The economic and social impact of University College Birmingham

Full Report for University College Birmingham

LE London Economics

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Head Office: Somerset House, New Wing, Strand, London, WC2R 1LA, United Kingdom.

w: londoneconomics.co.uk
t: +44 (0)20 3701 7700
e: info@londoneconomics.co.uk
f: +44 (0)20 3701 7701
: @LE_Education
@LondonEconomics

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Authors

Rhys Williams, Senior Economic Consultant, +44 (0) 20 3701 7712; rwilliams@londoneconomics.co.uk
Joscelyn Miller, Senior Economic Consultant, +44 (0) 20 3701 7711; jmiller@londoneconomics.co.uk
Maike Halterbeck, Divisional Director, +61 (0) 475 464 905; mhalterbeck@londoneconomics.co.uk
Dr Gavan Conlon, Partner, +44 (0) 20 3701 7703; gconlon@londoneconomics.co.uk

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Foreword

At University College Birmingham, we are committed to supporting our region to grow and develop, and in helping to ensure it meets its skills priorities. It's incredibly satisfying to see the scale of the economic impact that the University is having across both the West Midlands and the United Kingdom. This independent analysis has identified a total economic impact of **£358 million** across the UK. Of those strands of activity that can be linked to a region, the analysis estimates that **£88 million** of impact occurs in the West Midlands with a further **£48 million** of impact accrued across other regions and sectors of the UK economy. Reflecting the skills and enhanced productivity of our graduates, the remaining **£221 million** of impact occurs across the entire nation, but is heavily concentrated in the West Midlands, which reflects University College Birmingham's integration within our local community and the fact that most of our students remain within the region post-graduation.

Our students, who are drawn from all over the UK and the world, invest enormously in the region during their time here. They do so as graduates who have been ideally equipped by our industry-informed teaching and sector-leading curriculum facilities to deal with the issues and challenges facing local employers. Our recent recognition by students as the University of the Year at the 2022 Whatuni Student Choice awards reflects the vital role we play in shaping their future, and by extension, that of the region.

Universities must continue to play their part in the infrastructure that maintains the West Midlands' status as the economic engine of the UK, supporting the objectives for the region's Plan for Growth. As the report outlines, our contribution has been significant, but we are excited about doing even more in the future. We will pro-actively work with the West Midlands Combined Authority, the City of Birmingham, local businesses, community stakeholders, other regional partners and continue to strengthen our partnership with the University of Warwick; ensuring we continue to grow our contribution to our region.

Professor Mike Harkin

Vice Chancellor and Principal, University College Birmingham

Executive Summary

London Economics were commissioned by University College Birmingham to analyse the economic and social impact associated with University College Birmingham's activities in the 2020-21 academic year. Rather than just considering the traditional direct, indirect and induced impacts associated with University College Birmingham's **physical footprint**, this analysis also incorporates the economic impact associated with University College Birmingham's extensive **teaching and learning activities**, as well as the **contribution of University College Birmingham's international students** to the UK economy.

This study comes at a time of immense change. Since 2010, there have been several General Elections, a referendum resulting in the withdrawal of the United Kingdom from the European Union, and a global pandemic that will result in deep and prolonged economic damage. Despite these wider economic and political circumstances, some things remain the same:

- The acquisition of human capital remains one of the most significant determinants of a country's long-run economic growth. In the current economic environment, there has never been a more acute need for a highly skilled and versatile workforce to overcome the challenges that will present themselves in the coming decade. The activity of training the future workforce to navigate and prosper in a changing world remains one of University College Birmingham's guiding principles.
- International students add significantly to the economic and social capital of the United Kingdom. From the positive short-term impact on local communities during their studies to the long-term ties developed as a result of their time in the United Kingdom, international students are a living illustration of the global standing of the UK higher education sector. University College Birmingham will continue to both welcome overseas students and play a continuing role to promote the United Kingdom at home and abroad.
- With annual expenditure of £53 million in 2020-21, University College Birmingham's contribution to the UK economy extends far beyond Birmingham and the West Midlands. With thousands of suppliers of goods and services to provide for the requirements of the institution, its staff and its students, University College Birmingham supports sustainable employment and economic activity in every region. The economic success of University College Birmingham is not reflected in retained profit or improved shareholder dividends, but rather injected back into the economy to support economic and social wellbeing.

This has always been, and always will be, the role of University College Birmingham.

The aggregate economic impact of University College Birmingham

The total economic impact on the UK economy associated with University College Birmingham's activities in 2020-21 was estimated at approximately **£358 million** (see Table 1). Compared to University College Birmingham's total operational costs of approximately **£53 million** in 2020-21[1], this corresponds to a **benefit to cost ratio of 6.7:1**. In terms of the components of this impact:

[1] Compared to the **£43 million** of direct impact of University College Birmingham's expenditures included in Section 4 the **£53 million** of operating expenditure here *excludes* capital expenditure (**£1 million**) but *includes* depreciation costs (**£4 million**) and movements in pension provisions (**£7 million**).

- The impact generated by the **spending of University College Birmingham** stood at **£61 million** (**17%**):
  - The majority of this impact (**£40 million**, **65%**) was generated in the **West Midlands**, with the remaining **£21 million** (**35%**) occurring in **other regions** across the UK;
  - The University's spending supported a total of **550** FTE jobs across the UK economy in 2020-21 (of which **415** are located in the West Midlands);
- The impact of University College Birmingham's educational exports associated with its international higher education students was estimated at **£75 million** (**21%**);
  - The majority of this impact (**£48 million**, **64%**) was generated in the **West Midlands**, with the remaining **£27 million** (**36%**) occurring in **other regions** across the UK
  - The spending of the University's international students supported a further **725** FTE jobs across the UK economy in 2020-21 (of which **510** are located in the West Midlands);
- University College Birmingham's teaching and learning activities accounted for **£221 million** (**62%**) – including the impact associated with the higher education (HE) qualifications, further education (FE) qualifications, and apprenticeship training offered by the University.

