. This additional data has been beneficial in further understanding Doctoral graduate outcomes and could potentially be used in future Doctoral career tracking activities.

As well as informing the CTWG on data currently gathered on Doctoral graduate outcomes in Ireland the CSO pilot project has also been beneficial in identifying data to aid future national research policy. The project helped to successfully demonstrate the rich source of data already available on Doctoral graduate outcomes and that perceived issues on tracking career outcomes of Doctoral graduates may be addressed through enhancing the use of this data rather than there being a lack of data available in the first place. Comparative work completed demonstrates the high levels of employment being attained by Doctoral graduates and also the higher financial reward being achieved by the same graduates in comparison with graduates from other levels of educational attainment.

From the findings listed in the report there are a number of takeaways that could help aid with future research policy formation.

1. **PPSN Coverage** – In 2021, 82% of all Doctoral graduates had a valid PPSN in the ELD and for Irish nationals specifically there was 97% coverage. This enhanced coverage means that administrative data outcomes for the majority of Doctoral graduates will be available for a future longitudinal tracking mechanism. This will, undoubtedly, provide a rich evidence base for policy makers to utilise in informing research policy formation. The challenge of tracking international Doctoral students who qualify in Ireland but who may not have a PPSN and/or leave post qualification to return to their home countries or elsewhere remains an issue for Ireland. Research completed by the CTWG, and which is evidenced in the report of the CTWG report 2024 shows that this is a challenge being experienced by other countries implementing career tracking systems for Doctoral students.

2. **Employment Levels** – Positive signs can be seen in the CSO data related to employment levels of Doctoral graduates. Employment only levels 5 years post-graduation from 2013 to 2017 have grown significantly. For example, in 2017, five years after graduation 66% of Doctoral graduates were in employment only, while in 2013, 53% were in employment only. Given the strong competition for roles in academia[8], it is reassuring that the skills developed by Doctoral graduates in their studies are being utilised in other roles and could also suggest that the skillset of Doctoral graduates is being more recognised by employers.

8 *The Scientific Century, securing our future prosperity* at https://royalsociety.org/-/media/policy/publications/2010/4294970126.pdf.

3. **Comparative Earnings** – All national and international evidence indicates that Doctoral graduates successfully enter the labour market with higher earnings than those with lower levels of educational qualification.

4. **Researcher Mobility** – The CSO data indicates that up to seven years after graduation, 33% of Doctoral graduates are assumed to be working abroad. It was found that Irish Doctoral graduates constituted 49.3% of these who were assumed to be working abroad. This finding suggests that the standard of an Irish doctoral degree has equipped Doctoral graduates with the necessary knowledge, skills and abilities to forge careers outside of Ireland. The encouraging aspect of this is that experience gathered by Doctoral graduates while abroad can deliver a positive impact upon returning to Ireland by both enriching the research ecosystem and providing economic benefits. The CSO data is also of relevance to Impact 2030 and its aim to support international mobility by giving an indication of the number of Irish Doctoral graduates who have worked abroad.

5. **Differences in Pay by Gender** – The CSO data identified that seven years after graduation males were more likely to have a weekly salary of more than €1,600 per week compared to females (35% of males compared to 25% of females). This could indicate that there may still be barriers to females compared to their male counterparts in progressing their careers and obtaining senior positions. One year after graduation there is greater parity between males and females for those making over €1,600 per week with 9% of males and 7% of women making over €1,600 per week. However, it is important to caveat this by saying that pay band figures can be affected by a number of things, such as the sector of the economy in which graduates work and current market conditions etc. The pay bands in this analysis also only reflect the average weekly earnings and do not take into account the number of hours worked.

# Notes

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