An Analysis of Graduate Earnings across Higher Education Institutions

Graduation Cohorts: 2010 - 2017

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An Analysis of Graduate Earnings across Higher Education Institutions

Graduation Cohorts: 2010 - 2017

A Report by the Higher Education Authority

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Glossary

CAO	Central Applications Office
CSO	Central Statistics Office
DEIS	Delivering Equality of Opportunity in Schools
ELD	Educational Longitudinal Database
HEA	Higher Education Authority
HEI	Higher Education Institution
ISCED	International Standard Classification of Education
LC	Leaving Certificate
NFQ	National Framework of Qualifications
PAYE	Pay As You Earn
PPOD	Post-Primary Online Database
PPSN	Personal Public Service Number
QQI	Quality and Qualifications Ireland
RCSI	Royal College of Surgeons in Ireland, University of Medicine and Health Sciences
STEM	Science, Technology, Engineering and Mathematics

Graduates' earnings are modelled in two ways.

Raw Prediction: The average prediction of graduates' earnings before any attempt is made to explain differences.

Model Prediction: Compares like-for-like graduates who:

- studied the same subject/course in the same institution,
- received the same grade,
- are the same gender,
- from the same county,
- attended the same type of second-level school,
- work in the same employment sector,
- accounts for the effect of having children on female earnings,
- enter higher education at the same age (undergraduates only),
- had the same Leaving Certificate performance (undergraduates only) and
- are from the same socio-economic group (undergraduates only).

Legal Framework Underpinning this Research

The CSO provides researchers with access to relevant data holdings, subject to stringent confidentiality criteria, within the framework of the Statistics Act, 1993.

The examination of learners' outcomes provided in this report was produced by the HEA under Section 11 of the Statistics Act 1993 using the Educational Longitudinal Database (ELD) data source, which was created in compliance with all relevant data protection legislation.

The ELD data source brings together data from the Department of Education and a number of state agencies, including the HEA, QQI and SOLAS, with employment, benefits and earnings data from the Revenue Commissioners and the Department of Social Protection. Access to this data source is strictly limited to Officers of Statistics.

The ELD, provides the basis for a series of projects that the CSO facilitates in strict compliance with the Statistics Act, which allows researchers to further analyse and examine learner outcomes.

The CSO's role is limited to the development of the ELD data source and it is important to note that any analysis, conclusions or recommendations made in this report are the HEA's alone.

Full details relating to the framework for this research work can be accessed through the following links:

Statistical Agreement between the CSO and HEA:
https://www.cso.ie/en/aboutus/lgdp/legislation/memorandumsofunderstanding/statisticalagreementbetweenthecentralstatisticsofficeandthehighereducationauthority/
Statistics Act 1993: http://www.irishstatutebook.ie/eli/1993/act/21/enacted/en/html
Educational Longitudinal Database:
https://www.cso.ie/en/methods/education/educationallongitudinaldatabase/

Executive Summary

This report was developed within the Central Statistics Office, under the legal framework of the Statistics Act 1993. It extends the HEA's (2019) previous graduate earnings report by providing new evidence on graduates' earnings from higher education institutions.

Graduates' labour market earnings are influenced by their choice of subject, their grade and their sector of employment. However, earnings are also influenced by graduates' background characteristics, such as their prior academic attainment and their socio-economic background. Therefore, comparisons of raw earnings across institutions may be confounded by the impact of background characteristics. This report attempts to disentangle these effects by modelling earnings to isolate the impact of institution choice on graduates' earnings by comparing like-for-like graduates.

Using model predictions, institutions are compared using like-for-like graduates who studied the same subject, received the same grade, are the same gender, from the same county, entered higher education at the same age, had the same performance in the Leaving Certificate, have the same socio-economic background and work in the same sector.
The main findings are as follows:

- In raw terms, undergraduates from TCD have the highest average earnings of €744 per week four years after graduation. This is followed by DCU (€725 per week) and UCD (€720 per week).
- Amongst institutes of technology, DIT undergraduates have the highest average raw earnings of €682 per week four years after graduation; while Letterkenny IT, IT Tralee, and IT Sligo had the lowest average raw earnings at €501, €532, and €554 per week.
- Relatively high earnings are evident for graduates of colleges that provide teacher education: €713 per week for St. Angela's College, €703 per week for St. Patrick's College, Drumcondra and €678 per week for Mary Immaculate College.
- When institutions are compared on a like-for-like basis, average predicted graduate earnings from universities generally decrease, while the predicted earnings for institutes of technology and colleges increase.
- Comparing like-for-like graduates, the predicted earnings for graduates from TCD, DCU and UCD fall substantially (while remaining above the overall average). Conversely, the predicted earnings for graduates from IT Tralee, Letterkenny IT and IT Sligo increase substantially (while remaining below the overall average).

These findings indicate that a large part of the differences in earnings across institutions can be explained by differences in the subjects offered by each institution and differences in student characteristics, such as prior academic achievement.

Some of the differences in student characteristics across institutions that the model predictions account for include:

Leaving Certificate Points

- Undergraduates from universities and colleges achieved higher Leaving Certificate points compared to undergraduates from institutes of technology.
- 94 percent of St. Patrick's graduates and 87 percent of TCD graduates achieved over 400 points compared to 3 percent of IT Blanchardstown graduates.

Second-Level School Type

- Overall, a higher proportion of university graduates previously attended a fee-paying, lower proportions attended a DEIS school. The reverse is true for institutes of technology.
- In UCD, 27 percent of graduates previously attended a fee-paying school, while 7 percent attended a DEIS school. In Limerick IT, less than 0.5 percent of graduates previously attended a fee-paying school, while 38 percent attended a DEIS school.

Gender

- The proportion of male and female graduates varies across institutions. Almost all graduates from St. Angela's and 68 percent of graduates from NCAD are female. This compares to 46 percent and 45 percent female graduates, respectively, from Carlow IT and GMIT.

Limitations

- The report only measures the labour market returns of higher education and fails to capture the wider benefits of higher education to individuals and to society.
- The report only compares earnings of higher education graduates relative to other graduates and does not compare absolute differences in graduates' earnings to non-graduates.
- The data do not include where a graduate is employed but it does measure the county where the student is from.
- The relevance of a graduate's qualification to their job is not captured in the data.
- The data does not capture individuals who graduate from an Irish HEI and work overseas. In addition, the data does not identify Irish domiciled students who graduate from institutions overseas and subsequently work in Ireland.
- The analysis only covers PAYE income for employees. Self-employment income is excluded.

Note

- Earnings are defined in this report as an individual's weekly gross earnings, less tax reliefs, such as pension contributions.
- The findings in this report should not be compared directly with data disseminated on the CSO website, as the CSO data is based on median weekly earnings each year.

1 Introduction

This report employs the same linked administrative data as the HEA's (2019) previous earnings report and extends the analysis to exploring graduate earnings from different institutions. This report uses regression analysis to take into consideration the different mix of subjects in institutions and the different background characteristics of student populations, such as prior academic attainment.

In line with the data confidentiality protocols of the CSO, all data linking, and analysis is carried out on pseudonymised datasets using Protected Identifier Keys. The CSO replaces the PPSN for individuals with a proxy that is used to link the HEA's graduation records to the CSO's administrative data. In addition, all identifiable information relating to individuals and employers, such as names and addresses, are removed.

The purpose of this report is to compare graduate earnings across institutions, while taking into consideration differences in subject mixes in institutions and differences in student populations. For instance, when measuring the earnings impact from studying in a particular institution, it is important to consider graduates' underlying ability, as students with strong ability before entering higher education may be better rewarded by the labour market irrespective of their institution choice. To overcome such issues, this report compares graduates' earnings amongst similar individuals by exploiting a rich set of information on graduates' degrees, prior academic attainment, socio-economic background, sector of employment and an indicator to account for the effect of having children on female earnings.

It is worth remembering that there are many benefits of participating in higher education which extends beyond the narrow outcome of earnings in the labour market. For example, there are many personal, social, and cultural benefits of participating in higher education which are not measured here, such as participating in the Erasmus+ programme, volunteering opportunities and involvement in sports and societies.

2 Data Description

2.1 Introduction

The analysis in this report is based on the CSO's Educational Longitudinal Database, which uses administrative data to link graduates from higher education in Ireland into the Irish labour market. The data is compiled in the CSO from numerous administrative sources, which include earnings data from Revenue, benefits data from the Department of Social Protection and data on educational participation from the Department of Education and a number of State Agencies, including the HEA, QQI and SOLAS.

Under the auspices of the Statistics Act 1993 and in compliance with all relevant data protection legislation, all data linking, and analysis is carried out on pseudonymised datasets using Protected Identifier Keys. The CSO replaces the PPSN for individuals with a proxy called the CSOPPSN. It is this proxy that is used to link the HEA's records to the CSO's administrative data sources. In addition, all identifiable information relating to individuals and employers are removed, such as names, addresses and date of birth information.

The analysis in this paper uses a part of the ELD that focuses on the HEA's graduation records as the primary information source. This dataset is then linked to the HEA's new entrant records, Revenue's employment records, the Department of Social Protection's records and the Department of Education's records on post-primary education (PPOD).

The HEA's graduation records contains information on the year of graduation, institution attended, course studied, type of award, final degree grade, gender and county of origin for graduation cohorts over eight years from 2009/2010 to 2016/2017.

The HEA's new entrant records contain information on students when they register for the first time on a full-time undergraduate course. The data includes the year of entry to higher education, Leaving Certificate points, Leaving Certificate Mathematics and English grades for new entrant cohorts from 2007/2008 to 2014/2015. It also includes information from the Equal Access Survey, such as fathers' socio-economic group.[1]

[1] The Equal Access Survey is a voluntary survey administered to all undergraduate new entrants at registration every year. The overall response rates for each academic year from 2007/2008 to 2014/2015 is as follows: 56 percent, 78 percent, 72 percent, 66 percent, 60 percent, 63 percent, 66 percent and 68 percent. Overall survey response rates by institution are published annually in the HEA's Key Facts and Figures publication available here: http://hea.ie/statistics/publications/

Revenue's employment records contain information on individuals' income from their main employment, the number of weeks of insurable work and the sector of employment. The records span eight years from 2011 to 2018.

The Department of Social Protection's records contain relationship information between mothers and children born after the year 2000. This is used to construct an indicator identifying mothers of non-adult children. It is important to bear in mind that while this indicator may partly explain some of the differences in earnings by gender it may also partially capture part-time employment amongst females, as hours worked are not observed in the data.

The Department of Education's PPOD records contain information, since 2002, on enrolments in second-level schools. From this, the most recent school each student attended before they entered higher education is derived and this is used to determine the HP deprivation index score of the school's Electoral Division.[2] The most recent second-level school that students attended are divided into three types of school (standard, DEIS and fee-paying schools) as a proxy measurement of graduates' socio-economic background.

Table 1 shows the timeline of data availability for the PPOD, new entrant and graduation records. Sufficient time must elapse to join a student's PPOD and new entrant records to their graduation record. Eight years of PPOD records (from 2001/02 academic year) are available before the first graduates are observed in 2010. This means that the type of second-level school that graduates previously attended can be observed for both undergraduates and postgraduates over all graduation cohorts. New entrant records are only available from 2008, meaning that sufficient matches to graduation records only occur from 2012, which coincides with the average length of a four-year Honours Bachelor degree. As the length of time for postgraduate study is longer, their new entrant information is excluded when analysing their earnings.

Table 2 shows the years of earnings data that are observed for each graduation cohort. For example, eight years of earnings data (from 2011 to 2018) are observed for the 2010 graduation cohort (one to eight years after graduating). One year of earnings data (2018) is observed for the 2017 graduation cohort (one year after graduating). The shaded area shows the (post-2012) graduation cohorts and years of earnings data for which new entrant information is available.

[2] The HP deprivation index is a composite index of demographic, social class and labour market indicators in the 2016 Census. Further information is available here: https://www.pobal.ie/app/uploads/2018/06/The-2016-Pobal-HP-Deprivation-Index-Introduction-07.

Table 1: Timeline of Data Availability

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PPOD (Academic Year)	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14			
New Entrant (Academic Year)							07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15		
Graduation Cohort									**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**

Table 2: Timeline of Earnings Data

		Years of Earnings Data (and Years Since Graduation)							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Graduation Cohort	**2010**	2011	2012	2013	2014	2015	2016	2017	2018
	2011	2012	2013	2014	2015	2016	2017	2018	
	2012	2013	2014	2015	2016	2017	2018		
	2013	2014	2015	2016	2017	2018			
	2014	2015	2016	2017	2018				
	2015	2016	2017	2018					
	2016	2017	2018						
	2017	2018							

Note: The shaded area shows the graduation cohorts (post-2012) for which new entrant information is available to analyse earnings.

2.2 Description of Earnings Data

Earnings data are sourced from Revenue's P35 returns, which employers file annually on behalf of their employees, and contains information on PAYE income. Earnings in this report are defined as an individual's income, which is liable to income tax.[3] An individual's annual earnings information is not necessarily directly observed on the tax records because individuals may have more than one job in a calendar year and the data includes one record for each job. Each record includes the number of weeks of insurable work and the pay received by the employee. The data does not include the number of hours worked or the hourly wage. Earnings from self-employment are not analysed in this report because there is a longer lag in its availability and there are difficulties in interpreting a consistent measure of individuals' income from their sales, profit and turnover.

[3] It is thus the total income of taxpayers less personal reliefs (such as pension contributions) and other deductions at the marginal tax rate but prior to the application of tax credits and reliefs at the standard tax rate (such as health expenses).

It is preferable to analyse weekly earnings rather than annual earnings because individuals may work for different periods of time, in different jobs, in a calendar year. To calculate weekly earnings, a main employment (or job) is identified for each individual as the one which contributes the single largest pay to that individual over the course of the year. An individual's average weekly earnings is calculated for this main employment as their gross pay divided by their number of weeks of insurable work for this employment. Earnings are adjusted for inflation by multiplying by a factor based on the Consumer Price Index (CPI, base=December 2016).

To ensure that short-term or casual work is excluded, graduates' earnings are only analysed for individuals who are in 'substantial employment'. An individual is regarded as being in substantial employment within a given calendar year if they fulfil the following two requirements:

1. They have at least 12 weeks of insurable work within the calendar year across all employments. This can be supplemented by weeks of maternity leave and/or illness leave.
2. The average weekly earnings from only their main employer are at least €100 per week.

It is worth noting that while the definition of earnings remains the same, the analysis of earnings in this report is not directly comparable to the CSO (2018) study. This is because analysis here is based on mean earnings (as regressions are calculated at mean values) rather than median earnings.

2.3 Description of Student Characteristics

Below is a list of all student characteristics that are accounted for in this analysis, grouped together into eight categories. Variables marked with an asterisk (*) are only included for undergraduate models as they are sourced from the new entrant record of individuals' first full-time enrolment in higher education. Appendix B contains further information about these student characteristics variables.[4]

1. Graduation Cohort
   - Graduation cohorts (2010, …, 2017)
2. HEI and Subject
   - Institution (detailed in Table B.2)
   - Field of study (detailed in Table B.4)
3. Degree Characteristics
   - Award type (Ordinary Degree, Honours Degree, Masters, PhD etc.)
   - Final degree grade
4. Demographic Characteristics
   - Gender
   - County of origin (including Dublin postcodes)
   - Age at entry to higher education*
5. Prior Academic Attainment
   - Leaving Certificate points (155-200, 205-250, …, 555-600)*
   - Leaving Certificate Mathematics grade*
   - Leaving Certificate English grade*
6. Socio-economic Background
   - Second-level school type (DEIS, fee-paying and standard)
   - HP relative deprivation index score of schools' Electoral Division
   - Students' socio-economic group (based on fathers' occupation)*
7. Mother Information
   - Indicator of motherhood
8. Sector of Employment
   - NACE sector of employment

[4] All variables are categorical and Table B.5 shows these categories and the shares of each category (mostly) with respect to the `Earnings Sample' for all graduation cohorts (column 6 in Table A.2).

2.4 Administrative Data versus Survey Data

Other sources of graduates' earnings data for Ireland are the First Destinations Survey and the Graduate Outcomes Survey, which surveys graduates nine months after completing their degrees.[5] Response rates are strong for these types of survey at over 60 percent for the First Destinations Survey and over 50 percent for the Graduate Outcomes Survey. However, the response rate for earnings is substantially lower, ranging between 19 and 31 percent for Honours Degree graduates between 2013 and 2016.