Table 1 Total economic impact of University College Birmingham's activities in the UK in 2020-21 (£m and % of total)

Type of impact	£m	%
Impact of teaching and learning	**£221m**	**62%**
Students	£122m	34%
Exchequer	£100m	28%
Impact of exports	**£75m**	**21%**
Impact of tuition fee income	£35m	10%
Impact of non-tuition fee income	£40m	11%
Impact of University College Birmingham's expenditure	**£61m**	**17%**
Direct impact	£43m	12%
Indirect and induced impacts	£18m	5%
Total economic impact	**£358m**	**100%**

Note: All numbers are presented in 2020-21 prices (rounded to nearest £1m). Totals may not add up due to rounding. ***Source: London Economics.***

The impact of University College Birmingham's teaching and learning activities

The analysis of the impact of University College Birmingham's teaching and learning activities estimates the **enhanced employment and earnings benefits to learners/graduates**, and, separately, the **additional taxation receipts to the Exchequer** associated with the wide range of educational opportunities offered by the University[2]. The analysis is adjusted for the characteristics

[2] The estimation of the net graduate premiums/net learner benefits and net Exchequer benefits is based on a detailed econometric analysis of the publicly available dataset from the Labour Force Survey. The analysis considers the impact of qualification attainment on earnings and employment outcomes; however, as no information is available on the particular HEI attended, the analysis is not specific to University College Birmingham alumni. Rather, the findings from the analysis are adjusted to reflect the characteristics of the 2020-21 cohort of University College Birmingham students (e.g. in terms of mode of study, level of study, subject mix (for HE qualifications), domicile, gender, average age at enrolment, duration of qualification, and completion rates).

of the **3,905** UK domiciled students who started a HE qualification (or standalone module/credit), FE qualification or apprenticeship at University College Birmingham in the 2020-21 academic year.

Incorporating both the expected costs associated with qualification/apprenticeship attainment and the labour market benefits expected to be accrued by students/graduates over their working lives, the analysis suggests that the **net graduate premium** achieved by representative English domiciled students in the 2020-21 cohort completing a **full-time first degree** at University College Birmingham (with a Level 3 qualification as their highest level of prior attainment) stands at approximately **£64,000** (in 2020-21 money terms, on average across men and women). Separately, and additionally, taking account of the benefits (i.e. additional taxation receipts) and costs to the public purse (e.g. student loan write-offs), the analysis indicates that the corresponding **net Exchequer benefit** associated with these students stands at **£67,000**.

There are also substantial net learner benefits and net Exchequer benefits associated with FE qualifications, where the **net learner benefit** achieved by a typical English domiciled student in the 2020-21 cohort completing a **full-time Level 3 vocational qualification** (with a Level 2 vocational qualification as their highest prior attainment) was estimated at **£42,000**, with a corresponding **net Exchequer benefit** of **£26,000**. In terms of apprenticeships, the net learner benefit associated with a representative English domiciled student in the 2020-21 cohort completing an **Advanced Apprenticeship** at University College Birmingham (with an Intermediate Apprenticeship as their highest prior attainment) stands at **£12,000**, with a net Exchequer benefit of **£7,000**.

The net graduate premiums and net Exchequer benefits (by gender, study mode, study level, domicile, and prior attainment, and adjusted for the subject mix of the cohort) were combined with information on the number of students starting qualifications at University College Birmingham in 2020-21 and expected completion rates. The aggregate economic impact generated by University College Birmingham's teaching and learning activities associated with the 2020-21 cohort stood at approximately **£221 million**. This is split roughly equally between students (**£122 million**, **55%**) and the Exchequer (**£100 million**, **45%**).

Table 2 Total impact of University College Birmingham's teaching and learning activities associated with the 2020-21 cohort (£m), by beneficiary, type of study, and mode of study

Beneficiary and study mode	Type of study			
	HE qualifications	FE qualifications	Apprenticeships	Total
Students	**£58m**	**£62m**	**£2m**	**£122m**
Full-time	£55m	£62m	£2m	**£119m**
Part-time	£3m	-	-	**£3m**
Exchequer	**£70m**	**£29m**	**£1m**	**£100m**
Full-time	£68m	£29m	£1m	**£98m**
Part-time	£2m	-	-	**£2m**
Total	**£128m**	**£90m**	**£3m**	**£221m**
Full-time	£123m	£90m	£3m	**£217m**
Part-time	£5m	-	-	**£5m**

Note: All estimates are presented in 2020-21 prices, discounted to reflect net present values, rounded to the nearest £1m, and may not add up precisely to the totals indicated.
Source: London Economics' analysis

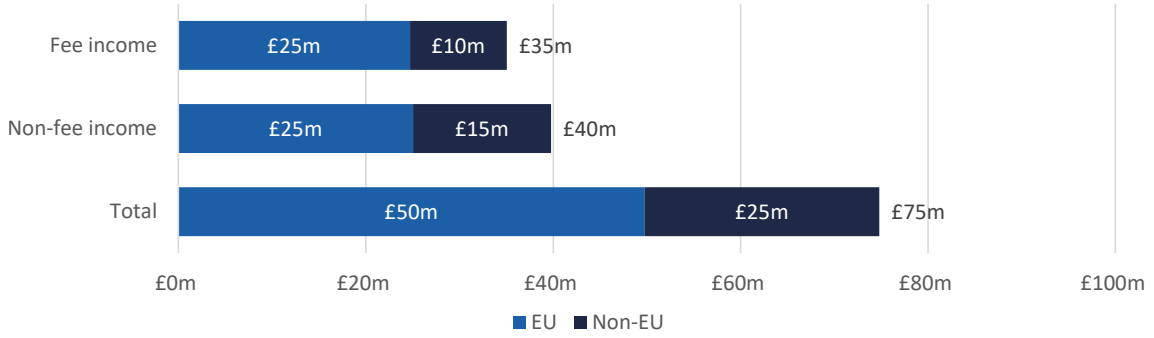
The impact of University College Birmingham's educational exports

With University College Birmingham attracting many international students (e.g. see page 29 for student stories), University College Birmingham's higher education offer represents a tradeable activity with imports and exports like any other tradeable sector. The economic impact of the University's contribution to educational exports is based on the **direct** injection of **tuition fee and non-tuition fee income** from international students. This income generates **indirect and induced impacts** throughout the UK economy, through supply chain and wage income effects. The analysis focuses on the cohort of **730** non-UK domiciled students who started HE qualifications (or modules/credits) at University College Birmingham in 2020-21. Of these students, **450** (**62%**) were EU domiciled, and **280** (**38%**) were from non-EU countries.

Combining the estimates of tuition fee income (net of any Exchequer cost, or the University's own cost of fee waivers/bursaries) and non-tuition fee income associated with international students in the 2020-21 cohort, the **total export income (i.e. direct impact)** generated by this cohort stood at **£29 million**. Approximately half of this income (**£15 million**) was generated from international students' non-tuition fee expenditure, while the other half (**£14 million**) was generated from these students' (net) tuition fees accrued by University College Birmingham.

The total (direct, indirect, and induced) economic impact associated with this export income was estimated using relevant economic multipliers, capturing the extent to which the direct export income generates additional activity throughout the UK economy. We thus estimate that the **total economic impact** on the UK generated by the (net) tuition fee income and non-tuition fee income associated with international students in the 2020-21 University College Birmingham cohort stood at **£75 million**. **£35 million** of this impact was associated with international students' (net) **tuition fees**, and **£40 million** was associated with these students' **non-tuition fee expenditures** over the duration of their studies at University College Birmingham. In terms of region, the majority of the total impact of exports (**£48 million**, **64%**) was generated in the **West Midlands**, with the remaining **£27 million** (**36%**) occurring in **other regions** across the UK.

Figure 1 Impact of University College Birmingham's educational exports associated with international students in the 2020-21 cohort (£m), by domicile and type of income



Note: All estimates are presented in 2020-21 prices, discounted to reflect net present values, rounded to the nearest £1m, and may not add up precisely to the totals indicated. ***Source: London Economics' analysis***

The impact in terms of gross value added was estimated at **£45 million** across the UK economy as a whole (with **£30 million** generated within the West Midlands), while the corresponding estimates in terms of employment stood at **725 full-time equivalent jobs** across the UK as a whole, with **510 jobs** supported across the West Midlands.

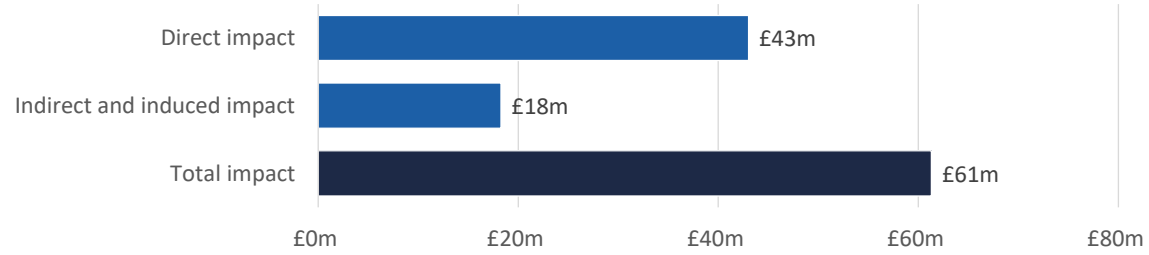
The impact of University College Birmingham's expenditure

University College Birmingham's physical footprint supports jobs and promotes economic growth throughout the UK. This is captured by the **direct, indirect, and induced impact** associated with the expenditures of the institution. The **direct impact** of University College Birmingham's physical footprint was based on the operating and capital expenditures of University College Birmingham. In 2020-21, University College Birmingham incurred a total of **£43 million** of expenditure (including **£42 million** of operating expenses[3] and **£1 million** of capital expenditure).

As with the expenditures of international students (captured in the above impact of educational exports), the direct increase in economic activity resulting from the University's expenditures generates additional rounds of spending throughout the economy (through University College Birmingham's supply chains, and the spending of staff). Applying the relevant economic multipliers, the **total direct, indirect, and induced impact** associated with University College Birmingham's expenditures in 2020-21 was estimated at **£61 million**.

In terms of **region**, approximately two thirds of this impact (**£40 million, 65%**) occurred in the West Midlands, while the remainder (**£21 million, 35%**) was generated in other regions throughout the UK.

Figure 2 Impact associated with University College Birmingham's expenditure in 2020-21 (£m)



Note: All estimates are presented in 2020-21 prices, rounded to the nearest £1m, and may not add up precisely to the totals indicated.
Source: London Economics' analysis

In terms of the number of full-time equivalent (FTE) jobs supported, University College Birmingham's spending supported a total of **550** FTE jobs across the UK economy in 2020-21, of which **415** were located in the West Midlands, and the remaining **135** jobs were located throughout other regions of the UK.