Administrative data has several advantages over survey data. Population-level coverage allows estimates to be calculated with greater precision and enables analysis of specific sub-sections of the population, while retaining sufficient sample size. Administrative data examines the same individual over multiple periods in time, creating a panel dataset over a long time series, which provides insight into earnings growth in graduates' early career years rather than just at a specific point in time. In addition, administrative data (such as earnings) is largely free from measurement error, such as self-recall bias, non-response bias or, in the case of panel data, attrition bias.[6]

However, there are limitations. Administrative data is collected separately to administer the higher education sector and the tax system and not with the sole intention of analysing the outcomes of graduates from higher education. For example, the perceived relevance of a graduate's qualification to their area of employment cannot be examined and the region where graduates are employed cannot be identified from the data.[7]

This report only extends to individuals who graduate from an Irish HEI who subsequently work in Ireland. Therefore, the data does not capture individuals who graduate from an Irish HEI and work outside the State.[8] In addition, the data cannot identify Irish domiciled individuals who graduate from institutions outside of Ireland and subsequently return to work in Ireland.[9]

[5] These reports are available on the HEA website at: http://hea.ie/statistics/publications/
[6] Attrition bias can be significant. The response rate was 44 percent amongst 2007/08 graduates in the UK who were followed up after three and a half years (Crawford and Vignoles, 2014).
[7] Nevertheless, the region of employment can be considered an outcome of attending a particular HEI insofar as a student chooses to relocate to a HEI in a strong labour market region, with the intention of remaining there after graduation.
[8] Survey data of Irish university graduates indicates that nine months after graduating with an Honours Degree, the proportion employed overseas range from 9 percent in 2011 to 12 percent in 2013, and 8 percent in 2016. For Masters and Doctorate graduates these range from 13 percent in 2011 to 15 percent in 2016 (HEA, 2018).
[9] For instance, almost 11,000 students of Irish domicile were enrolled in UK universities in the 2014/15 academic year. Further information is available here: https://www.hesa.ac.uk/data-and-analysis/students/where-from

2.5 Sample Selection

The CSO's Educational Longitudinal Database contains the population of graduations from HEA-funded institutions. A number of restrictions are applied before arriving at the sample used in this analysis. Full details of the sample selection process are given in Appendix A.

RCSI graduates and non-Irish domiciled individuals are excluded due to high rates of missing PPSN identifiers among these groups, which is required for matching to other administrative data sources. In addition, small numbers of graduation records are excluded from generic programmes (ISCED code 0) and a small number of graduation records are excluded for individuals who had more than one graduation in the same year.

It is important to note that one-fifth of individuals have received more than one graduation between the years 2010 and 2017. This report attributes individuals' earnings only with their latest graduation and thus, removes individuals' earlier graduations. This is to ensure that analysis is based on unique individuals rather than multiple graduations that relate to the same individual.

The sample is then restricted to full-time young graduates to enable the report to focus on the cohort of graduates who are attending higher education soon after leaving secondary school. Around 5 percent of the remaining sample (of full-time young graduates) is missing a CSOPPSN identifier, which prevents these graduations being matched to the CSO's administrative databases.[10] Graduates in substantial employment, in any particular year, then form the basis of the sample used for analysis.

[10] To guard against the possibility that CSOPPSN is missing in a non-random fashion, all estimates are weighted by institute, award type and graduation cohort. Full description of the weighting method is given in Appendix D.

3 Descriptive Statistics

3.1 Introduction

This section presents descriptive analysis of graduates' earnings across institutions. Differences in the student population across institutions are then shown, which may help to explain the observed differences in earnings across institutes. Differences in gender, the type of second-level school previously attended, and Leaving Certificate points are shown for each institution.

3.2 Average Earnings across Institutions

This subsection shows the trajectory of average earnings over eight years, separately for undergraduates and postgraduates, across institutions. However, the figures that follow are purely descriptive and do not account for other student characteristics that may determine wages.

It is worth reiterating that the earnings analysis in this report is not directly comparable to the CSO (2018) study despite both using the same administrative data. This is because descriptive analysis here is based on mean earnings instead of median earnings. Average weekly earnings for each year after graduating are shown for combined graduation cohorts.[11]

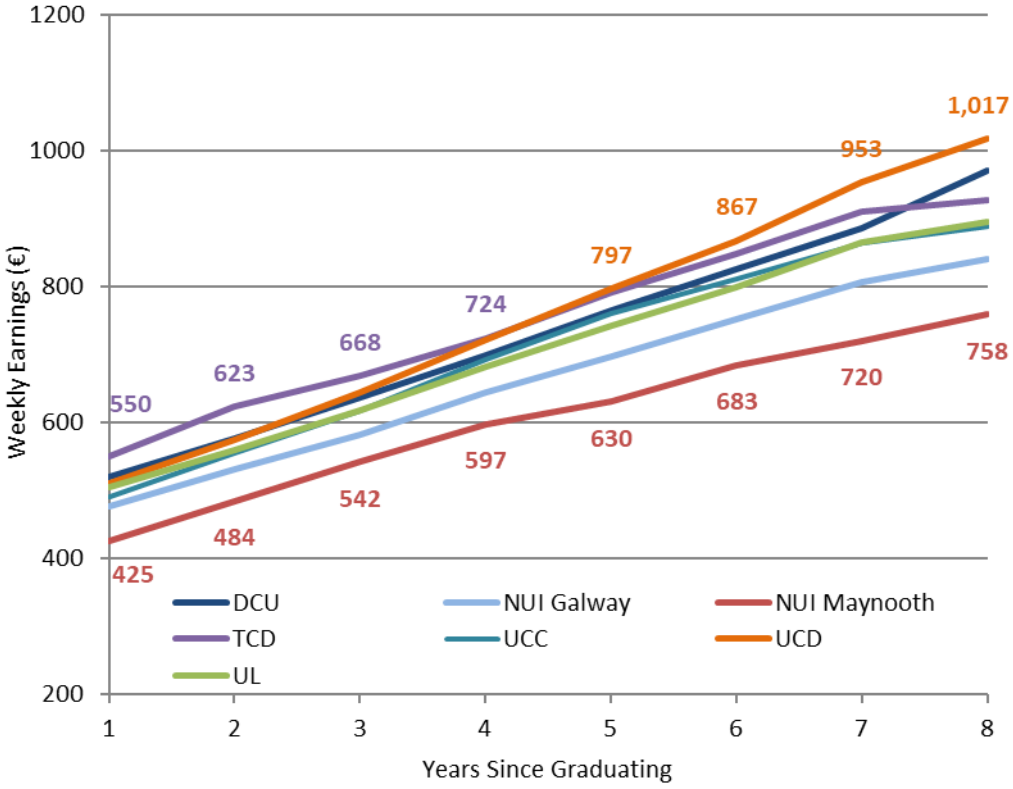
3.2.1 Undergraduates

Average earnings for university undergraduates are shown in Figure 1. The average earnings do not take into account the reality that students generally enter universities with different Leaving Certificate points and also do not account for the different subject mix offered by institutions.

Undergraduates from TCD earn the most one, two and three years after graduating however, undergraduates from UCD earn the most after six, seven and eight years. Graduates from TCD earn on average €550 per week after one year, rising to €668 after three years. After eight years, graduates from UCD earn on average €1,017 per week.

[11] To explain, average earnings one year after graduation include all graduation cohorts from 2010 to 2017, while average earnings two years after graduation includes cohorts from 2010 to 2016 and so on until earnings eight years after graduation includes only the 2010 cohort.

Figure 1: Undergraduates' Average Weekly Earnings by Institution (€), Universities



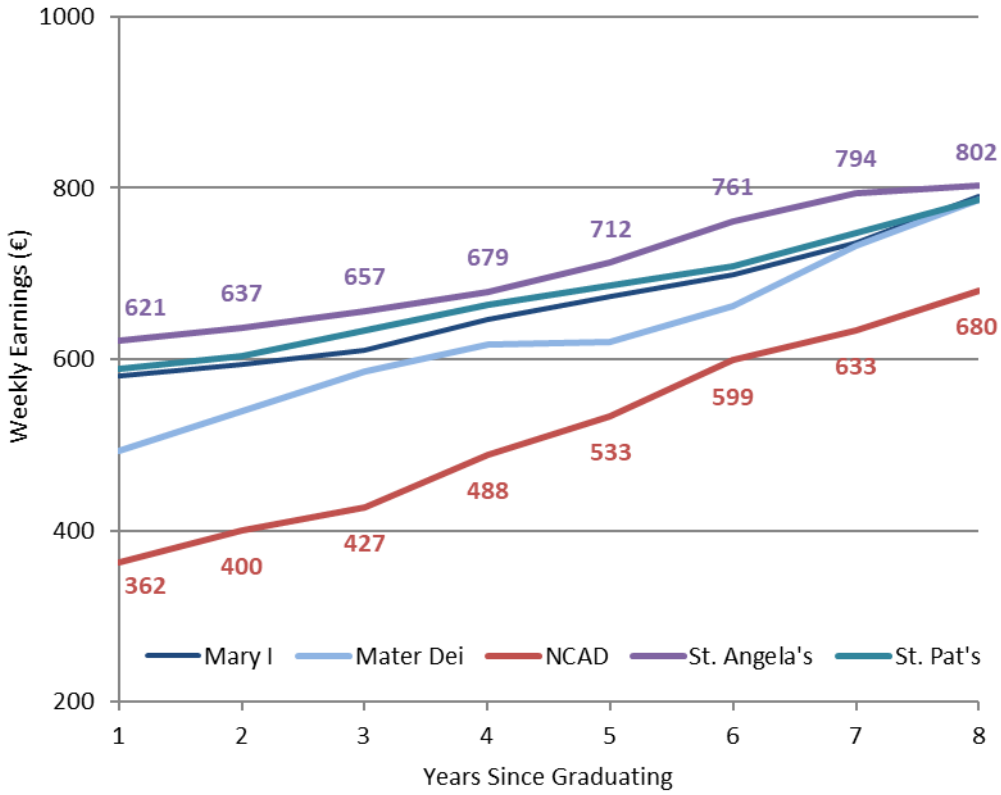
Note: Earnings are conditional on substantial employment and relate to real values in terms of 2016 consumer prices (using the headline Consumer Price Index). Calculations for each year since graduation are based on the respective sample in substantial employment in columns 2 – 9 of Table A.3.

Average earnings for college undergraduates are shown in Figure 2. Colleges primarily offer teacher training courses, except for NCAD, which primarily offers art and design courses. These differences are not reflected in the headline average earnings across institutions.

Many colleges have the highest earnings one and two years after graduating compared to all institutions, reflecting the concentration of graduates from teacher training courses.[12] Undergraduates from St. Angela's have the highest average earnings after graduating. They earn €621 per week on average after one year, rising to on average €802 after eight years.

[12] Mater Dei Institute of Education and St. Patricks College, Drumcondra were incorporated into DCU from the 2016/17 academic year. Therefore, graduates from these institutes in 2017 are recorded as graduating from DCU.

Figure 2: Undergraduates' Average Weekly Earnings by Institution (€), Colleges



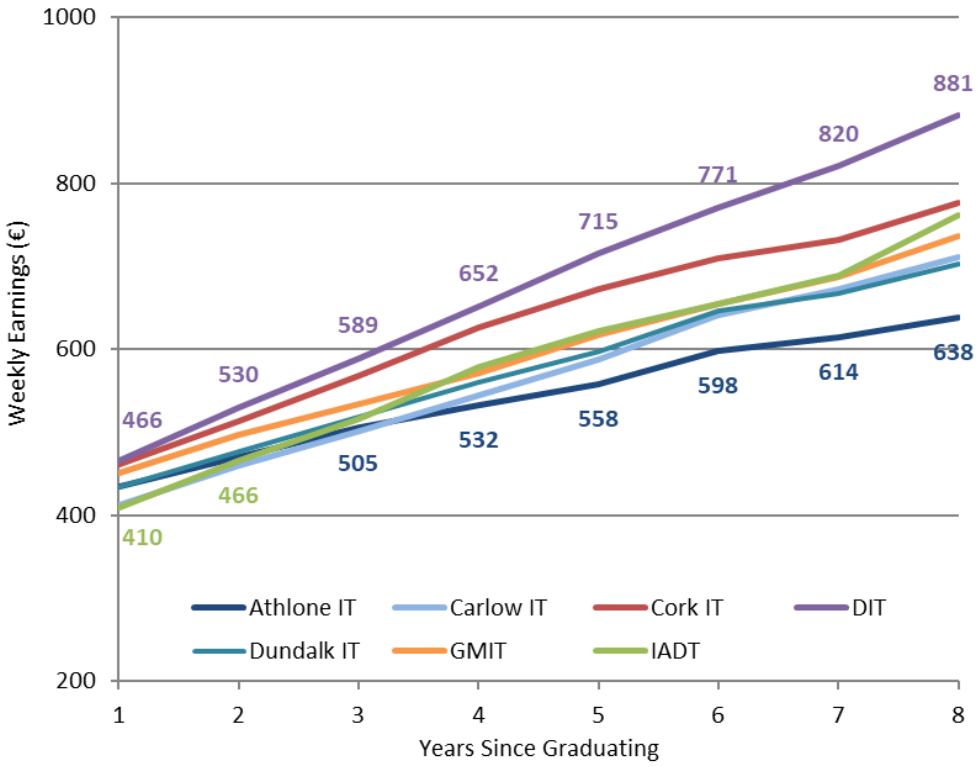
Note: Earnings are conditional on substantial employment and relate to real values in terms of 2016 consumer prices (using the headline Consumer Price Index). Calculations for each year since graduation are based on the respective sample in substantial employment in columns 2 – 9 of Table A.3.

Average earnings for undergraduates from institutes of technology are shown in Figure 3. For readability, the institutions are displayed across two figures alphabetically (according to the names used in this report). The average earnings do not reflect the different student populations in each institution.

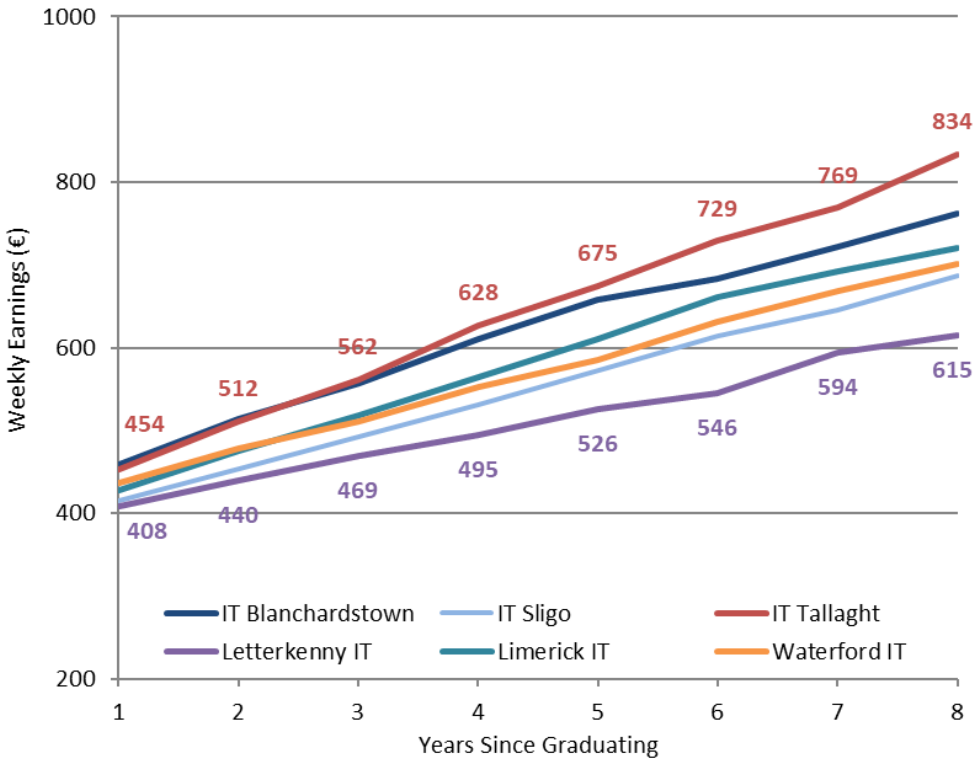
Undergraduates from DIT have the highest average earnings amongst institutes of technology, earning €466 per week one year after graduation and €881 after eight years.

Figure 3: Undergraduates' Average Weekly Earnings by Institution (€) – Institutes of Technology

A: Institutions A - I



B: Institutions, I - W

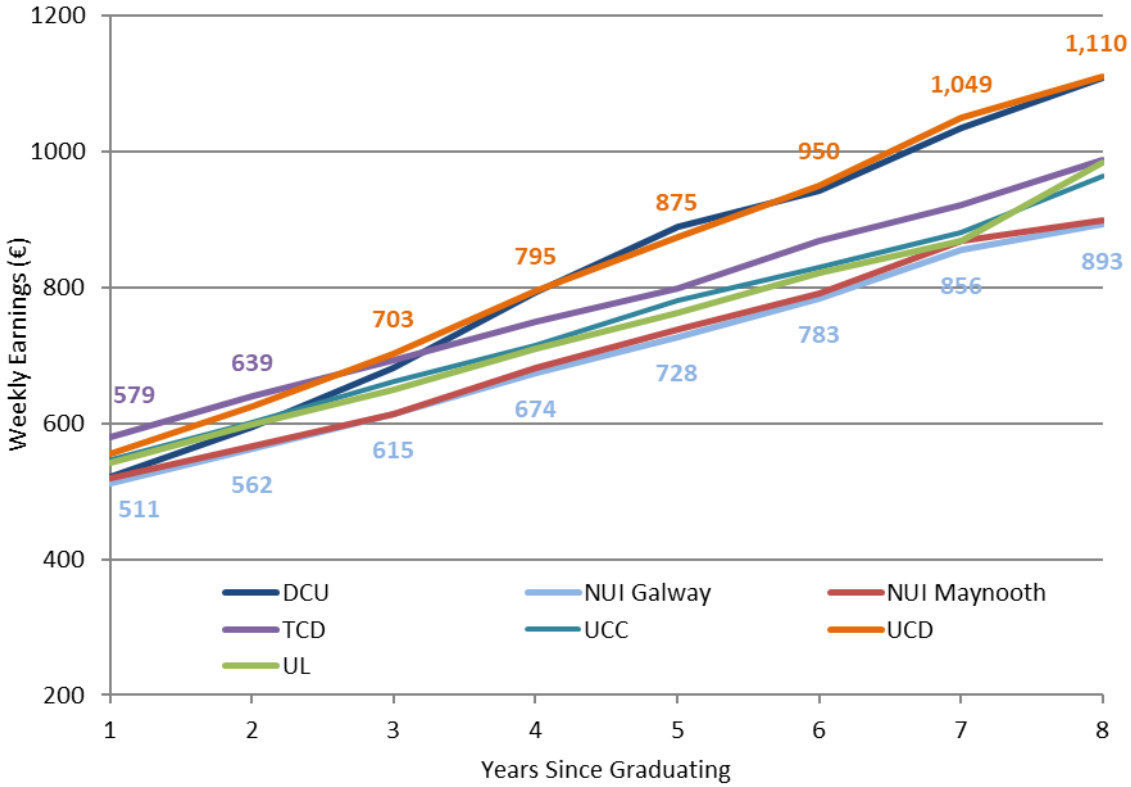


Note: Earnings are conditional on substantial employment and relate to real values in terms of 2016 consumer prices (using the headline Consumer Price Index). Calculations for each year since graduation are based on the respective sample in substantial employment in columns 2 – 9 of Table A.3.

3.2.2 *Postgraduates*

Average earnings for university postgraduates are shown in Figure 4. Postgraduates from TCD earn the most one and two years after graduating, while graduates from UCD and DCU earn the most after four years. Postgraduates from TCD earn on average €579 per week after one year and postgraduates from UCD and DCU earn on average around €1,110 per week after eight years.

Figure 4: Postgraduates' Average Weekly Earnings by Institution (€) – Universities



Note: Earnings are conditional on substantial employment and relate to real values in terms of 2016 consumer prices (using the headline Consumer Price Index). Calculations for each year since graduation are based on the respective sample in substantial employment in columns 2 – 9 of Table A.4.

3.3 Differences in Institution Populations by Gender

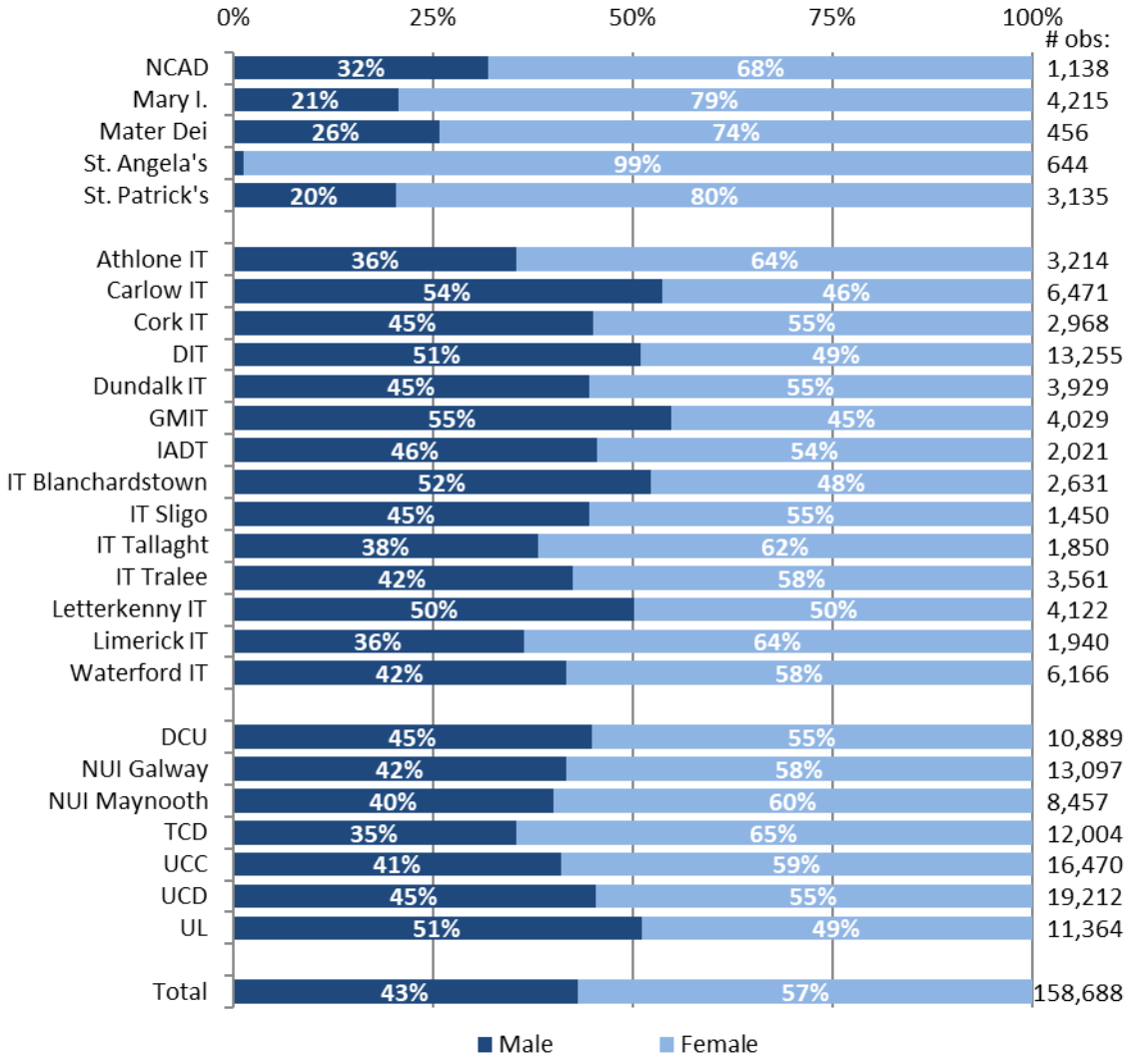
The concentration of male and female graduates varies across institutions. Overall, female graduates comprise 57 percent of the "Earnings Sample" used in this report, while male graduates make up 43 percent.

The distribution of males and females graduating from universities generally reflects the overall graduate gender distribution. However, TCD has proportionally more female graduates (65 percent), while UL has proportionally less (49 percent).

In general, there are proportionally more males graduating from institutes of technology compared to the overall gender graduate distribution. Males comprise over half of graduates from Carlow IT, DIT, GMIT, IT Blanchardstown and Letterkenny IT. However, only 36 percent of graduates are male from Athlone IT and Limerick IT.

The majority of graduates from colleges are women. Women comprise almost all graduates from St. Angela's and around two in three (68 percent) graduates from NCAD. This reflects the concentration of female graduates from art, design and educational courses that are offered by these institutions.

Figure 5: Gender Profile by Institution



Note: The number of observations is shown and is based on the 'Earnings Sample' for graduation cohorts from 2010 to 2017 (column 6 in Table A.2).

3.4 Differences in Institution Populations by Second-Level School Type

The type of second-level school that graduates previously attended is used in this report as a proxy measurement of socio-economic background. Graduates' institution is broken down by the type of second-level school they attended prior to entering higher education in Figure 6. Overall, a similar proportion of graduates previously attended a DEIS or fee-paying school (10 percent and 11 percent, respectively). However, this distribution varies substantially across institutions.

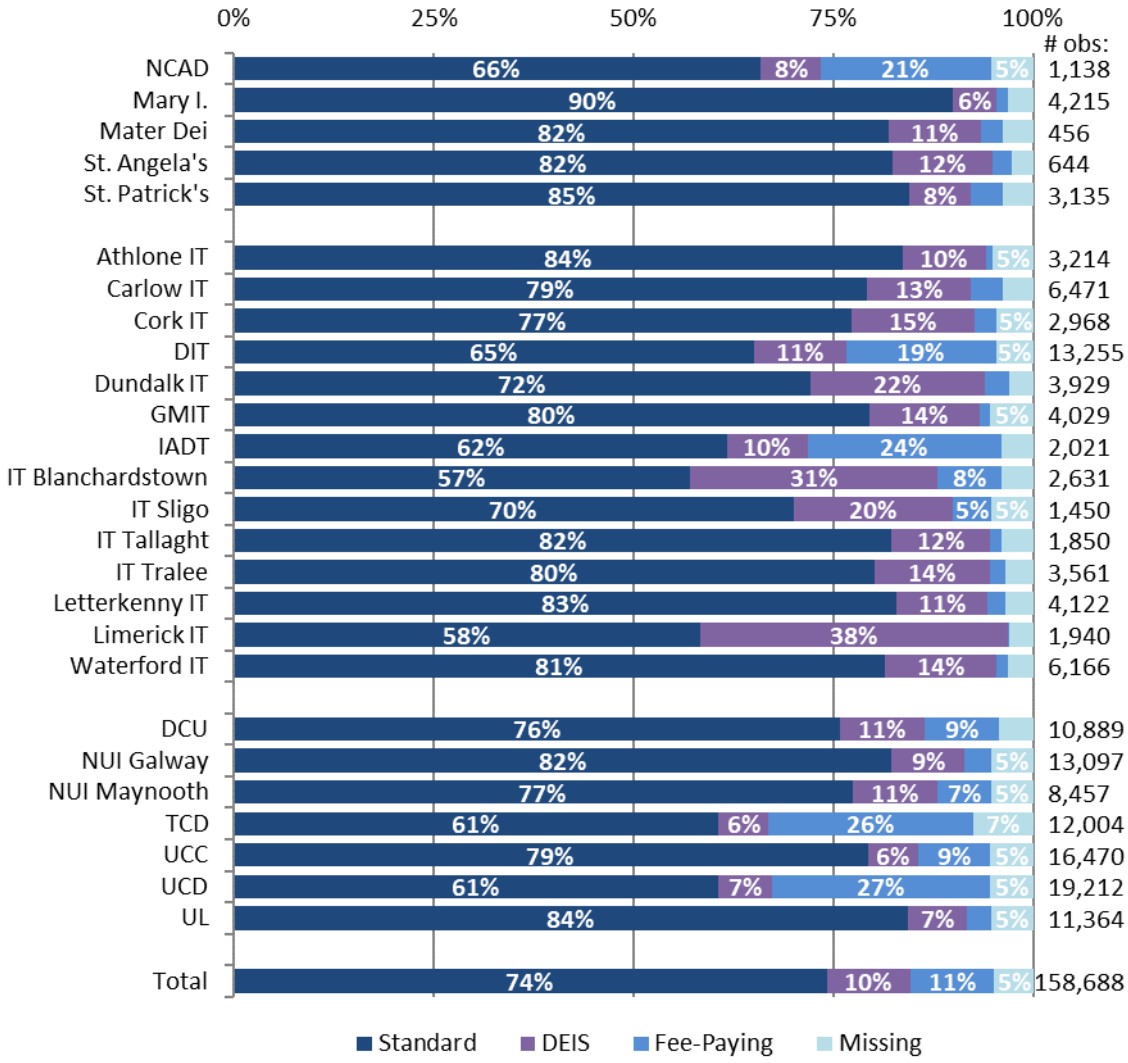
Overall, for universities, more graduates previously attended a fee-paying school and less attended a DEIS school. TCD and UCD have the highest proportion of graduates who attend a fee-paying school (26 percent and 27 percent, respectively) compared to a DEIS school (6 percent and 7 percent, respectively). However, NUI Maynooth, DCU, NUI Galway and UL have higher proportions of graduates that attended a DEIS school compared to a fee-paying school.

Overall, for institutes of technology, more graduates previously attended a DEIS school and less attended a fee-paying school. Limerick IT and IT Blanchardstown have the highest proportion of graduates who previously attended a DEIS school (38 percent and 31 percent respectively). Less than half a percent of graduates from Limerick IT attended a fee-paying school. However, around one-in-five graduates from DIT and IADT attended a fee-paying school.

More graduates from colleges previously attended a DEIS school compared to a fee-paying school, except for NCAD. Less than 4 percent of graduates from colleges previously attended a fee-paying school compared to 21 percent of graduates from NCAD.

Together these trends demonstrate the importance of accounting for institution and second-level school type simultaneously using regression analysis. This is especially relevant given the unequal geographical spread of DEIS and fee-paying schools around the country.

Figure 6: Second-Level School Type Profile by Institution



Note: The number of observations is shown and is based on the 'Earnings Sample' for graduation cohorts from 2010 to 2017 (column 6 in Table A.2). Type of school is missing for 7,675 individuals or 5 percent of this sample and are included here and in the regression analysis as a missing category. Further detail on missing values is provided in Appendix B.

3.5 Differences in Institution Populations by Leaving Certificate Points

Leaving Certificate points are used in this report as a measurement of academic attainment prior to higher education. After meeting basic matriculation requirements, most students analysed in this report are allocated places in higher education courses on the basis of their Leaving Certificate points. It is likely that high-achieving students in the Leaving Certificate may self-select into courses with promising job prospects.

Analysis of Leaving Certificate points is restricted to undergraduate programmes only as the information is obtained from an individual's record upon first registering in higher education and this coverage is limited for postgraduates (as detailed in Section 2.1).

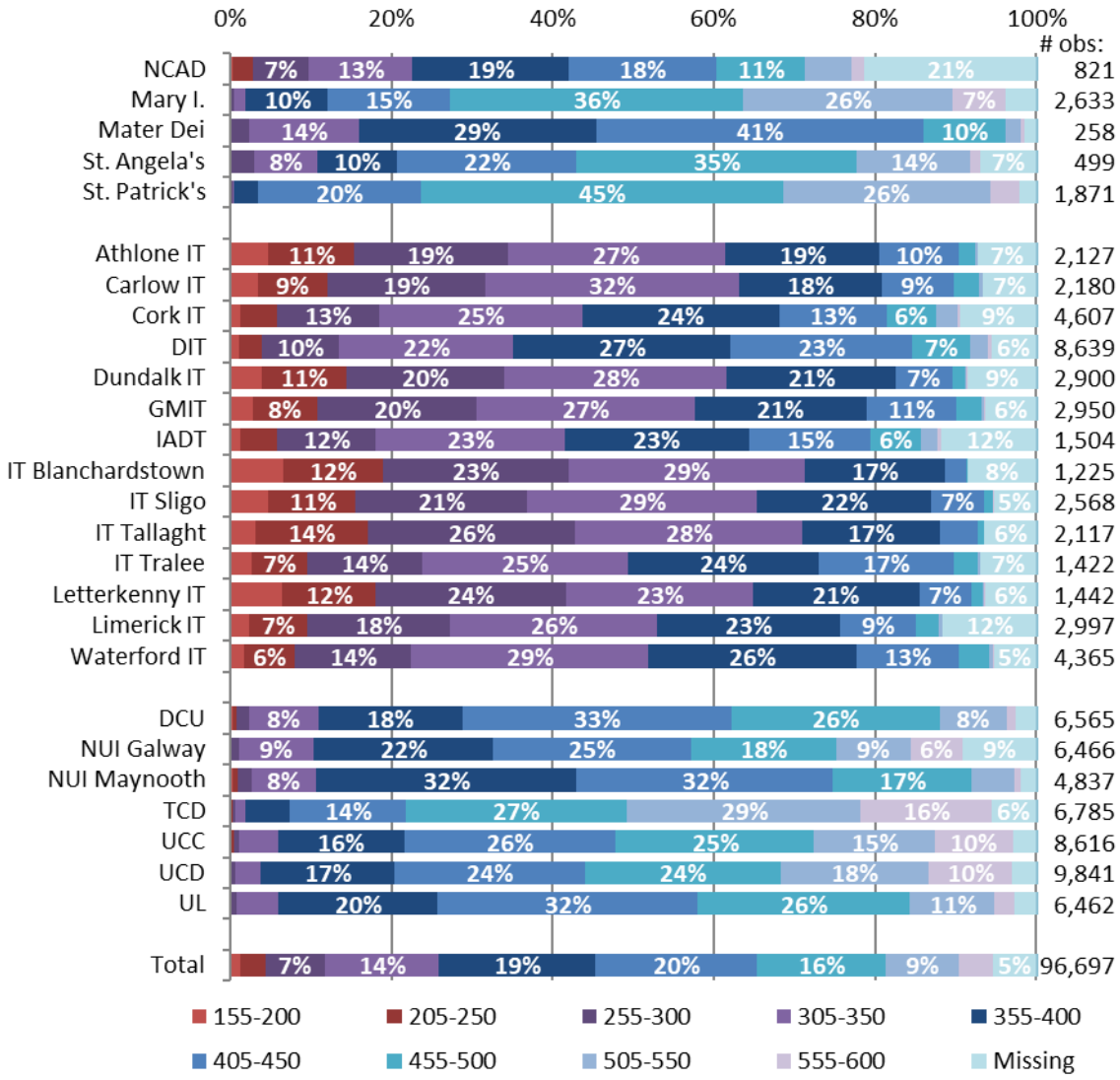
Entry requirements differ across institutions, so the distribution of Leaving Certificate points varies by institution, as shown in Figure 7. Across all institutions, 49 percent of undergraduates entered their institution with over 400 points (excluding 5 percent of graduates with missing records).