[3] The total current operational expenditure (excluding capital expenditure) of University College Birmingham in 2020-21 stood at **£53 million**. For the purpose of this analysis, we excluded **£4 million** in depreciation costs and **£7 million** in movements in pension provisions, as it is assumed that these are not relevant from a procurement perspective (i.e. these costs are 'non-cash' items). This results in operational expenditure of **£42 million** in 2020-21.

1 Introduction

London Economics were commissioned to assess the **economic and social impact of University College Birmingham in the United Kingdom**, focusing on the 2020-21 academic year. University College Birmingham contributes to the UK's national prosperity through a range of activities and channels, and the analysis is split into:

- The economic contribution of University College Birmingham's provision of **teaching and learning**;
- The impact of University College Birmingham's contribution to **educational exports**;
- The impact of University College Birmingham's **operating and capital expenditures**; and

Reflecting these channels of impact, the remainder of this report is structured as follows.

In **Section 2**, we assess the improved labour market earnings and employment outcomes associated with education attainment at University College Birmingham – including the range of higher education (HE) qualifications, further education (FE) qualifications, and apprenticeship training offered by the University. Through an assessment of the lifetime benefits and costs associated with educational attainment, we estimate the net economic benefits of University College Birmingham's teaching and learning activity to University College Birmingham's students and the public purse (through enhanced taxation receipts), focusing on the cohort of **3,905** UK domiciled students who started higher education qualifications, further education qualifications, or (off-the-job) apprentice training at University College Birmingham in 2020-21.

In addition to these UK domiciled students, there were a further **730** international HE students in the 2020-21 cohort of University College Birmingham students, contributing to the value of UK educational exports through their tuition fees as well as their non-fee (i.e. living cost) expenditures during their studies. **Section 3** assesses the direct, indirect, and induced economic impacts generated by this fee and non-fee income associated with University College Birmingham's 2020-21 cohort of international higher education students.

Given that University College Birmingham is a major employer and supports its core activities through significant expenditures, University College Birmingham's substantial physical footprint also supports jobs and promotes economic growth throughout the West Midlands and wider UK economy. **Section 4** presents our estimates of the direct, indirect, and induced economic impacts associated with the operating and capital expenditures incurred by University College Birmingham in 2020-21.

In addition to the many economic impacts associated with skills and qualification acquisition, there are a multitude of non-economic or societal benefits associated with further and higher education qualification attainment. Throughout this report, we demonstrate the depth of the impact of learning at University College Birmingham on students' jobs, lives, families, learning and prospects through spotlighting stories of University College Birmingham students and alumni through case studies.

A new partnership to support student ambitions

From January 2022, 35 undergraduate and postgraduate courses, as well as higher-level apprenticeships will be accredited by the University of Warwick, a prestigious Russell Group university ranked 6th in the UK by The Guardian 2022 league table. The accreditation is a result of a wider partnership between the two Midlands based institutions, seeking to benefit students and their professional ambitions as well as strengthen the local economy in its post pandemic recovery.

The partnership brings together the University of Warwick's excellent research and employment reputation with University College Birmingham's strengths in teaching and track record in widening participation, securing excellent educational and employment outcomes for people from areas with traditionally low progression to higher education. Both institutions bring a business facing, entrepreneurial, and employability-focused approach with links to industry, providing students access to the broad academic and employer networks and rich learning resources of the universities.

Kanyi Bubacarr, **Aviation Management MSc**

Kanyi chose to continue his studies at University College Birmingham following completion of his BA (Hons) degree in Aviation and Airport Management. As well as being able to benefit from the specialist teaching and facilities at the University including the Aviation and Tourism Suite, the collaboration with Warwick has enabled him to connect with fellow students. He is now looking to set up an African Aviation and Business Conference with them to influence and benefit the aviation industry.

Laura Hulme, **International Tourism Management FdA**

"The University of Warwick is one of the best in the UK and the accreditation adds something valuable to the course… Having a degree with University College Birmingham and the University of Warwick will give me a competitive edge in the job market."

Victor Basinyi, **Business Enterprise FdA**

Successful businessman and mechanical engineer, Victor, wanted to step up his entrepreneurial skills with a research-based degree from a reputable institution. The partnership with the University of Warwick was a crucial factor in his decision to study, allowing him to access an enterprise network of academics and contributors in his specific area of interest, and be at the heart of providing solutions to job creation in the local area.

2 The impact of University College Birmingham's teaching and learning activities

Typically, economic impact analyses of higher education institutions only consider the direct, indirect, and induced economic effects of a university's expenditures (through the institution's extensive supply chains, and the expenditures on its staff) and the economic impacts associated with the expenditures of students attending the institution. However, given that one of universities' primary activities is to provide teaching and learning, a simple study of this nature would significantly underestimate the impact of any higher education institution's activities on the UK economy.

In terms of measuring the impact of universities' teaching and learning activities, Atkinson's (2005) report to the Office for National Statistics asserted that the economic value of education and training is essentially the **value placed on that qualification as determined by the labour market**. Based on this approach, in this section, we detail our estimates of the economic impact of the teaching and learning activities undertaken at University College Birmingham, by considering the labour market benefits associated with enhanced qualification attainment and skills acquisition – to **both the individual and the public purse**.

2.1 The 2020-21 cohort of UK domiciled University College Birmingham students

The analysis of the economic impact of University College Birmingham's teaching and learning activities focuses on the **2020-21 cohort of UK domiciled students** (and including the full range of qualifications offered by the University, i.e. including higher education students, further education student, and apprenticeships). In other words, instead of considering the University's entire student body of **7,310** students in 2020-21 (*irrespective* of when these individuals may have started their studies), the analysis in this section focuses on the **3,905** UK domiciled[4] students starting higher education qualifications[5] (**2,030** students), further education qualifications (**1,735** students), or apprenticeships (**140** students) in the 2020-21 academic year[6].