Undergraduates from colleges achieved the highest Leaving Certificate points overall. 94 percent of St. Patrick's graduates achieved over 400 points, while 84 percent of Mary Immaculate graduates did so.

Graduates from universities also achieved Leaving Certificate points above average. 87 percent of TCD graduates entered their courses with over 400 points, while 45 percent achieved over 500 points. Amongst universities, graduates from NUI Maynooth entered their courses with the lowest Leaving Certificate points with 55 percent achieving over 400 points.

Graduates from institutes of technology generally attained lower points than the average for all graduates. Amongst institutes of technology, graduates from IT Blanchardstown entered with the lowest points (3 percent entered with over 400 points), while graduates from DIT and IADT entered with the highest points (32 percent and 24 percent, respectively, entered with over 400 points).

Figure 7: Leaving Certificate Points Profile by Institution, for Undergraduates



Note: The number of observations is shown and is based on the 'Earnings Sample' for undergraduate graduation cohorts from 2012 to 2017 (column 1 in Table A.3). Leaving Certificate points are missing for 5,290 or 5 percent of this sample and are included here and in the regression analysis as a missing category. Further detail on missing values is provided in Appendix B.

4 Regression Analysis Four Years After Graduation

4.1 Introduction

As outlined above, this report focuses on analysing graduates' earnings across higher education institutions. This section presents the results of regression analysis that model graduate earnings by taking into consideration graduate characteristics that determine wages.

For instance, entry to most courses in institutions is based on prior academic performance, so graduate characteristics will vary across institutions. Sections 3.3, 3.4 and 3.5 show how gender, second-level school type and Leaving Certificate points, respectively, vary across institutions. In turn, these characteristics may also determine graduates' earnings, which may confound the impact of institution on graduates' earnings. This section attempts to compare like-for-like graduates to isolate the impact of institution on graduates' earnings.

4.2 Regression Methodology

In keeping with most of the academic literature, the causal impact of degree subject, institution type, gender and socio-economic background on earnings cannot be determined without experimental data. The causal impact of higher education on earnings is masked by a student's innate ability, which may also drive their choice of degree subject and institution. For example, a student with exceptional ability may earn high wages, irrespective of their education level, but typically they are more likely to study a degree programme in an institution with high earnings potential.

While a student's ability is not readily observable, prior academic attainment in terms of Leaving Certificate points, Mathematics and English grades are observed in the HEA's new entrant records and these are used as a proxy for ability.

In essence, the analysis employs richly specified regression models to estimate how graduates' earnings vary amongst similarly qualified individuals. Graduates' earnings four years after graduation are measured as a function of graduation cohort, institution, subject, demographic characteristics, prior academic attainment, socio-economic controls, an indicator for motherhood and sector of employment.

The effect of socio-economic background is measured using the type of second-level school that graduates previously attended because it is observed for both undergraduates and postgraduates (as detailed in Section 2.1). The analysis also captures the effects of socio-economic background using a deprivation index score of the schools' Electoral Division. This

is because a disadvantaged school may not necessarily be located in a disadvantaged area. Students' socio-economic group is also captured though it is only observed for undergraduates as it comes from their new entrant record.[13]

Regressions include a control for detailed ISCED field of study rather than each course because there is limited overlap of courses with the same names across institutions.

Specifically, ordinary least squares regression models of the relationship between graduates' characteristics and their earnings are estimated. The dependant variable in all models is the log of weekly earnings as the log transformation reduces the impact of outliers and yields residuals more closely resembling normal. All regressions are weighted to adjust for missing values of CSOPPSN by institution, award type and graduation cohort.[14]

Average predicted earnings four years after graduation are shown separately for undergraduates and postgraduates by institution. Two predictions are shown. The 'Raw' prediction shows the raw relationship between earnings and the student characteristic of interest.[15] This represents the average prediction of graduate earnings before any attempt is made to explain part of the variation in wages.

The 'Model' prediction takes into account the full set of student characteristics described in Section 2.3, meaning that comparisons are being made for like-for-like graduates. That is, comparisons are being made between graduates from different institutions who studied the same subject, received the same grade, are the same gender, from the same county, attended the same type of secondary school, work in the same sector and can account for the effect of having children on female earnings. For undergraduates, comparisons are also made between graduates who entered higher education at the same age, had the same performance in the Leaving Certificate and are in the same socio-economic group.

Note that predictions of undergraduate and postgraduate earnings are not directly comparable as postgraduate regressions do not include controls for graduates' prior academic attainment, age at entry to higher education and socio-economic background. As detailed in Section 2.1, this information comes from a student's new entrant record, when they first register in higher education, and sufficient time does not elapse to link this information to their postgraduate qualification.

[13] There may nevertheless be other factors relating to social disadvantage that may cause earnings differences among graduates that cannot be accounted for here, such as parental education or health status.
[14] Full description of the weighting method is given in Appendix D: Graduates with Missing PPSN.
[15] The only other characteristic included is the graduation cohort the student graduates from.

Furthermore, undergraduate models are estimated for pooled 2012, 2013 and 2014 graduation cohorts when such background information can be translated to their graduation record. The number of observations in undergraduate models is 34,788. Postgraduate models are estimated for more graduation cohorts, pooled from 2010 to 2014, as these models are not constrained by the availability of such background information. The number of observations in postgraduate models is 16,731.

4.3 Graduates' Predicted Earnings by Institution

Entry requirements vary across courses and institutions and therefore, graduate characteristics will vary across different institutions. For instance, Sections 3.3, 3.4 and 3.5 shows how gender, second-level school type and Leaving Certificate points, respectively, vary across institutions. Differences between the raw and model predictions indicate that the variation in earnings across institutions can, at least partially, be explained by different subject mixes and different student populations in institutions.

4.3.1 Undergraduates

Undergraduate predicted earnings four years after graduation by institution are shown in Figure 8. Both the raw and model predictions are shown, and institutions are sorted by the model prediction. The average number of individuals in each institution is 1,338 and ranges from over 100 for some colleges (123 in Mater Dei and 161 in St. Angela's) to over 1,000 in others. The average predicted earnings, four years after graduating, for undergraduate cohorts 2012, 2013 and 2014, is €657 per week.

In the raw prediction, university undergraduates generally earn the most, four years after graduating. This is followed by the four teacher training colleges and then by institutes of technology. Average predicted raw earnings are highest for TCD graduates, earning €744 per week four years after graduating, followed by DCU (€725 per week) and UCD (€720 per week). Amongst institutes of technology, DIT graduates have the highest average predicted raw earnings (€682). However, these values do not take into account differences in the subjects offered by institutions and different student populations.

In the model prediction, comparisons of institutions are being made for individuals who studied the same subject, received the same grade, are the same gender, from the same county, entered higher education at the same age, had the same performance in the Leaving Certificate, have the same socio-economic background and work in the same sector. A clear pattern emerges that, when otherwise similar graduates are compared, the predicted earnings for universities decrease, while the predicted earnings for institutes of technology and colleges increase. This indicates that some of the differences in earnings across institutions can be explained by differences in the subjects offered by each institution and differences in student characteristics, such as prior academic achievement.

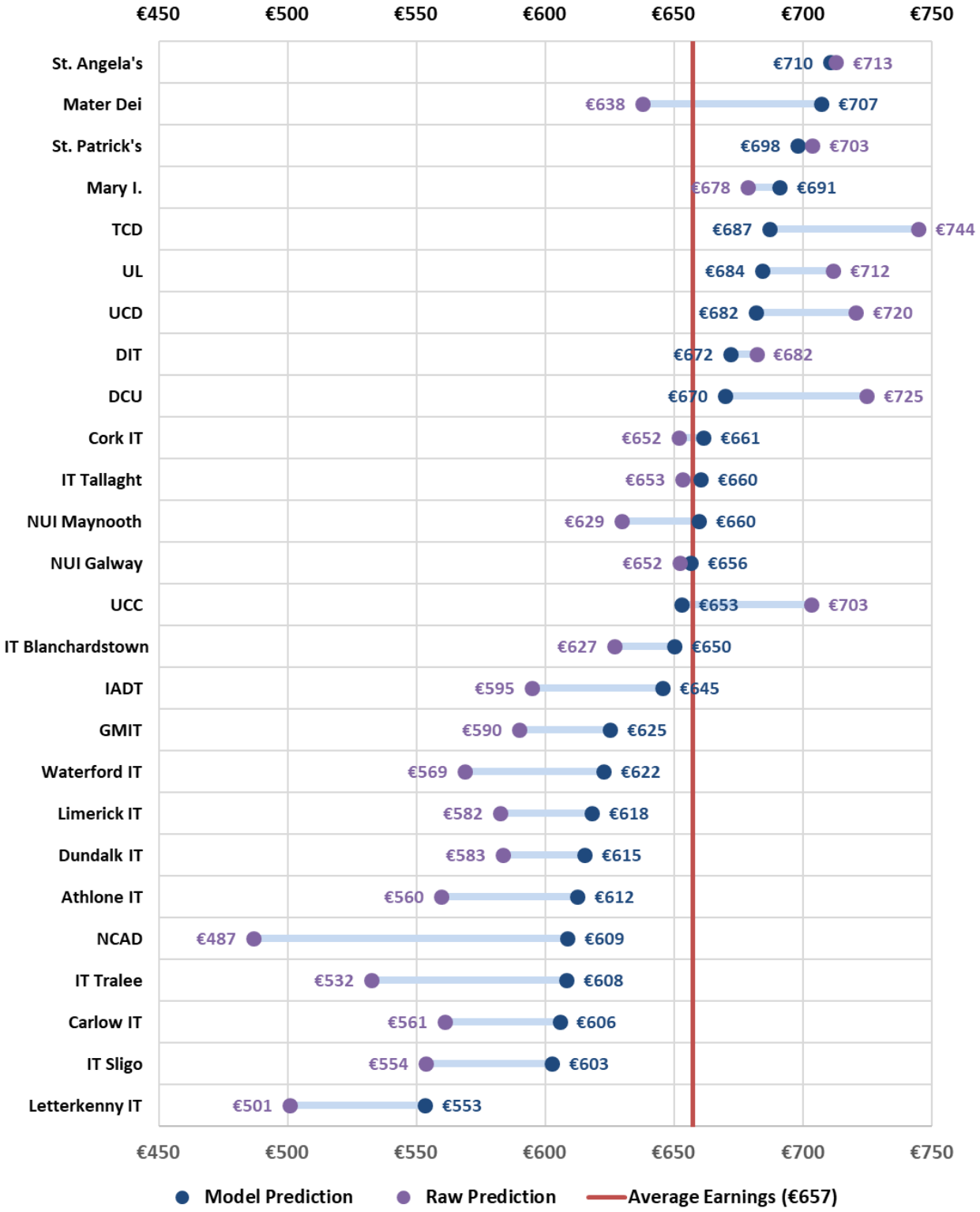
Introducing controls for field of study and student characteristics has a considerable impact on some institutes. For instance, undergraduates from NCAD earn the lowest amount in terms of average predicted raw earnings (€487 per week) four years after

graduating or 31 percent less than a UCC undergraduate. However, when controlling for the impact of field of study, prior academic attainment and other characteristics, the difference compared to a UCC undergraduate is reduced to 7 percent.

When otherwise similar graduates are compared in the model prediction, the four teacher training colleges have the highest earnings, in terms of the model prediction, four years after graduating. This is likely due to the relative homogeneity of graduates from these institutions. For instance, graduates from these institutions predominantly study education courses and work in the education sector so, there is little overlap of subjects between these colleges and other institutions.

Amongst universities, TCD undergraduates have the highest average predicted earnings of €687 per week when comparing otherwise similar graduates, followed by UL (€684) and UCD (€682). Amongst institutes of technology, DIT undergraduates have the highest average predicted earnings of €672 per week, followed by Cork IT (€661) and IT Tallaght (€660).

Figure 8: Undergraduates' Predicted Earnings 4 Years after Graduation by Institution (€)



Note: Predicted earnings are conditional on graduates being in substantial employment. The number of observations is 34,788. The 'Raw Prediction' is the predicted earnings from the model containing indicators for only the graduation cohort and institution. The 'Model Prediction' for undergraduates includes additional controls for subject, award type, final degree grade, gender, county of origin, age at entry to higher education, LC points, LC Maths and English grades, second-level school type, deprivation index score of schools' Electoral Division, socio-economic group, an indicator for motherhood and sector of employment. Detailed regression results are shown in Table E.1.

4.3.2 Postgraduates

Postgraduate predicted earnings four years after graduation by institution are shown in Figure 9. Both the raw and model predictions are shown, and institutions are sorted by the model prediction. Estimates have been supressed for institutions comprising less than 100 individuals to increase confidence that the predictions are not the result of sample variability. Excluding these, the average number of individuals in each institute is 1,240 and ranges from over 150 for some institutions (189 in Athlone IT and 229 in Cork IT) to over 1,000 in others. The average predicted earnings, four years after graduating, for postgraduate cohorts 2010, 2011, 2012, 2013 and 2014 is €733 per week.

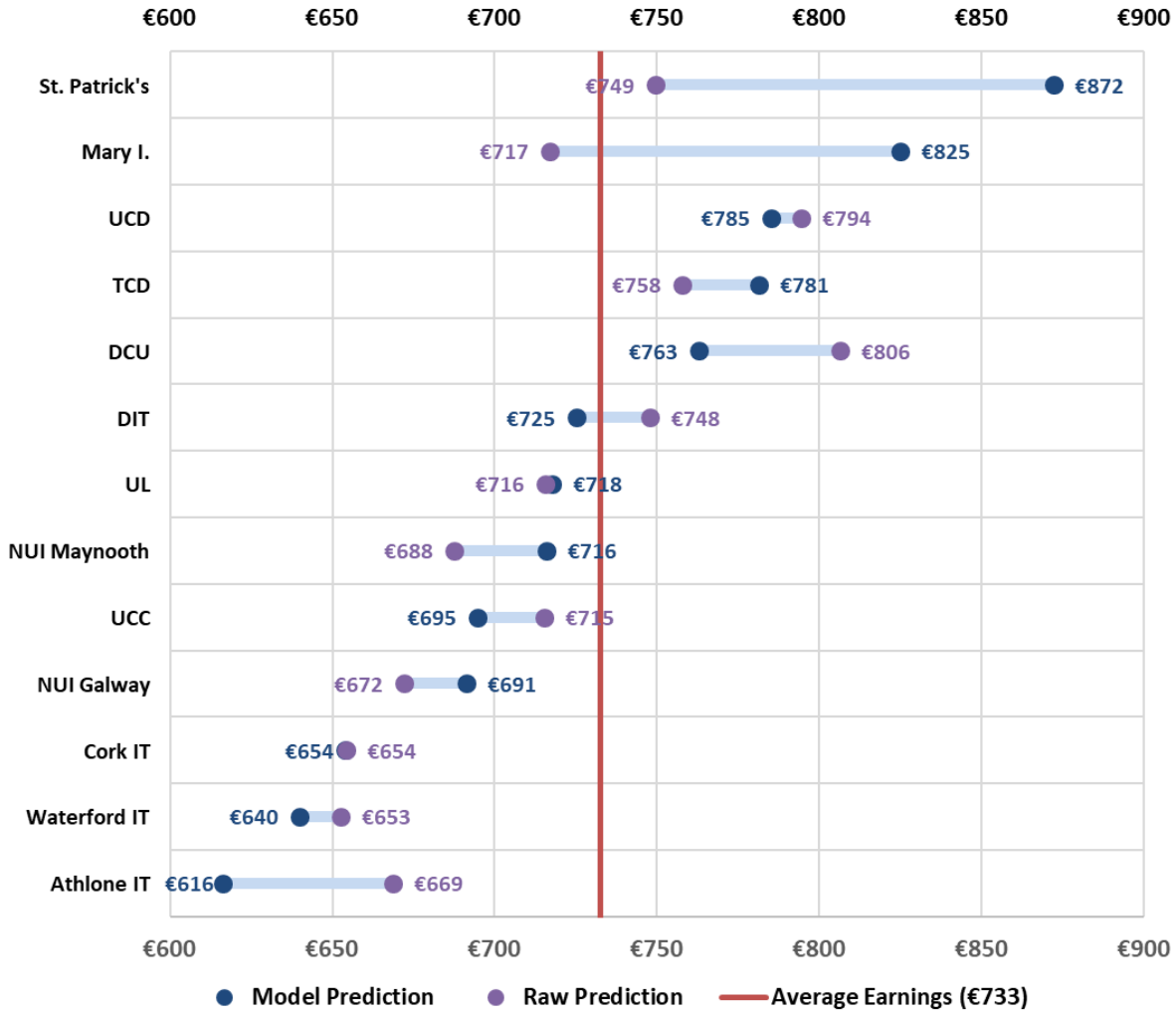
Average predicted raw earnings are highest for DCU postgraduates, earning €806 per week four years after graduating, followed by UCD (€794 per week) and TCD (€758 per week). Amongst institutes of technology (for which sufficient observations are available), DIT postgraduates have the highest average predicted raw earnings (€748). However, these earnings are not adjusted for differences in the subjects offered by institutions and differences in student populations.