2.1.1 Higher education students

Focusing on higher education students in the cohort, in terms of **level of study** (Figure 3), approximately half of all UK domiciled students in the cohort (**1,045** students, **51%**) were undertaking **first degrees**, followed by **860** students (**42%**) starting **other undergraduate**

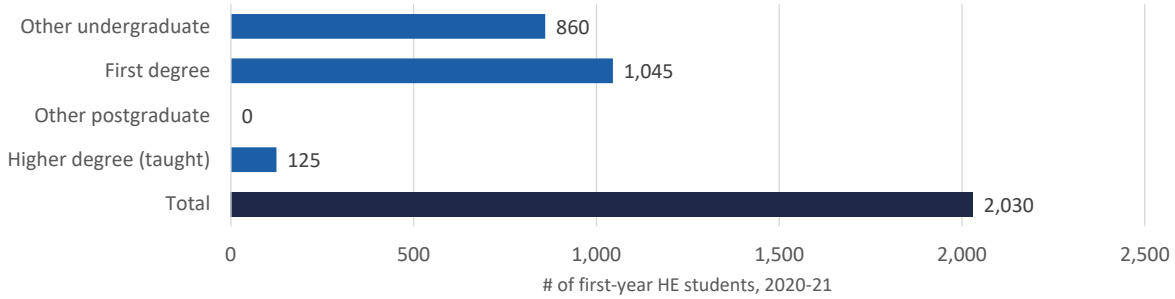
[4] It is likely that a proportion of EU and non-EU domiciled students undertaking their studies at University College Birmingham will remain in the UK to work following completion of their studies; similarly, UK domiciled students might decide to leave the UK to pursue their careers in other countries. Given the uncertainty in predicting the extent to which this is the case, and the difficulty in assessing the net labour market returns for students not resident in the UK post-graduation, the analysis of teaching and learning focuses on UK domiciled students only. In other words, we assume that all UK domiciled students will enter the UK labour market upon graduation, and that non-UK students will leave the UK upon completing their qualifications at University College Birmingham.

[5] HE students include students who started standalone modules/credits, rather than full higher education qualifications.

[6] All student numbers here are rounded to the nearest 5. In unrounded terms, for higher education students, we received HESA data on a total of **2,768** first-year students from University College Birmingham. Of these, we excluded **3** students whose gender was specified as 'other' (due to the need to break down the analysis into male and female students), and **733** non-UK domiciled students (who are instead considered as part of the analysis of **educational exports** (Section 3)). For further education students and apprentices, we received data on a total of **1,877** first-year students/apprentice learners from the University College Birmingham, from which we excluded **1** student with an unknown funding source. The data did not provide any detail on these students' domicile prior to starting their qualifications/apprenticeship training, so we assumed that all of these students are from English domiciles.

qualifications (predominantly Foundation Degrees), and a further **125** students (**6%**) undertaking **postgraduate taught degrees**[7].

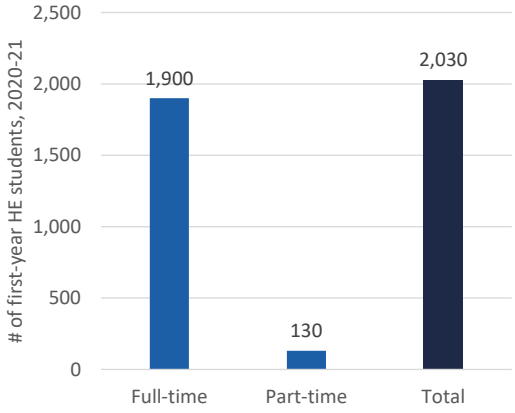
Figure 3 UK domiciled HE students in the 2020-21 cohort of University College Birmingham students, by level of study



Note: All numbers are rounded to the nearest 5, and the total values may not add up due to this rounding. 'Other undergraduate' learning includes mostly Foundation Degrees, as well as a small number of students undertaking other undergraduate qualifications or undergraduate-level credits. 'Other postgraduate' includes postgraduate certificates (at Level M); note that there were less than 5 UK domiciled students in the cohort undertaking 'other postgraduate' qualifications, so this has been rounded to 0 in the chart (but a larger number of non-UK domiciled students were undertaking learning at this level; see Section 3.1). Further note that there are no postgraduate research degrees offered by University College Birmingham.
Source: London Economics' analysis based on University College Birmingham HESA data

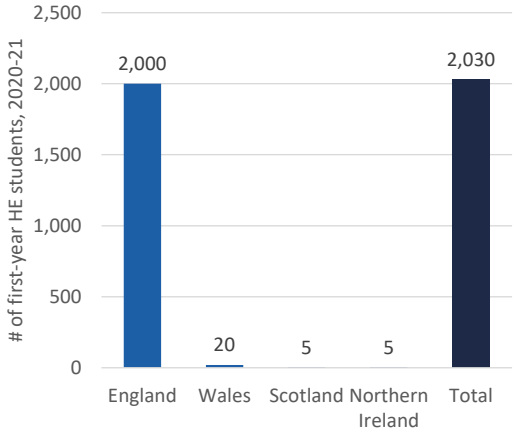
In relation to **mode of study** (Figure 4), **1,900** (**94%**) students in the cohort were undertaking their studies with University College Birmingham on a full-time basis, while the remaining **130** (**6%**) were enrolled on a part-time basis. In terms of **domicile** (Figure 5), the vast majority (**2,000**, **99%**) of UK domiciled HE students in the cohort were from England.