In the model prediction, comparisons of institutions are being made for individuals who studied the same subject, received the same grade, are the same gender, are from the same county, attended the same type of secondary school and work in the same sector.

Introducing controls for field of study and student characteristics has a considerable impact on the teacher training colleges. Mary Immaculate College and St. Patrick's have the highest earnings, in terms of the model prediction, four years after graduating. This is similar to the case for undergraduates and is likely due to the relative homogeneity of graduates from these institutes.

Amongst universities, UCD postgraduates have the highest average predicted earnings of €785 per week when comparing otherwise similar graduates followed by TCD (€781) and DCU (€763). Amongst institutes of technology, DIT postgraduates have the highest average predicted earnings of €725 per week.

Figure 9: Postgraduates' Predicted Earnings 4 Years after Graduation by Institution (€)



Note: Predicted earnings are conditional on graduates being in substantial employment. The number of observations is 16,731. The 'Raw Prediction' is the predicted earnings from the model containing indicators for only the graduation cohort and institution. The 'Model Prediction' for postgraduates includes additional controls for subject, award type, final degree grade, gender, county of origin, second-level school type, deprivation index score of schools' Electoral Division, an indicator for motherhood and sector of employment. Detailed regression results are shown in Table E.2.

5 Conclusions

This report has extended the HEA's previous graduate earnings report (2019) by examining graduates' earnings from different institutions. The report uses linked administrative data and regression analysis to take into consideration prior academic attainment and background characteristics.

The findings show that students' choice of institution varies by their gender, socio-economic background and prior academic achievement. There is also variation in the subject mix across institutions. When these differences are taken into account, by comparing like-for-like individuals, the returns to studying undergraduate programmes (in terms of predicted earnings) at universities decrease, while the returns to studying at institutes of technology and colleges increase. For instance, undergraduates from TCD and UCD have the highest average earnings, in raw terms, four years after graduation. However, when like-for-like graduates are compared, undergraduates from the teacher training colleges have the highest predicted earnings.

The analysis in this report makes a further contribution to the growing evidence base on graduates' earnings in the Irish labour market. The report shows that differences in raw earnings across institutions can largely be explained by differences in graduates' characteristics, particularly their performance in the Leaving Certificate. As more data becomes available in this longitudinal dataset in the coming years, analysis of graduates' outcomes will continue to become richer, which will allow further investigation into key policy issues, including social mobility afforded by higher education.

References

Central Statistics Office (2018). Higher Education Outcomes, Graduation Years 2010 to 2014. Dublin: CSO.

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Higher Education Authority (2019), An Analysis of Labour Market Earnings for Higher Education Graduates in their Early Careers, Graduation Cohorts: 2010 – 2017. Dublin: HEA.

Higher Education Authority (2018), What do graduates do? The class of 2016. Dublin: HEA.

Appendix

Appendix A: Sample Selection

Table A.2 describes the sample selection process used this report. A number of restrictions are applied to the population of graduations from HEA-funded institutions, which is called the 'Graduation Sample' in column 1.

- The HEA graduation records are missing PPSN identifiers for nearly 80 percent of non-Irish domiciled graduates.[16] This arises because non-Irish domiciled students are not required to apply for a PPSN to study at an Irish HEI. Non-Irish domiciled graduates were removed from the analysis to allow the report to focus on the outcomes for Irish graduates. These numbered approximately 40,000. A further 2,500 graduations were Irish domiciled but were from Northern Ireland and these were also removed.
- The RCSI are missing PPSN identifiers for almost 75 percent of their graduates. Approximately 7,000 graduations from RCSI were removed to prevent the results for this cohort being estimated for a minority of the population.
- Around 7,000 Springboard graduates were removed as these students are mostly older with different employment histories.
- Around 500 individuals had more than one graduation in the same year. Examples include a graduate who received a Diploma in Education in combination with an Honours Degree in another course or a graduate receiving a Certificate in Religious Education in combination with an Honours Degree in Education. In these cases, the lower NFQ award type was removed.

It is important to note that the same individual can have multiple graduations over different years. There are 357,166 individuals in the dataset but 437,445 graduation records. Table A.1 shows the number of graduations for each individual in the dataset. One-fifth of individuals have more than one graduation. 17.5 percent of individuals have two graduations, 2.3 percent have three graduations, while a small number have four or five graduations. In total, 71,045 individuals had more than one graduation.

[16] Irish domicile refers only to the Republic of Ireland.

Table A.1: Number of Graduations per Individual

Number of Graduations	Number	Percent
1	286,121	80.1%
2	62,390	17.5%
3	8,102	2.3%
4	527	0.1%
5	26	0.0%
Total No. of Individuals	357,166	100%

Note: The total number of individuals corresponds to the 'Graduates Sample' sample (column 2) in Table A.2.

To ensure that regressions are based on unique individuals, rather than multiple graduations relating to the same individual, the analysis of earnings is restricted to only the individual's latest graduation.[17] This implies that an individual's earnings, after they graduate, are only attributable to their latest graduation. This restriction is applied in the 'Graduates Sample' in column 2 of Table A.2. In total, 80,279 graduation records are dropped relating to 71,045 individuals who had more than one graduation.[18]

However, out of the 71,045 individuals who had more than one graduation, 16,455 individuals have two distinct periods in the labour market arising from two different graduations. A distinct period in the labour market is defined as an individual graduating from a course (and not enrolling in another full-time course in higher education) and then entering substantial employment. These 16,455 individuals are re-included in the analysis (in the 'Latest Graduations' in column 3) because their earnings after each graduation are separate.[19]

To explain further, consider an individual who graduates with an Ordinary Degree in 2010 and graduates from an Honours Degree in 2011. They then enter the labour market in 2012 and 2013. In 2014, they enrol in a full-time Taught Masters, graduate in 2015, and re-enter employment in 2016. Thus, this individual has two distinct periods in the labour market arising from different graduations. Their earnings in 2012 and 2013 are earned one and two years after graduating from their Honours Degree, while their earnings in 2016 and after are attributable to their Masters Degree.

[17] 99.3 percent of individuals' latest graduation corresponds to their highest NFQ level award. A typical example of those whose latest graduation is at a lower NFQ level than previous awards are individuals with a Level 9 Masters qualification who later graduate with a Level 8 Professional Diploma in Education.
[18] Additional information on individuals' previous graduations is described in Appendix C: Multiple Graduations in Different Years.
[19] 1,372 of the 8,279 individuals have more than two distinct periods in the labour market. These earlier graduations are not considered.

The sample is further restricted in column 4 to full-time young graduates to enable the report to focus on the cohort of graduates who attended higher education full-time soon after leaving secondary school.[20] Around 160,000 mature graduates were removed and a further 7,000 young part-time graduates were removed.

A CSOPPSN identifier is required to facilitate linking of graduation records to labour market earnings. Around 5 percent of full-time young graduates are missing a PPSN identifier and these are dropped. The remaining number of graduates with a valid CSOPPSN is shown in column 5 of Table A.2. To guard against the possibility that CSOPPSN is missing in a non-random fashion, all estimates are weighted by institution, award type and graduation cohort. Full description of the weighting method is given in Appendix D: Graduates with Missing PPSN.

Column 6 shows the 'Earnings Sample'. These are the individuals who have substantial earnings on record (while not being enrolled in another full-time higher education course) in any year after graduating.

Columns 7 to 14 show the number of individuals with substantial earnings 1 to 8 years after graduating, while not being enrolled in another higher education course in these years. In addition, the top 1 percent of earnings are removed from each year since graduation (columns 7 – 14) to prevent a small number of outliers disproportionally affecting results.[21] In total, 5,000 observations are dropped for this reason.

[20] Appendix A describes the age threshold for young graduates, which is based on their type of degree awarded.
[21] This means that an individual's earnings may be dropped in some years after graduating but not necessarily the rest. The top 1 percent of earnings are removed by year since graduating to prevent excess earnings being omitted from individuals in the data who spent the longest period of time in the labour market. This is because these individuals who are in the labour market the longest, in general, have the highest earnings in the data.

Table A.2: Sample Selection: All Graduates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Graduation	Graduations	Graduates	Latest	Young	Valid	Earnings	Substantial Employment After:							
Cohort	Sample	Sample	Graduations	Full-time	PPSN	Sample	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years
2010	51,008	37,349	40,819	23,072	21,247	18,312	13,227	12,775	12,453	12,404	12,366	12,360	12,327	12,629
2011	52,468	38,619	42,076	23,042	21,802	18,897	14,255	13,643	13,428	13,401	13,247	13,141	13,328	
2012	53,384	39,899	42,959	23,988	22,790	19,838	15,478	14,781	14,669	14,441	14,117	14,193		
2013	55,272	42,728	45,302	24,626	23,481	19,984	15,997	15,379	15,106	14,743	14,590			
2014	56,335	45,216	47,171	25,451	24,003	20,430	17,211	16,398	15,988	15,777				
2015	54,047	44,604	45,843	24,339	23,493	19,411	16,868	15,880	15,898					
2016	56,751	50,571	51,271	28,220	27,240	20,967	18,920	18,545						
2017	58,180	58,180	58,180	32,446	31,587	20,849	20,757							
Total	437,445	357,166	373,621	205,184	195,643	158,688	132,713	107,401	87,542	70,766	54,320	39,694	25,655	12,629

Note: For the most recent (2017) graduation cohort, the number of graduates in column 2 is equal to the number of latest graduations in column 3. This is because a later graduation for these individuals cannot be observed yet. However, it is known whether these graduates are enrolled in another full-time course in higher education in 2018 (one year after graduating) and these individuals are excluded in the earnings samples in columns 6 and 7.

Table A.3: Undergraduate Observations

Graduation Cohort	(1) Earnings Sample	(2) Substantial Employment after: 1 Year	(3) 2 Years	(4) 3 Years	(5) 4 Years	(6) 5 Years	(7) 6 Years	(8) 7 Years	(9) 8 Years
2010	13,797	9,667	9,360	9,106	9,114	9,128	9,146	9,131	9,387
2011	14,517	10,734	10,263	10,146	10,133	9,988	9,917	10,026	
2012	15,616	12,035	11,461	11,370	11,202	10,913	10,960		
2013	15,710	12,429	11,876	11,681	11,405	11,294			
2014	15,906	13,249	12,608	12,285	12,181				
2015	15,674	13,520	12,738	12,772					
2016	16,809	15,068	14,839						
2017	16,982	16,981							
Total	125,011	103,683	83,145	67,360	54,035	41,323	30,023	19,157	9,387
NE Total	96,697	83,282	63,522	48,108	34,788	22,207	10,960		

Note: The shaded area shows the graduation cohorts (post-2012) for which new entrant (NE) information is available.

Table A.4: Postgraduate Observations

Graduation Cohort	(1) Earnings Sample	(2) Substantial Employment After: 1 Year	(3) 2 Years	(4) 3 Years	(5) 4 Years	(6) 5 Years	(7) 6 Years	(8) 7 Years	(9) 8 Years
2010	4,515	3,560	3,415	3,347	3,290	3,238	3,214	3,196	3,242
2011	4,380	3,521	3,380	3,282	3,268	3,259	3,224	3,302	
2012	4,222	3,443	3,320	3,299	3,239	3,204	3,233		
2013	4,274	3,568	3,503	3,425	3,338	3,296			
2014	4,524	3,962	3,790	3,703	3,596				
2015	3,737	3,348	3,142	3,126					
2016	4,158	3,852	3,706						
2017	3,867	3,776							
Total	33,677	29,030	24,256	20,182	16,731	12,997	9,671	6,498	3,242

Appendix B: Details of Student Characteristics

Young Graduates Detail

Young graduates, for the purposes of this analysis, are the cohort of graduates who attend higher education soon after leaving secondary school. The distinction between young and mature graduates are determined using an individual's age at graduation in combination with award type, as set out in Table B.1.

Table B.1: Threshold Ages for Young Graduates for each Award Type

Award Type	Maximum Age at Graduation
Certificate	21
Ordinary Degree	23
Honours Degree	24 plus 1 for each year the course exceeds three years
Postgraduate Diploma / Certificate	26
Taught / Research Masters	27
PhD	29

HEA-Funded Institutions Detail

Table B.2: HEA-Funded Institutions by Institution Types

Universities	Colleges	Institutes of Technology
Dublin City University (DCU)	Mary Immaculate College, Limerick	Athlone IT
National University of Ireland, Galway	Mater Dei Institute of Education	Cork IT
National University of Ireland, Maynooth	National College of Art and Design (NCAD)	Carlow IT
Trinity College Dublin (TCD)	St. Angela's College of Home Economics, Sligo	Dublin Institute of Technology (DIT)
University College Cork (UCC)	St. Patricks College, Drumcondra	Dun Laoghaire Institute of Art, Design and Technology (IADT)
University College Dublin (UCD)		Dundalk IT
University of Limerick (UL)		Galway-Mayo IT (GMIT)
		IT Blanchardstown
		IT Sligo
		IT Tallaght
		IT Tralee
		Letterkenny IT
		Limerick IT
		Waterford IT

Note: RCSI is not included as it is missing PPSN for 80 percent of graduates. Mater Dei Institute of Education and St. Patricks College, Drumcondra were incorporated into DCU from the 2016/17 academic year. Therefore, graduates from these institutions in 2017 are recorded as graduating from DCU.

Award Type and NFQ Level Detail

In some instances, the NFQ Level does not correlate exactly to the respective award types. The NFQ level was recoded to align with the respective award types as below. In addition, some award types were combined as some new award types were created for graduation cohorts after 2016 and graduates from some awards were comparatively small. The seven 'Merged Award Types' are included as controls in all regression models.

Table B.3: Award Type and NFQ Level

Merged Award Type	Award Type	NFQ Level
Undergraduate / Higher Cert	Undergraduate Certificate[1]	6
	Higher Certificate[1]	6
Ordinary Degree	Ordinary Degree	7
Honours Degree	Honours Degree	8
Postgraduate Diploma / Cert	Higher Diploma[2]	8
	Postgraduate Diploma[2]	9
	Postgraduate Certificates	9
Taught Masters	Taught Masters	9
Research Masters	Research Masters	9
PhD	PhD	10

Note: [1] Undergraduate Certificates and Higher Certificates were disaggregated for graduation cohorts from 2016 to reflect the different credits associated with both qualifications. Previously they were just recorded as Undergraduate Certificates.
[2] Award types for Higher Diplomas and Postgraduate Diplomas were disaggregated from 2016 to reflect their different NFQ levels. Previously, they were just recorded as Postgraduate Diplomas.

Final Degree Grade Detail

Grading practices differ between courses and across institutions. For the purposes of this report, the grades awarded for each course were coded into four standard categories:

- First Class Honours (H1)
- Upper Second Class Honours (H21)
- Lower Second Class Honours (H22)
- Third Class Honours (H3)

In addition, an 'Other' category captures non-standard grade categories for graduates of non-research programmes.[22] These included grades of 'Other Honours', 'Credit', 'Not Specified', 'Recommended (for Masters Degrees)' and 'Unclassified'. This category is

[22] Research Masters or PhD graduates are awarded degrees without a standard grade classification. Their grade is therefore excluded from the regression analysis as it is uniform and perfectly collinear with their type of award.

included in the regression analysis but only comprises less than 1 percent of graduations for the 'Earnings Sample' (column 6 in Table A.2).

The range of possible grades awarded for each course were analysed and certain records were reassigned to one of the four classifications above. For instance, grades of Distinction, Merit 1, Merit 2 and Pass were respectively assigned to H1, H21, H22, H3.

Some courses awarded both a H3 and a Pass and these were both assigned to a H3. Some courses were awarded a generic Second Class Honours (H2) grade together with either an Upper or Lower Second Class Honours (H21 and H22). The H2 in these cases was deemed to be an Upper or Lower Second Class Honours, depending on which class was missing.

However, in some cases, it was unclear whether a generic Second Class Honours (H2) was equivalent to either an Upper or Lower Second Class Honours (H21 or H22):

- Some courses were awarded a generic Second Class Honours (H2) grade in conjunction with both a H21 and a H22. In these cases, it was assumed that a H2 is equivalent to an Upper Second Class Honours (H21).
- Some courses were awarded a generic Second Class Honours (H2) grade without either a H21 or H22 (or a Merit 1 or a Merit 2). In these cases, it was assumed that a H2 is equivalent to a Lower Second Class Honours (H22).

Calculation of Leaving Certificate Points Detail

Information on Leaving Certificate points comes from the HEA's new entrant records. It is reported by each HEI, and it represents the total points awarded by the HEI to gain admission to a particular course. It therefore includes additional points for portfolios and bonus points for sitting exams through Irish. However, the data also contains each student's Leaving Certificate subject and grade, so a consistent measure of Leaving Certificate points are calculated using each student's six best subjects.[23]

It is worth noting that applicants can meet the matriculation requirements of a course using multiple sittings of the Leaving Certificate, while points can only be calculated on the basis of one sitting. These separate sittings of the Leaving Certificate are not separated in the data so Leaving Certificate points are calculated using a maximum of 10 subjects.