Figure 4 UK domiciled HE students in the 2020-21 cohort of University College Birmingham students, by mode of study



Note: All numbers are rounded to the nearest 5, and the total values may not add up due to this rounding.
Source: London Economics' analysis based on University College Birmingham HESA data

Figure 5 UK domiciled HE students in the 2020-21 cohort of University College Birmingham students, by domicile



Note: All numbers are rounded to the nearest 5, and the total values may not add up due to this rounding.
Source: London Economics' analysis based on University College Birmingham HESA data

[7] Note that there was also a small number of students (less than 5) undertaking 'other postgraduate' qualifications, which has been rounded to 0 in Figure 3.

Table 3 UK domiciled HE students in the 2020-21 cohort of University College Birmingham students, by level of study, mode, and domicile

Level and mode of study	Domicile				
	England	Wales	Scotland	Northern Ireland	Total
Full-time					
Other undergraduate	820	5	0	0	**825**
First degree	935	10	5	5	**955**
Other postgraduate	0	0	0	0	**0**
Higher degree (taught)	120	0	0	0	**120**
Total	**1,870**	**20**	**5**	**5**	**1,900**
Part-time					
Other undergraduate	35	0	0	0	**35**
First degree	90	0	0	0	**90**
Other postgraduate	0	0	0	0	**0**
Higher degree (taught)	5	0	0	0	**5**
Total	**130**	**0**	**0**	**0**	**130**
Total					
Other undergraduate	850	10	0	0	**860**
First degree	1,025	10	5	5	**1,045**
Other postgraduate	0	0	0	0	**0**
Higher degree (taught)	125	0	0	0	**125**
Total	**2,000**	**20**	**5**	**5**	**2,030**

Note: All numbers are rounded to the nearest 5, and the total values may not add up due to this rounding.
'Other undergraduate' learning includes mostly Foundation Degrees, as well as a small number of students undertaking other undergraduate qualifications or undergraduate-level credits. 'Other postgraduate' includes postgraduate certificates (at Level M); note that there were less than 5 UK domiciled students in the cohort undertaking 'other postgraduate' qualifications, so this has been rounded to 0 in the chart (but a larger number of non-UK domiciled students were undertaking learning at this level; see Section 3.1). Further note that there are no postgraduate research degrees offered by University College Birmingham.
Source: London Economics' analysis based on University College Birmingham HESA data

2.1.2 Further education students and apprentices

In addition to higher education qualifications, University College Birmingham offers a range of vocational learning, including **further education qualifications at Regulated Qualifications Framework (RQF) Levels 1 to 4**, and **three levels of apprenticeships** (including Intermediate, Advanced, and Higher Apprenticeships[8]).

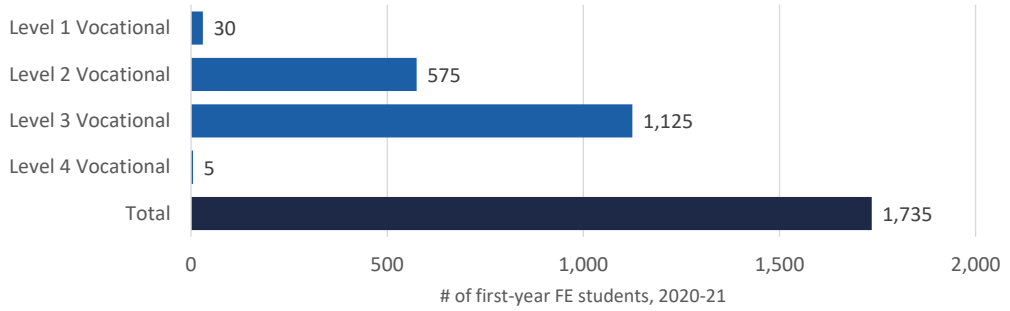
In terms of **FE qualifications** (see Figure 6), of the total of **1,735** students in the 2020-21 cohort[9], a majority of students (**1,125**, **65%**) were enrolled in FE qualifications at Level 3, followed by **575** students (**33%**) undertaking Level 2 qualifications. In addition, there were much smaller numbers of students (**30** and **5**, respectively) undertaking qualifications at Levels 1 or 4. Note that all of these students were enrolled on a **full-time basis** (i.e. there were no part-time further education students in the 2020-21 cohort).

Considering apprenticeships (see Figure 7), of the **140** learners starting their (off-the-job) apprenticeship training at University College Birmingham in 2020-21, **100** learners (**71%**) were

[8] Intermediate Apprenticeships are categorised as learning at RQF Level 2; Advanced Apprenticeships are categorised as Level 3; and Higher Apprenticeships are categorised as Level 4. For more information, see Department for Education (no date).
[9] Again, the analysis assumes that all of these students were UK domiciled (specifically, English domiciled) prior to commencing their studies.

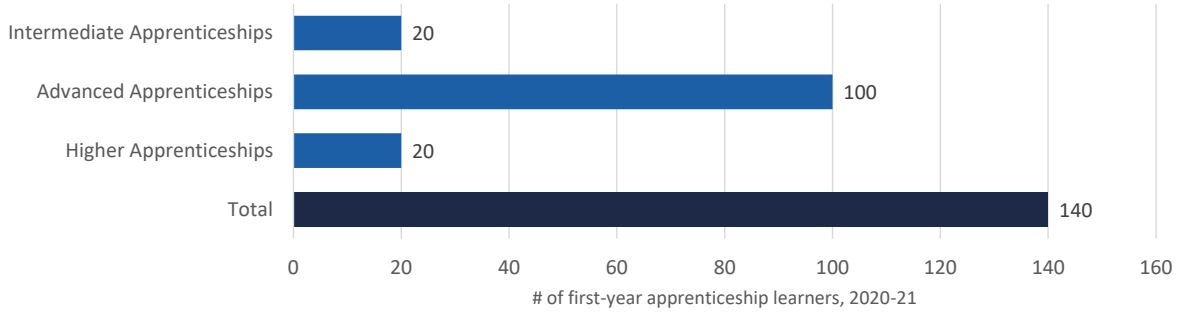
undertaking Advanced Apprenticeships, with **20** students (each) enrolled in Intermediate Apprenticeships and Higher Apprenticeship (**14%**, respectively).

Figure 6 FE students in the 2020-21 cohort of University College Birmingham students, by level of study



Note: All numbers are rounded to the nearest 5, and the total values may not add up due to this rounding.
All further education students in the 2020-21 cohort were assumed to be English domiciled prior to starting their qualifications at University College Birmingham, and all of these students were undertaking their FE qualifications on a full-time basis.
Source: London Economics' analysis based on University College Birmingham HESA data

Figure 7 Apprentice learners in the 2020-21 cohort of University College Birmingham students, by apprenticeship level



Note: All numbers are rounded to the nearest 5, and the total values may not add up due to this rounding.
All apprentices in the 2020-21 cohort were assumed to be English domiciled prior to starting their training at University College Birmingham.
Source: London Economics' analysis based on University College Birmingham HESA data

2.2 Adjusting for completion rates

The previous section provided an overview of the number of UK domiciled students *starting* qualifications/apprenticeships[10] at University College Birmingham in 2020-21. However, to aggregate the individual-level impacts of University College Birmingham's teaching and learning activity, it is necessary to adjust the number of 'starters' to account for **completion rates**.

2.2.1 Higher education students

To achieve this, for **higher education qualifications**, we used information provided by University College Birmingham on the completion outcomes of a previous cohort of University College Birmingham students - broken down by study intention, and study completion[11]. In other words, these completion data include the number of students who completed their intended qualification (or module); completed a different (usually lower) qualification; or discontinued their studies

[10] Or standalone higher education modules/credits.
[11] Specifically, the information focused on students who started higher education qualifications at University College Birmingham in 2015-16, and captures their completion outcomes by the 2020-21 academic year (i.e. 5 years after their initial enrolment). Note that, for consistency with our above definition of 'other undergraduate' students, we combined the original separate data for Foundation Degrees and other undergraduate learning into a single category.

without being awarded a qualification (which we modelled as completion at 'other undergraduate' level (for students who originally enrolled in first degrees or other undergraduate qualifications) or 'other postgraduate' level (for students who originally intended to complete taught higher degrees or other postgraduate qualifications)[12])[13].

Table 4 presents the resulting completion rates for higher education students applied throughout the analysis. We assume that, of those students starting a (full-time or part-time) first degree at University College Birmingham in 2020-21, **74%** complete the first degree as intended, while the remaining **26%** 'switch' to another (lower) undergraduate qualification or undertake one or more of the credits/modules associated with their degree before discontinuing their studies (also modelled as completion at 'other undergraduate' level). At postgraduate level, we assume that of those individuals starting a postgraduate taught degree, **86%** complete the qualification as intended, while the remaining **14%** instead 'switch' to complete (a lower) qualification at 'other postgraduate' level[14] or undertake one or more of the credits/modules associated with the intended degree before dropping out (in this case, also modelled as completion at 'other postgraduate' level). In all of these cases, **the analysis of the impact of teaching and learning calculates the estimated returns associated with the *completed* qualification/standalone module(s)**.

Table 4 Assumed completion rates of University College Birmingham HE students

Completion outcome	Study intention			
	Other undergraduate	First degree	Other postgraduate	Higher degree (taught)
Other undergraduate	99%	26%	-	-
First degree	1%	74%	-	-
Other postgraduate	-	-	80%	14%
Higher degree (taught)	-	-	20%	86%
Total	**100%**	**100%**	**100%**	**100%**

Note: We assume the same completion rates across full-time and part-time students.
Source: London Economics' analysis based on information provided by University College Birmingham

2.2.2 Further education students and apprenticeships

For further education students (see Table 5), we again made use of completion information for a previous cohort of FE students provided by University College Birmingham[15], broken down by level of study (including RQF Levels 1, 2, and 3[16]). Based on this information, we assume that of those students starting (full-time) Level 1 or 2 FE qualifications at University College Birmingham in 2020, approximately **74%** complete the intended qualification. The corresponding assumed completion rate for both Level 3 and 4 FE qualifications stands at **77%**.

[12] In other words, students who discontinued their studies were assumed to at least complete one or several standalone modules associated with their intended qualification, so that these students' completion outcomes were modelled as either completion at 'other undergraduate' or 'other postgraduate' level. As a result, the total assumed completion rates sum up to 100%. Note that this applies to higher education students only, but not to further education students or apprentices (see Section 2.2.2, where the assumed completion rates amount to less than 100%).

[13] Note that the original data did not include a breakdown of completion rates by mode, so that we assume the same completion rates across full-time and part-time students.

[14] Reversely, note that for students *starting* other postgraduate qualifications, the data indicate that while 80% of these students are expected to complete the intended qualification or one or more of the credits/modules associated with the qualification, 20% instead complete a (higher) postgraduate taught degree.

[15] In this case, the information focused on the completion outcomes (by 2020-21) of students who started FE qualifications in the 2019-20 academic year. Again, note that all FE students studying at University College Birmingham are enrolled on a full-time basis. In contrast to the above completion rates for higher education students, we assume that students do not 'switch' between different levels of FE qualifications once they are enrolled (i.e. they either complete their intended qualification, or drop out entirely).

[16] The data did not include information on completion rates for a (very small) number of students undertaking Level 4 FE qualifications at University College Birmingham, so we assumed the same completion rates for these students as for FE qualifications at Level 3.