For individuals whose points could not be calculated in this way, their reported points were used when available. Points were then grouped into ranges from 155-200, 205-250, …, 555-

[23] Most new entrant information predates the introduction of bonus points for Leaving Certificate Mathematics (in 2012). Therefore, these bonus points are excluded to ensure consistency.

600. Points below 155 and above 600 (a small number of individuals had reported points above 600) were coded into an 'other' category. These comprise around 1 percent of the 'Earnings Sample' for undergraduate post-2012 graduation cohorts (shaded area of column 1 in Table A.3). Points could not be calculated for an additional 4 percent of these graduates and are coded into a missing category, which is included in all estimates throughout this report. Note that for descriptive statistics in Section 3.5 the missing category comprises both the 'other' and 'missing' categories.

Socio-economic Group Detail

Students' socio-economic group is based on their fathers' occupation. The information is collected from students' responses to the Equal Access Survey, which is administered to all undergraduate new entrants at registration. Occupational information is coded into eleven socio-economic groups following CSO procedures. These are detailed in Table B.5.

NACE Sector Detail

The sectors of employment in this report are based on the alphabetical letter of the NACE code (Revision 2). These are detailed in Table B.5.

Age at Entry to Higher Education Detail

Age at entry to higher education is not directly observed on the HEA's new entrant records. However, graduates' age and year of graduation is available in the graduation records. These are used in conjunction with the year of entry to higher education to determine their age at entry. Age at entry is only used in undergraduate regression models and is missing for 3 percent of the 'Earnings Sample' for undergraduate post-2012 graduation cohorts (shaded area of column 1 in Table A.3).

It is preferable to control for graduates' age on entry to higher education rather than their age at graduation because the latter is closely correlated with their type of award. This is exacerbated by the fact that young graduates, in this report, are determined by their age in combination with award type.

Detail on Missing Values

Some of the variables in Section 2.3 have missing values for some students. These missing values are included as separate categories in the regression analysis in Sections 4 and are also shown in the descriptive statistics in Section 3.

Missing values occur for a variety of reasons, such as variables containing 'Unknown' categories, inability to match graduate records to their new entrant records and information

being collected from voluntary surveys. Missing data related to age at entry to higher education and Leaving Certificate points are detailed above.

The variable recording students' county of origin includes fields for 'Unknown Dublin' and 'Unknown Ireland', which are included in regressions. Together, these comprise less than 1 percent of the 'Earnings Sample' (column 6 in Table A.2).

Leaving Certificate Mathematics and English grades are missing respectively for 14 percent and 13 percent of the 'Earnings Sample' for undergraduate post-2012 graduation cohorts (shaded area of column 1 in Table A.3).

The type of second-level school could not be identified for some graduates. This information is linked to an individual's graduation record from the last second-level school they attended (which is identified from the Department of Education's PPOD records). In some instances, graduates could be of Irish domicile (defined as resident in Ireland for three of the last five years) but they may not have attended an Irish second-level school immediately prior to entering higher education. Also, the PPOD data is available from 2002, which allows eight years for the first observed postgraduates to graduate in 2010. This may be an insufficient time span for a 29-year-old PhD student who graduates in 2010 (29 is the oldest age for a PhD graduate to be considered a young graduate in the context of this report). This is reflected in the rates of missing school type information. School type is missing for 3 percent of the 'Earnings Sample' for undergraduates (column 1 in Table A.3) and for 11 percent of the 'Earnings Sample' for postgraduates (column 1 in Table A.4).

The student's socio-economic group is based on their father's occupation and is collected via a voluntary survey of undergraduate new entrants at registration. Socio-economic group information is missing for 31 percent of the 'Earnings Sample' for undergraduate post-2012 graduation cohorts (shaded area of column 1 in Table A.3), which may be due to non-response to the survey or to this specific question.

Field of Study Detail

HEIs assign each course into a field of study using the International Standard Classification of Education (ISCED), which is developed and used by the OECD and Eurostat. ISCED fields of study can be broken down into broad, narrow and detailed classifications.

The first column of Table B.4 shows the labels used throughout this report, which are based on detailed ISCED fields of study. Some of these labels are in fact merged ISCED fields where sample sizes are small. In such cases, detailed fields of study are merged within the

same narrow field of study. For example, Fine Arts (ISCED code 0215) is merged with Handicrafts (ISCED code 0214). Also, `interdisciplinary` courses are merged with courses 'not further defined or elsewhere classified' for the most part.

The ISCED classification system was revised for graduation cohorts from 2014 onwards. The final two columns show the relationship between the pre- and post-2014 ISCED fields of study. The majority of pre-2014 fields of study are simply mapped to post-2014 fields. However, a number of pre-2014 ISCED fields are mapped according to the course name as outlined below:

- Courses in Biology and Biochemistry (pre-2014 ISCED code 421) and Computer Science (pre-2014 ISCED code 481) were allocated to new ISECD fields on the basis of the course name.
- Courses in 'combined' fields of study are allocated according to the course name and any remaining courses are allocated to the indicated 'interdisciplinary' ISCED field.
- Courses in Balanced Combination across different fields of education (pre-2014 ISCED code 900) and Balanced Combination of 'Humanities and Arts' and 'Social Sciences Business and Law' (pre-2014 ISCED code 910) are allocated according to the course name and any remaining courses are allocated to 'Arts not further defined'.

Table B.4: Description of Recoding Pre-2014 ISCED Fields of Study

Fields of Study Label	Post-2014 ISCED Code	Post-2014 ISCED Label	Pre-2014 ISCED Code and Label
Education	**1**	**Education**	**1 Education**
Pre-school teacher training & other	0110 &	Education n.f.d.	
	0112	Training for pre-school teachers	143 Training for pre-school teachers
Education science	0111	Education science	142 Education science
Teacher training without subject spec.	0113	Teacher training without subject specialisation	144 Training for teachers at basic levels
Teacher training with subject spec.	0114	Teacher training with subject specialisation	145 Training for teachers with subject specialisation
			146 Training for teachers of vocational subjects
Arts & Humanities	**2**	**Arts & Humanities**	**2 Humanities & Arts**
Other arts	0210	Arts n.f.d.	210 Combined Arts
Audio-visual & media production	0211	Audio-visual techniques and media production	213 Audio-visual techniques and media production
Fashion, interior & industrial design	0212	Fashion, interior and industrial design	214 Design
Fine arts & handicrafts	0213 &	Fine arts	211 Fine arts
	0214	Handicrafts	215 Craft skills
Music & performing arts	0215	Music and performing arts	212 Music and performing arts
Other humanities	0220	Humanities (except languages) n.f.d.	220 Combined Humanities
Religion & philosophy & history	0221 &	Religion and theology	221 Religion
	0222 &	History and archaeology	225 History and archaeology
	0223	Philosophy and ethics	226 Philosophy and ethics
Languages	0230 &	Languages n.f.d.[3]	
	0231 &	Language acquisition	222 Foreign languages
	0232	Literature and linguistics	223 Mother tongue
Interdisciplinary Arts & Humanities	0288	Interdisciplinary Arts & Humanities	200 Combined Arts & Humanities[1]
Social Sciences	**3**	**Social Sciences, Journalism & Information**	**3 Social Sciences Business & Law**
Other social & behavioural sciences	0310 &	Social and behavioural sciences n.f.d.	310 Combined Social and behavioural science
	0388	Interdisciplinary Social Sciences & Journalism & Information	300 Combined Social Science, Business and Law[1]
Economics	0311	Economics	314 Economics
Political sciences & civics	0312	Political sciences and civics	313 Political Science and civics
Psychology	0313	Psychology	311 Psychology
Sociology & cultural studies	0314	Sociology and cultural studies	312 Sociology and cultural studies
Journalism & information	0320 &	Journalism and information n.f.d.	320 Combined Journalism and Information
	0321 &	Journalism and reporting	321 Journalism and reporting
	0322	Library, information and archival studies	322 Library, information, archive
Business, Admin. & Law	**4**	**Business, Administration & Law**	**3 Social Sciences Business & Law**
Other business & administration	0410 &	Business and administration n.f.d.	340 Combined Business and Administration
	0488	Interdisciplinary Business Admin & Law	
Accounting & taxation	0411	Accounting and taxation	344 Accounting and taxation
Finance, banking & insurance	0412	Finance, banking and insurance	343 Finance, banking, insurance
Management & administration	0413	Management and administration	345 Management and administration
Marketing & advertising	0414	Marketing and advertising	342 Marketing and advertising
Secretarial, retail & work skills	0415 &	Secretarial and office work	346 Secretarial and office work
	0416 &	Wholesale and retail sales	341 Wholesale and retail sales
	0417	Work skills	347 Working life
Law	0421	Law	380 Law
Sciences, Maths & Stats.	**5**	**Natural Sciences, Mathematics & Statistics**	**4 Science, Mathematics & Computing**
Other biological & related sciences	0510	Biological and related sciences n.f.d.	420 Combined Life Science
Biology	0511	Biology	421 Biology and biochemistry[2]
Biochemistry	0512	Biochemistry	421 Biology and biochemistry[2]
Other earth & physical sciences	0530	Physical sciences n.f.d.	440 Combined Physical Science
	0532	Earth sciences	443 Earth Science
Chemistry	0531	Chemistry	442 Chemistry
Physics	0533	Physics	441 Physics

Fields of Study Label	Post-2014 ISCED Code	Post-2014 ISCED Label	Pre-2014 ISCED Code and Label
Other mathematics & statistics	0540	Mathematics and statistics n.f.d.	460 Combined Maths and Statistics
	0541	Mathematics	461 Mathematics
Statistics	0542	Statistics	462 Statistics
Environment	0520 & 0521 & 0522	Environment n.f.d.	421 Biology and biochemistry[2]
		Environmental sciences	422 Environmental Science
		Natural environments and wildlife	852 Natural environments and wildlife
Interdisc. Nat. Sci. Maths & Stats	0588	Interdisciplinary Natural Sciences Maths & Stats	400 Combined Science, Mathematics and Computing[1]
ICT	**6**	**Information & Communication Technologies**	**4 Science, Mathematics & Computing**
Other ICTs	0610 & 0688	Information and Communication Technologies (ICTs) n.f.d.	481 Computer Science[2]
		Interdisciplinary ICT	
Computer use	0611	Computer use	482 Computer Use
Database & network design & admin.	0612	Database and network design and administration	481 Computer Science[2]
Software & applications development	0613	Software and applications development and analysis	481 Computer Science[2]
Engineering, Man. & Const.	**7**	**Engineering, Manufacturing & Construction**	**5 Engineering, Manufacturing & Construction**
Other engineering	0710 & 0788 & 0712	Engineering and engineering trades n.f.d.	520 Combined Engineering & Engineering Trades
		Interdisciplinary Engineering Manufacturing & Construction	500 Combined Engineering, Manufacturing and Construction[1]
		Environmental protection technology	851 Environmental protection technology & 850 Combined Environmental Protection
Chemical engineering & processes	0711	Chemical engineering and processes	524 Chemical and process
Electricity & energy	0713	Electricity and energy	522 Electricity and energy
Electronics & automation	0714	Electronics and automation	523 Electronics and automation
Mechanics & metal trades	0715	Mechanics and metal trades	521 Mechanics and metal work
Motor vehicles, ships & aircraft	0716	Motor vehicles, ships and aircraft	525 Motor vehicles, ships and aircraft
Other materials & textiles & manufact.	0720 & 0722 & 0723 0724	Manufacturing and processing n.f.d.	540 Combined Manufacturing and Processing
		Materials (glass, paper, plastic and wood)	543 Materials (wood, paper, plastic, glass)
		Textiles (clothes, footwear and leather)	542 Textiles, clothes, footwear, leather
		Mining and extraction	544 Mining and extraction
Food processing	0721	Food processing	541 Food processing
Other architecture & construction	0730	Architecture and construction n.f.d.	580 Combined Architecture and building
Architecture & town planning	0731	Architecture and town planning	581 Architecture and town planning
Building & civil engineering	0732	Building and civil engineering	582 Building and civil engineering
Agriculture	**8**	**Agriculture, Forestry, Fisheries & Veterinary**	**6 Agriculture & Veterinary**
Crop & livestock production	0811	Crop and livestock production	621 Crop and livestock production
Other agriculture, forestry & fisheries	0812 & 0819 & 0821 & 0831 & 0888	Horticulture	622 Horticulture
		Agriculture n.f.d.	620 Combined Agriculture, forestry and fishery
		Forestry	623 Forestry
		Fisheries	624 Fisheries
		Interdisciplinary Agriculture Forestry Fisheries & Veterinary	600 Combined Agriculture & Veterinary[1]
Veterinary	0841	Veterinary	641 Veterinary
Health & Welfare	**9**	**Health & Welfare**	**7 Health & Welfare**
Dental studies & other health	0910 & 0911 & 0917 & 0988	Health n.f.d.	720 Combined Health
		Dental studies	724 Dental Studies
		Traditional and complementary medicine and therapy[3]	
		Interdisciplinary Health & Welfare	700 Combined Health and Welfare[1]
Medicine	0912	Medicine	721 Medicine
Nursing & midwifery	0913	Nursing and midwifery	723 Nursing and caring
Medical diagnostic & treatment tech.	0914	Medical diagnostic and treatment technology	725 Medical diagnostic and treatment technology
Therapy & rehabilitation	0915	Therapy and rehabilitation	726 Therapy and Rehabilitation
Pharmacy	0916	Pharmacy	727 Pharmacy

Fields of Study Label	Post-2014 ISCED Code	Post-2014 ISCED Label	Pre-2014 ISCED Code and Label
Other Welfare	0920 & 0921	Welfare n.f.d.	760 Combined Social Services
		Care of the elderly and of disabled adults[3]	
Child care & youth services	0922	Child care and youth services	761 Child Care and youth services
Social work & counselling	0923	Social work and counselling	762 Social work and counselling
Services	**10**	**Services**	**8 Services**
Hotel, restaurants & catering	1010 & 1013	Personal services n.f.d.	810 Combined Personal Services
		Hotel, restaurants and catering	811 Hotel, restaurant and catering
Sports	1014	Sports	813 Sports
Travel, tourism & leisure	1015	Travel, tourism and leisure	812 Travel, tourism and leisure
Occupational health & safety	1020 & 1022	Hygiene and occupational health services n.f.d.[3]	
		Occupational health and safety	862 Occupational health and safety
Security & transport services	1031 & 1032 & 1041	Military and defence	863 Military and defence
		Protection of persons and property	861 Protection of persons and property
		Transport services	840 Transport services
No observations	1011	Domestic services	814 Domestic services
No observations	1012	Hair and beauty services	815 Hair and beauty services
No observations	1021	Community sanitation	853 Community sanitation services
No observations			860 Combined Security Services
			900 Balanced Combination across difference Fields of Education[4]
			910 Balanced Combination of 'Humanities and Arts' and 'Social Sciences Business and Law'[4]

Note: n.f.d. is short for 'not further defined or elsewhere classified'.
[1] Pre-2014 Combined ISCED fields are first allocated according to the name of the course. Any remaining courses are allocated to the indicated 'interdisciplinary' ISCED field.
[2] The pre-2014 ISCED fields are allocated into new disaggregated fields according to course name.
[3] New field.
[4] Allocated according to course name. Any remaining courses are allocated to 'Arts n.f.d.'

Table B.5: Description of Student Characteristics

Variable	# Obs.	Percent	Variable	# Obs.	Percent
Graduation Year			**Institution Type**		
2010	18,312	11.5%	College	9,588	6.0%
2011	18,897	11.9%	Institute of Technology	57,607	36.3%
2012	19,838	12.5%	University	91,493	57.7%
2013	19,984	12.6%	Total	158,688	100%
2014	20,430	12.9%	**Institution**		
2015	19,411	12.2%	Athlone IT	3,214	2.0%
2016	20,967	13.2%	Carlow IT	2,968	1.9%
2017	20,849	13.1%	Cork IT	6,471	4.1%
Total	158,688	100%	DCU	10,889	6.9%
Field of Study			DIT	13,255	8.4%
Pre-school teacher training & other	719	0.5%	Dundalk IT	3,929	2.5%
Education science	1,588	1.0%	GMIT	4,029	2.5%
Teacher training without subject spec.	6,976	4.4%	IADT	2,021	1.3%
Teacher training with subject spec.	4,969	3.1%	IT Blanchardstown	1,450	0.9%
Other Arts	5,083	3.2%	IT Sligo	3,561	2.2%
Audio-visual & media production	2,929	1.8%	IT Tallaght	2,631	1.7%
Fashion interior & industrial design	2,077	1.3%	IT Tralee	1,850	1.2%
Fine arts & handicrafts	1,601	1.0%	Letterkenny IT	1,940	1.2%
Music & performing arts	2,104	1.3%	Limerick IT	4,122	2.6%
Other Humanities	3,200	2.0%	Mary I.	4,215	2.7%
Religion & philosophy & history	1,979	1.2%	Mater Dei	456	0.3%
Languages	3,591	2.3%	NCAD	1,138	0.7%
Interdisciplinary arts & humanities	1,101	0.7%	NUI Galway	13,097	8.3%
Other Social & behavioural sciences	2,255	1.4%	NUI Maynooth	8,457	5.3%
Economics	1,203	0.8%	St. Angela's	644	0.4%
Political sciences & civics	1,311	0.8%	St. Patrick's	3,135	2.0%
Psychology	1,997	1.3%	TCD	12,004	7.6%
Sociology & cultural studies	2,419	1.5%	UCC	16,470	10.4%
Journalism & information	1,208	0.8%	UCD	19,212	12.1%
Other Business & administration	13,249	8.3%	UL	11,364	7.2%
Accounting & taxation	4,981	3.1%	Waterford IT	6,166	3.9%
Finance banking & insurance	1,840	1.2%	Total	158,688	100%
Management & administration	9,016	5.7%	**Award Type**		
Marketing & advertising	4,112	2.6%	Undergraduate / Higher Cert	2,169	1.4%
Secretarial retail & work skills	793	0.5%	Ordinary Degree	8,849	5.6%
Law	5,378	3.4%	Honours Degree	113,993	71.8%
Other Biological & related sciences	1,818	1.1%	Postgraduate Diploma / Cert	6,526	4.1%
Biology	3,129	2.0%	Taught Masters	24,418	15.4%

Variable	# Obs.	Percent
Biochemistry	1,404	0.9%
Environment	1,473	0.9%
Other Earth & physical sciences	1,292	0.8%
Chemistry	1,632	1.0%
Physics	637	0.4%
Other mathematics & statistics	996	0.6%
Statistics	472	0.3%
Interdisc. nat. sci. maths & stats	1,119	0.7%
Other ICTs	3,219	2.0%
Computer use	1,002	0.6%
Database & network design & admin.	1,032	0.7%
Software & applications development	2,500	1.6%
Other Engineering	2,227	1.4%
Chemical engineering & processes	922	0.6%
Electricity & energy	1,040	0.7%
Electronics & automation	1,753	1.1%
Mechanics & metal trades	2,332	1.5%
Motor vehicles ships & aircraft	413	0.3%
Other materials & textiles & manufact.	1,150	0.7%
Food processing	733	0.5%
Other Architecture & construction	436	0.3%
Architecture & town planning	1,726	1.1%
Building & civil engineering	3,454	2.2%
Crop & livestock production	1,458	0.9%
Other agriculture forestry & fisheries	675	0.4%
Veterinary	559	0.4%
Dental studies & other health	963	0.6%
Medicine	2,683	1.7%
Nursing & midwifery	7,688	4.8%
Medical diagnostic & treatment tech.	1,278	0.8%
Therapy & rehabilitation	2,813	1.8%
Pharmacy	993	0.6%
Other welfare	481	0.3%
Child care & youth services	3,271	2.1%
Social work & counselling	3,469	2.2%
Hotel restaurants & catering	2,241	1.4%
Sports	1,890	1.2%
Travel tourism & leisure	1,592	1.0%
Occupational health & safety	514	0.3%
Security & transport services	530	0.3%

Variable	# Obs.	Percent
Research Masters	596	0.4%
PhD	2,137	1.3%
Total	158,688	100%
Final Degree Grade		
First Class	22,085	13.9%
Upper Second Class	72,840	45.9%
Lower Second Class	43,409	27.4%
Third Class	16,430	10.4%
Other	1,191	0.8%
Research Programme	2,733	1.7%
Total	158,688	100%
Gender		
Male	68,463	43.1%
Female	90,225	56.9%
Total	158,688	100%
County		
Dublin County	11,969	7.5%
Meath	6,486	4.1%
Louth	4,047	2.6%
Westmeath	3,366	2.1%
Longford	1,473	0.9%
Wicklow	4,581	2.9%
Wexford	4,863	3.1%
Kildare	7,053	4.4%
Carlow	1,891	1.2%
Offaly	2,612	1.6%
Laois	2,381	1.5%
Kilkenny	3,616	2.3%
Galway	10,042	6.3%
Mayo	5,555	3.5%
Sligo	2,646	1.7%
Leitrim	1,301	0.8%
Roscommon	2,673	1.7%
Donegal	4,724	3.0%
Cavan	2,653	1.7%
Monaghan	2,372	1.5%
Cork	20,247	12.8%
Kerry	5,933	3.7%
Limerick	6,992	4.4%
Clare	4,725	3.0%

Variable	# Obs.	Percent
Total	158,688	100%
Age at Entry to Higher Education		
17	7,317	7.6%
18	43,715	45.2%
19	36,538	37.8%
20	5,456	5.6%
21	1,100	1.1%
Missing	2,571	2.7%
Total	96,697	100%
Leaving Certificate Points		
155-200	1,134	1.2%
205-250	3,103	3.2%
255-300	7,165	7.4%
305-350	13,598	14.1%
355-400	18,801	19.4%
405-450	19,322	20.0%
455-500	15,465	16.0%
505-550	8,839	9.1%
555-600	3,980	4.1%
Other	1,174	1.2%
Missing	4,116	4.3%
Total	96,697	100%
Leaving Certificate Mathematics		
Higher A1	1,492	1.5%
Higher A2	1,741	1.8%
Higher B1	2,297	2.4%
Higher B2	2,826	2.9%
Higher B3	3,324	3.4%
Higher C1	3,358	3.5%
Higher C2	3,182	3.3%
Higher C3	2,592	2.7%
Higher D1	1,942	2.0%
Higher D2	1,244	1.3%
Higher D3	869	0.9%
Higher Fail	170	0.2%
Ordinary A1	3,775	3.9%
Ordinary A2	6,047	6.3%
Ordinary B1	7,724	8.0%
Ordinary B2	8,443	8.7%
Ordinary B3	8,126	8.4%

Variable	# Obs.	Percent
Tipperary	5,967	3.8%
Waterford	4,238	2.7%
Dublin 1	163	0.1%
Dublin 2	108	0.1%
Dublin 3	1,042	0.7%
Dublin 4	853	0.5%
Dublin 5	1,233	0.8%
Dublin 6	995	0.6%
Dublin 6W	1,163	0.7%
Dublin 7	904	0.6%
Dublin 8	432	0.3%
Dublin 9	1,439	0.9%
Dublin 10	201	0.1%
Dublin 11	919	0.6%
Dublin 12	979	0.6%
Dublin 13	1,035	0.7%
Dublin 14	1,902	1.2%
Dublin 15	2,621	1.7%
Dublin 16	2,478	1.6%
Dublin 17	196	0.1%
Dublin 18	1,784	1.1%
Dublin 20	359	0.2%
Dublin 22	748	0.5%
Dublin 24	1,571	1.0%
Unknown Dublin	1,053	0.7%
Unknown Ireland	104	0.1%
Total	158,688	100%
Leaving Certificate English		
Higher A1	3,685	3.8%
Higher A2	5,823	6.0%
Higher B1	4,905	5.1%
Higher B2	8,167	8.4%
Higher B3	10,901	11.3%
Higher C1	9,687	10.0%
Higher C2	10,531	10.9%
Higher C3	9,046	9.4%
Higher D1	5,621	5.8%
Higher D2	3,049	3.2%
Higher D3	1,635	1.7%
Higher Fail	95	0.1%

Variable	# Obs.	Percent
Ordinary C1	7,033	7.3%
Ordinary C2	5,898	6.1%
Ordinary C3	4,469	4.6%
Ordinary D1	2,989	3.1%
Ordinary D2	1,728	1.8%
Ordinary D3	1,239	1.3%
Ordinary Fail	267	0.3%
Missing	13,922	14.4%
Total	96,697	100%
Socio-Economic Group		
(A) Employers & Managers	13,054	13.5%
(B) Higher Professional	6,839	7.1%
(C) Lower Professional	6,195	6.4%
(D) Non-manual	6,559	6.8%
(E) Manual Skilled	7,676	7.9%
(F) Semi-skilled	3,736	3.9%
(G) Unskilled	2,040	2.1%
(H) Own Account Workers	5,238	5.4%
(I) Farmers	6,389	6.6%
(J) Agricultural Workers	406	0.4%
(Z) Other Occupied & Unknown	8,914	9.2%
Missing	29,651	30.7%
Total	96,697	100%
School Type		
DEIS	16,486	10.4%
Fee-Paying	16,729	10.5%
Missing	7,675	4.8%
Standard	117,798	74.2%
Total	158,688	100.0%
Deprivation Index Score of School ED		
Less than (or equal to) -10	24,527	15.5%
-10 to 0	47,477	29.9%
0 to 10	34,137	21.5%
Greater than 10	44,872	28.3%
Missing	7,675	4.8%
Total	158,688	100%

Variable	# Obs.	Percent
Ordinary A1	636	0.7%
Ordinary A2	1,432	1.5%
Ordinary B1	944	1.0%
Ordinary B2	1,694	1.8%
Ordinary B3	2,502	2.6%
Ordinary C1	1,182	1.2%
Ordinary C2	1,300	1.3%
Ordinary C3	894	0.9%
Ordinary D1	304	0.3%
Ordinary D2	173	0.2%
Ordinary D3	99	0.1%
Ordinary Fail	6	0.0%
Missing	12,386	12.8%
Total	96,697	100%
Mother Indicator		
No	68,104	96.2%
Yes	2,662	3.8%
Total	70,766	100%
Employment Sector		
Agriculture Forestry & Fishing (A)	572	0.8%
Industry (B-E)	6,162	8.7%
Construction (F)	1,278	1.8%
Wholesale & Retail (G)	7,063	10.0%
Transportation & Storage (H)	855	1.2%
Accommodation & Food Services (I)	2,453	3.5%
Information & Communication	5,356	7.6%
Finance & Real Estate (K-L)	7,190	10.2%
Professional Scientific & Technical (M)	10,478	14.8%
Administrative & Support Services (N)	4,097	5.8%
Public Administration & Defence (O)	2,992	4.2%
Education (P)	12,032	17.0%
Health & Social Work (Q)	8,321	11.8%
Other Activities (R-U)	1,767	2.5%
Missing	150	0.2%
Total	70,766	100%

Note: The number of observations for most student characteristics is 158,688 and refers to the `Earnings Sample' for all graduation cohorts (column 6 in Table A.2). The number of observations for age at entry to higher education, Leaving Certificate and socio-economic group information is 96,697 because this information is available for undergraduates only and refers to the 'Earnings Sample' for 2012 to 2017 undergraduate cohorts (column 1 in Table A.3). The number of observations for the mother indicator and employment sector is 70,766 because these are the only indicators which vary according to the year of employment and refers to those with substantial earnings four years after graduation (column 10 in Table A.2).

Appendix C: Multiple Graduations in Different Years

As previously shown in Table A.2, one-fifth of individuals have more than one graduation over different academic years. While the analysis in this paper is restricted to an individuals' latest graduation, this Appendix sheds further light on individuals' previous graduations with respect to their award types and field of study.

Table C.1 shows the relationship between previous and later award types for individuals' last two graduations. The vast majority of undergraduates obtain a higher level of award (these are illustrated in bold). For instance, 97 percent of Ordinary Degree graduates subsequently obtain an Honours Degree. 92 percent of Higher Degree graduates subsequently obtain a postgraduate qualification. Most postgraduates obtain another postgraduate qualification. For instance, 52 percent of PhD graduates obtain a further Postgraduate Diploma qualification, while 25 percent obtain a Taught Masters.

Table C.1: Award Types for Multiple Graduations

	Latest Graduation							
Previous Graduation	Undergrad / Higher Cert	Ordinary Degree	Honours Degree	Postgrad Diploma	Taught Masters	Research Masters	PhD	Total
Undergrad / Higher Cert	**8%**	**55%**	**29%**	**3%**	**4%**	**0%**	**0%**	100%
Ordinary Degree	1%	**0%**	**97%**	**1%**	**1%**	**0%**	**0%**	100%
Honours Degree	3%	0%	5%	**18%**	**69%**	**2%**	**3%**	100%
Postgrad Diploma	4%	0%	1%	**29%**	**58%**	**2%**	**5%**	100%
Taught Masters	9%	1%	4%	44%	**29%**	**1%**	**12%**	100%
Research Masters	5%	1%	6%	29%	16%	**4%**	**40%**	100%
PhD	6%	0%	7%	52%	25%	0%	**9%**	100%

Note: The number of observations is 71,045 individuals who have a second graduation. This corresponds to the number of individuals with more than one graduation in Table A.2. This analysis is restricted to individuals' last two graduations.

Table C.2 shows the relationship between previous and later fields of study for individuals' last two graduations. The majority of graduates pursue further qualifications in later academic years in the same field of study. For instance, over 70 percent of Education, Business, ICT, Engineering Manufacturing & Construction, Agriculture and Health graduates obtain further a qualification in the same field.

Arts and Humanities and Social Sciences graduates are most likely to graduate with a second qualification in different a different field. One-quarter (26 percent) of Arts and Humanities graduates obtain a further qualification in Education, while 14 percent study Business, Administration and Law and 11 percent study Social Sciences.

Amongst Social Sciences graduates, nearly one-quarter (23 percent) receive a later qualification in Business, Administration and Law, while 12 percent graduate from Health & Welfare and 11 percent from Education.

Table C.2: Broad Fields of Study for Multiple Graduations

	Latest Graduation										
Previous Graduation	Education	Arts & Humanities	Social Sciences	Business, Admin. & Law	Sciences, Maths & Stats.	ICTs	Eng., Man. & Const.	Agriculture	Health & Welfare	Services	Total
Education	**71%**	9%	4%	5%	2%	2%	1%	0%	5%	1%	100%
Arts & Humanities	26%	**40%**	11%	14%	1%	4%	1%	0%	2%	0%	100%
Social Sciences	11%	7%	**40%**	23%	2%	4%	1%	0%	12%	1%	100%
Business, Admin. & Law	3%	1%	3%	**86%**	0%	4%	1%	0%	1%	1%	100%
Sciences, Maths & Stats.	8%	1%	1%	6%	**56%**	3%	10%	1%	13%	2%	100%
ICTs	1%	4%	1%	7%	2%	**82%**	1%	0%	0%	0%	100%
Eng., Man. & Const.	2%	1%	0%	7%	3%	4%	**79%**	0%	1%	2%	100%
Agriculture	4%	0%	0%	15%	9%	0%	3%	**68%**	1%	1%	100%
Health & Welfare	5%	2%	5%	4%	2%	1%	1%	0%	**78%**	2%	100%
Services	3%	1%	1%	24%	1%	1%	2%	0%	4%	**64%**	100%

Note: The number of observations is 71,045 individuals who have a second graduation. This corresponds to the number of individuals with more than one graduation in Table A.2. This analysis is restricted to individuals' last two graduations.

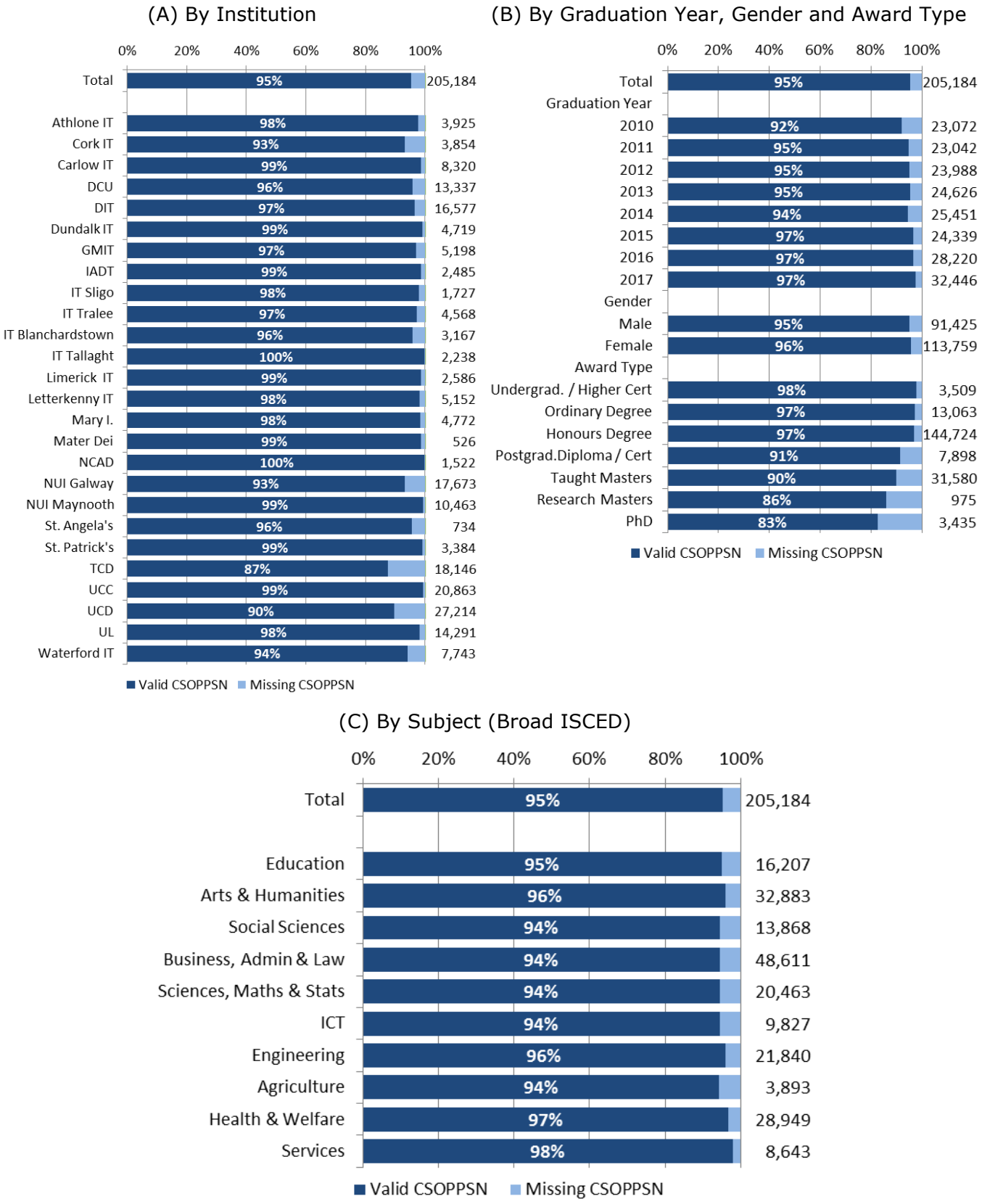
Appendix D: Graduates with Missing PPSN

CSOPPSN identifiers are missing for 5 percent of graduates from the HEA's records of young, full-time and Irish domiciled graduates (column 4 in Table A.2). Figure D.1 shows the rates of missing CSOPPSN across several key variables: institution, graduation year, gender, award type and field of study. Rates of missing CSOPPSN are broadly similar across gender and subject of study. Amongst institutions, TCD has the highest rate of missing identifiers (13 percent) followed by UCD (10 percent), Cork IT (7 percent) and NUI Galway (7 percent). Institutions with less than 1 percent missing graduate identifiers include Dundalk IT, IADT, Limerick IT, Mater Dei, NCAD, NUI Maynooth, St. Patrick's College and UCC.

CSOPPSN identifier coverage improves for more recent graduation cohorts. 8 percent of graduate records were returned with a missing identifier in 2010, while 3 percent were missing after 2015. Postgraduate courses have higher rates of missing identifiers. For instance, PPSN identifiers are missing for around 3 percent of undergraduate award types compared to missing identifiers for 14 percent and 17 percent of Research Masters and PhDs, respectively.

This analysis shows that rates of missing CSOPPSN are most prevalent across institution, award type and graduation cohort. To account for the non-random nature of missing CSOPPSN identifiers, post-stratification weights are applied for these three strata where the primary sampling units are the observed graduates.

Figure D.1: Rates of Missing CSOPPSN



Note: The number of observations is 205,184 young full-time individuals, which correspond to the 'Young Full-Time' sample (column 4) in Table A.2. Full names for institutions are given in Table B.2.

Appendix E: Detailed Regression Results

Table E.1: Undergraduates Regression Results for Institution, 4 Years after Graduation

Institute	Institute	Subject	Degree	Demo-graphics	Pre-HE Attain	SEG	Mother	Sector
Athlone IT	-20.41***	-18.21***	-11.74***	-10.27***	-6.73***	-6.79***	-6.48***	-6.19***
	(1.14)	(1.13)	(1.23)	(1.42)	(1.52)	(1.52)	(1.52)	(1.47)
Carlow IT	-20.26***	-16.75***	-11.50***	-11.05***	-7.98***	-7.89***	-7.54***	-7.25***
	(1.29)	(1.34)	(1.41)	(1.57)	(1.66)	(1.67)	(1.66)	(1.60)
Cork IT	-7.31***	-5.42***	-2.02*	-2.23*	1.16	1.11	1.38	1.26
	(1.17)	(1.15)	(1.19)	(1.19)	(1.28)	(1.28)	(1.28)	(1.23)
DCU	3.03***	2.35**	3.27***	2.28*	3.59***	3.37**	3.45**	2.60**
	(1.18)	(1.09)	(1.10)	(1.34)	(1.36)	(1.37)	(1.37)	(1.31)
DIT	-3.04***	-0.37	2.07**	0.53	3.06**	2.98**	3.15**	2.88**
	(1.02)	(1.03)	(1.05)	(1.31)	(1.36)	(1.36)	(1.35)	(1.30)
Dundalk IT	-17.04***	-13.58***	-9.16***	-9.37***	-6.56***	-6.42***	-5.94***	-5.76***
	(1.08)	(1.09)	(1.15)	(1.43)	(1.52)	(1.52)	(1.52)	(1.47)
GMIT	-16.14***	-13.03***	-9.99***	-8.92***	-5.62***	-5.59***	-5.17***	-4.28***
	(1.19)	(1.16)	(1.19)	(1.38)	(1.47)	(1.47)	(1.47)	(1.44)
IADT	-15.44***	-4.84**	-1.67	-3.09	0.35	0.29	0.09	-1.14
	(1.78)	(2.00)	(2.03)	(2.15)	(2.26)	(2.25)	(2.24)	(2.11)
IT Blanchardstown	-10.89***	-10.30***	-2.95	-4.38**	-1.36	-1.28	-0.49	-0.45
	(1.74)	(1.69)	(1.82)	(2.00)	(2.10)	(2.11)	(2.13)	(2.06)
IT Sligo	-21.27***	-16.92***	-12.21***	-11.26***	-8.18***	-8.17***	-7.78***	-7.71***
	(1.12)	(1.18)	(1.25)	(1.45)	(1.54)	(1.54)	(1.54)	(1.48)
IT Tallaght	-7.12***	-7.44***	-1.38	-3.45**	0.06	0.41	1.01	1.14
	(1.35)	(1.32)	(1.40)	(1.63)	(1.75)	(1.75)	(1.76)	(1.66)
IT Tralee	-24.30***	-18.35***	-12.00***	-10.66***	-7.90***	-7.94***	-7.40***	-6.84***
	(1.43)	(1.49)	(1.62)	(1.70)	(1.77)	(1.78)	(1.76)	(1.70)
Letterkenny IT	-28.77***	-28.27***	-23.57***	-19.38***	-16.42***	-16.24***	-15.69***	-15.26***
	(1.43)	(1.40)	(1.48)	(1.77)	(1.87)	(1.87)	(1.85)	(1.79)
Limerick IT	-17.18***	-16.04***	-10.64***	-9.92***	-6.46***	-6.63***	-6.36***	-5.34***
	(1.13)	(1.11)	(1.18)	(1.30)	(1.39)	(1.39)	(1.39)	(1.35)
Mary I.	-3.53***	4.90***	7.38***	7.34***	5.59***	5.57***	5.74***	5.83***
	(1.05)	(1.50)	(1.54)	(1.58)	(1.56)	(1.56)	(1.55)	(1.53)
Mater Dei	-9.34***	1.38	4.65	5.04*	8.72***	8.75***	9.55***	8.29***
	(2.45)	(2.82)	(2.93)	(2.98)	(3.14)	(3.16)	(3.19)	(3.01)
NCAD	-30.79***	-10.91***	-8.69***	-9.69***	-7.53**	-7.58**	-7.91**	-6.79**
	(2.25)	(3.06)	(3.15)	(3.17)	(3.32)	(3.31)	(3.30)	(3.19)
NUI Galway	-7.27***	-3.35***	-1.79	-0.85	0.52	0.38	0.66	0.54
	(1.14)	(1.12)	(1.15)	(1.35)	(1.37)	(1.37)	(1.38)	(1.32)
NUI Maynooth	-10.49***	-0.80	0.34	-0.52	0.72	0.84	1.09	1.03
	(1.08)	(1.19)	(1.20)	(1.42)	(1.44)	(1.44)	(1.44)	(1.37)
St. Angela's	1.32	6.44***	7.14***	9.56***	10.08***	9.92***	9.78***	8.82***
	(1.96)	(2.31)	(2.29)	(2.46)	(2.46)	(2.48)	(2.46)	(2.46)
St. Patrick's	0.03	7.37***	9.00***	8.84***	7.02***	6.90***	6.82***	6.86***
	(1.02)	(1.56)	(1.59)	(1.80)	(1.79)	(1.79)	(1.79)	(1.74)
TCD	5.86***	8.68***	9.16***	8.36***	6.37***	6.22***	6.26***	5.23***
	(1.24)	(1.20)	(1.22)	(1.47)	(1.43)	(1.43)	(1.42)	(1.36)
UCC	-	-	-	-	-	-	-	-
UCD	2.44**	5.42***	6.50***	5.21***	4.64***	4.65***	4.89***	4.42***
	(1.11)	(1.03)	(1.06)	(1.30)	(1.29)	(1.29)	(1.29)	(1.24)
UL	1.18	2.39**	4.44***	4.43***	5.05***	5.09***	5.33***	4.78***
	(1.10)	(1.03)	(1.05)	(1.14)	(1.15)	(1.15)	(1.15)	(1.09)
Waterford IT	-19.11***	-13.72***	-9.47***	-8.91***	-5.93***	-5.92***	-5.38***	-4.65***
	(1.00)	(1.03)	(1.08)	(1.22)	(1.30)	(1.30)	(1.29)	(1.25)

	Institute	Subject	Degree	Demo-graphics	Pre-HE Attain	SEG	Mother	Sector
Observations	34,788	34,788	34,788	34,788	34,788	34,788	34,788	34,788
R-squared	0.072	0.234	0.258	0.266	0.271	0.272	0.281	0.335
Controls:								
Graduation Cohort	✓	✓	✓	✓	✓	✓	✓	✓
Institution	✓	✓	✓	✓	✓	✓	✓	✓
Subject		✓	✓	✓	✓	✓	✓	✓
Award Type			✓	✓	✓	✓	✓	✓
Final Degree Grade			✓	✓	✓	✓	✓	✓
Gender				✓	✓	✓	✓	✓
County of Origin				✓	✓	✓	✓	✓
Age at Entry to HE				✓	✓	✓	✓	✓
Leaving Certificate Points					✓	✓	✓	✓
Leaving Certificate Maths					✓	✓	✓	✓
Leaving Certificate English					✓	✓	✓	✓
Second-Level School Type						✓	✓	✓
School ED Deprivation Index						✓	✓	✓
Socio-Economic Group						✓	✓	✓
Mother							✓	✓
Sector								✓

Note: *, **, and *** denotes significance at the 10%, 5% and 1% level respectively. Coefficients and standard errors (in parentheses) show percentage differences in each institutions' earnings compared to UCC. The variables included in the set of controls are described further in Section 2.3 and Appendix B. The coefficients (and standard errors) have been transformed from log percentage points into percentage points using the transformation $100(e^b - 1)$ where *b* is the log percentage points coefficient. The delta method is used to transform the log point standard errors (*se*) to percentage points using the transformation $se \times 100(e^b)$.

Table E.2: Postgraduates Regression Results for Institution, 4 Years after Graduation

Institute	Institute	Subject	Degree	Demo-graphics	SEG	Mother	Sector
Athlone IT	-6.52**	-13.90***	-15.88***	-12.50***	-12.24***	-11.90***	-11.29***
	(2.69)	(2.62)	(2.51)	(2.67)	(2.68)	(2.67)	(2.63)
Carlow IT	-8.21	-8.42	-8.11	-5.20	-5.02	-3.51	-4.26
	(5.94)	(6.45)	(6.33)	(6.82)	(6.79)	(6.40)	(6.42)
Cork IT	-8.52***	-6.59***	-7.23***	-7.64***	-7.36***	-7.09***	-5.85**
	(2.38)	(2.39)	(2.38)	(2.37)	(2.38)	(2.40)	(2.33)
DCU	12.72***	6.65***	7.13***	9.74***	9.93***	10.04***	9.83***
	(1.28)	(1.22)	(1.22)	(1.50)	(1.50)	(1.49)	(1.43)
DIT	4.54***	0.34	2.50*	4.48***	4.49***	4.57***	4.40***
	(1.25)	(1.33)	(1.36)	(1.61)	(1.61)	(1.59)	(1.55)
Dundalk IT	-4.78	-17.17***	-17.12***	-13.78***	-13.39***	-13.26***	-12.03***
	(3.22)	(3.06)	(3.01)	(3.34)	(3.36)	(3.34)	(3.26)
GMIT	-0.64	-10.19***	-10.01***	-6.87**	-6.62*	-6.82**	-4.12
	(3.48)	(3.15)	(3.16)	(3.35)	(3.36)	(3.36)	(3.61)
IADT	-24.52***	-7.48	-8.34	-6.51	-6.26	-6.62	-8.44
	(4.88)	(6.52)	(6.26)	(6.43)	(6.45)	(6.43)	(5.89)
IT Blanchardstown	-6.80	-13.85	-12.89	-11.82	-11.24	-11.77	-13.49
	(12.94)	(11.83)	(11.96)	(11.95)	(11.95)	(11.91)	(10.91)
IT Sligo	-13.16*	-17.37**	-16.84*	-14.13	-14.16	-13.54	-13.50
	(7.26)	(7.65)	(8.44)	(8.69)	(8.72)	(8.82)	(8.46)
IT Tallaght	40.26***	15.39**	11.53	14.04*	14.77**	16.73***	16.06***
	(11.88)	(7.67)	(7.84)	(7.79)	(7.82)	(6.91)	(5.82)
IT Tralee	-29.30***	-30.52***	-32.44***	-32.16***	-32.05***	-31.51***	-31.37***
	(4.94)	(4.16)	(4.04)	(4.18)	(4.21)	(3.78)	(3.32)
Letterkenny IT	-14.28***	-26.80***	-26.19***	-22.48***	-22.15***	-21.61***	-19.41***
	(3.06)	(2.54)	(2.51)	(2.87)	(2.89)	(2.92)	(3.06)
Limerick IT	-15.86***	-14.44***	-11.97***	-10.29**	-10.15**	-9.81**	-10.18**
	(3.90)	(3.73)	(3.76)	(3.88)	(3.88)	(3.83)	(3.76)
Mary I.	0.21	17.31***	16.36***	17.65***	17.51***	17.58***	18.73***
	(1.63)	(2.99)	(2.92)	(2.95)	(2.95)	(2.90)	(2.87)
Mater Dei	-6.19*	7.79**	1.75	4.89	4.67	5.42	7.52*
	(3.55)	(4.02)	(3.77)	(4.01)	(3.98)	(3.92)	(4.00)
NCAD	-24.81***	-15.70***	-16.31***	-14.01***	-14.19***	-14.11***	-13.78***
	(4.00)	(4.29)	(4.24)	(4.39)	(4.38)	(4.40)	(4.33)
NUI Galway	-6.05***	-3.10***	-3.52***	-0.53	-0.44	-0.42	-0.49
	(0.99)	(1.01)	(0.99)	(1.25)	(1.25)	(1.24)	(1.19)
NUI Maynooth	-3.87***	-0.11	0.25	2.55*	2.71**	2.86**	3.06**
	(1.12)	(1.15)	(1.14)	(1.38)	(1.39)	(1.38)	(1.34)
St. Angela's	25.04***	38.09***	41.23***	48.54***	48.28***	46.87***	46.16***
	(6.48)	(7.37)	(9.09)	(10.13)	(10.00)	(9.98)	(9.84)
St. Patrick's	4.76***	21.21***	21.15***	24.83***	24.70***	24.70***	25.53***
	(1.16)	(2.79)	(2.74)	(2.91)	(2.91)	(2.86)	(2.78)
TCD	5.94***	11.36***	10.68***	12.97***	12.94***	12.85***	12.48***
	(1.32)	(1.36)	(1.37)	(1.60)	(1.59)	(1.59)	(1.54)
UCC	-	-	-	-	-	-	-
UCD	11.05***	12.16***	10.90***	13.07***	12.82***	12.83***	13.03***
	(1.09)	(1.15)	(1.13)	(1.42)	(1.42)	(1.41)	(1.36)
UL	0.06	1.66	1.13	2.52**	2.61**	2.85**	3.29***
	(1.15)	(1.16)	(1.15)	(1.27)	(1.27)	(1.26)	(1.24)
Waterford IT	-8.75***	-9.50***	-10.55***	-9.73***	-9.55***	-9.11***	-7.89***
	(2.06)	(1.96)	(1.91)	(2.08)	(2.09)	(2.07)	(2.11)
Observations	16,731	16,731	16,731	16,731	16,731	16,731	16,731
R-squared	0.049	0.206	0.235	0.241	0.242	0.248	0.293

	Institute	Subject	Degree	Demo-graphics	SEG	Mother	Sector
Controls:							
Graduation Cohort	✓	✓	✓	✓	✓	✓	✓
Institution	✓	✓	✓	✓	✓	✓	✓
Subject		✓	✓	✓	✓	✓	✓
Award Type			✓	✓	✓	✓	✓
Final Degree Grade			✓	✓	✓	✓	✓
Gender				✓	✓	✓	✓
County of Origin				✓	✓	✓	✓
Second-Level School Type					✓	✓	✓
School ED Deprivation Index					✓	✓	✓
Mother						✓	✓
Sector							✓

Note: *, **, and *** denotes significance at the 10%, 5% and 1% level respectively. Coefficients and standard errors (in parentheses) show percentage differences in each institutions' earnings compared to UCC. The variables included in the set of controls are described further in Section 2.3 and Appendix B. The coefficients (and standard errors) have been transformed from log percentage points into percentage points using the transformation $100(e^b - 1)$ where *b* is the log percentage points coefficient. The delta method is used to transform the log point standard errors (*se*) to percentage points using the transformation $se \times 100(e^b)$.