Table 5 Assumed completion rates of University College Birmingham FE students

Completion outcome	Study intention			
	Level 1 vocational	Level 2 vocational	Level 3 vocational	Level 4 vocational
Level 1 vocational	74%	-	-	-
Level 2 vocational	-	74%	-	-
Level 3 vocational	-	-	77%	-
Level 4 vocational	-	-	-	77%
Total	**74%**	**74%**	**77%**	**77%**

Note: All FE students in the 2020 University College Birmingham cohort were undertaking their FE qualifications on a full-time basis.
Source: London Economics' analysis based on information provided by University College Birmingham

For apprentice learners (see Table 6), again based on data from University College Birmingham, we assume that of those learners in the 2020-21 cohort starting Advanced Apprenticeships, **70%** complete the training as intended, with the corresponding assumptions for Intermediate Apprenticeships and Higher Apprenticeships standing at **57%** and **67%**, respectively[17].

Table 6 Assumed completion rates of University College Birmingham apprentice learners

Completion outcome	Study intention		
	Intermediate Apprenticeship	Advanced Apprenticeship	Higher Apprenticeship
Intermediate Apprenticeship	57%	-	-
Advanced Apprenticeship	-	70%	-
Higher Apprenticeship	-	-	67%
Total	**57%**	**70%**	**67%**

Source: London Economics' analysis based on information provided by University College Birmingham

2.3 Defining the returns to higher education qualifications

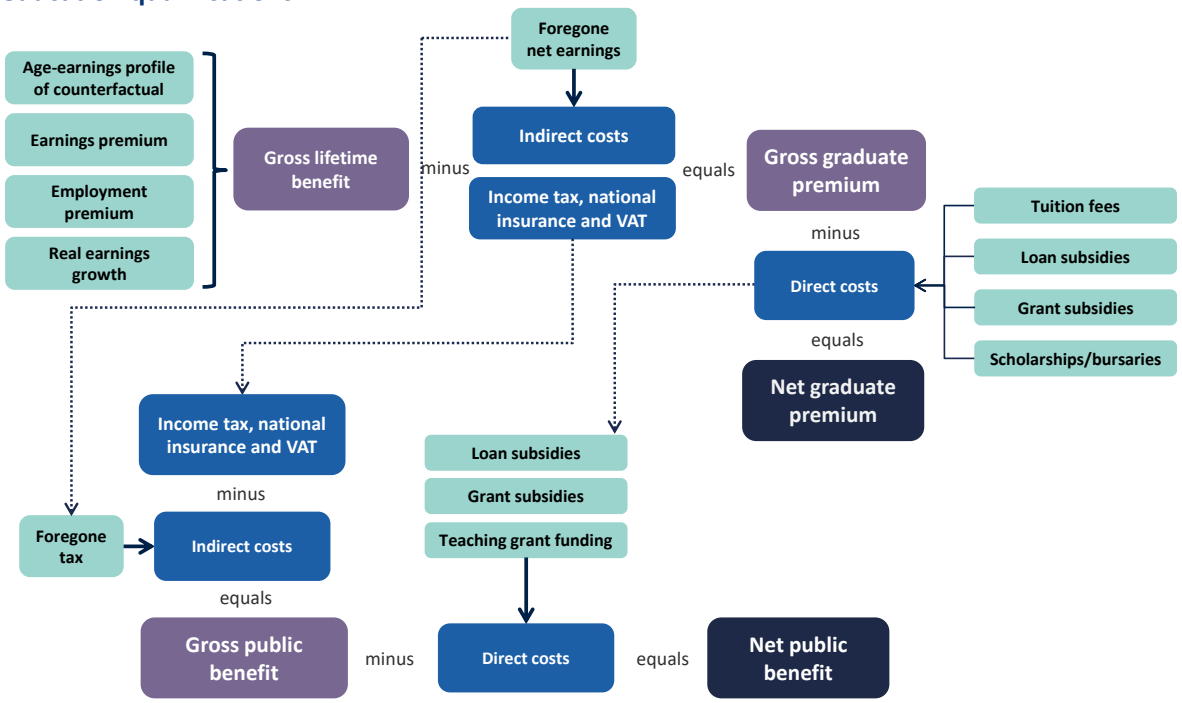
The fundamental objective of the analysis of the impact of University College Birmingham's teaching and learning activities is to estimate the **gross and net graduate premium** (or net learner benefit, for FE and apprenticeship learners) to the individual and the **gross and net public purse benefit** to the Exchequer associated with qualification attainment, defined as follows (and presented in Figure 8, Figure 9, and Figure 10 for HE qualifications, FE qualifications, and apprenticeships, respectively):

- The ***gross* graduate premium/learner benefit** associated with qualification attainment is defined as the **present value of enhanced after-tax earnings** (i.e. after income tax, National Insurance and VAT are removed, and following the deduction of any foregone earnings during study (where applicable)) relative to an individual in possession of the counterfactual qualification;
- The ***gross* benefit to the public purse** is defined as the **present value of enhanced taxation** (i.e. income tax, National Insurance and VAT, following the deduction of the costs of foregone tax earnings during study) relative to an individual in possession of the counterfactual qualification;
- The ***net* graduate premium/learner benefit** is defined as the gross graduate premium *minus* the present value of the direct costs associated with qualification attainment; and

[17] As for higher education students, the information on apprenticeship completion was based on the cohort of learners who started apprenticeships in 2015-16, capturing their completion outcomes by the 2020-21 academic year (i.e. 5 years after the start of their training). As for FE qualifications, but in contrast to the above completion rates for HE students, we assume that apprentice learners do not 'switch' between different levels of apprenticeships over time (i.e. they either complete their intended apprenticeship, or drop out of their training entirely).

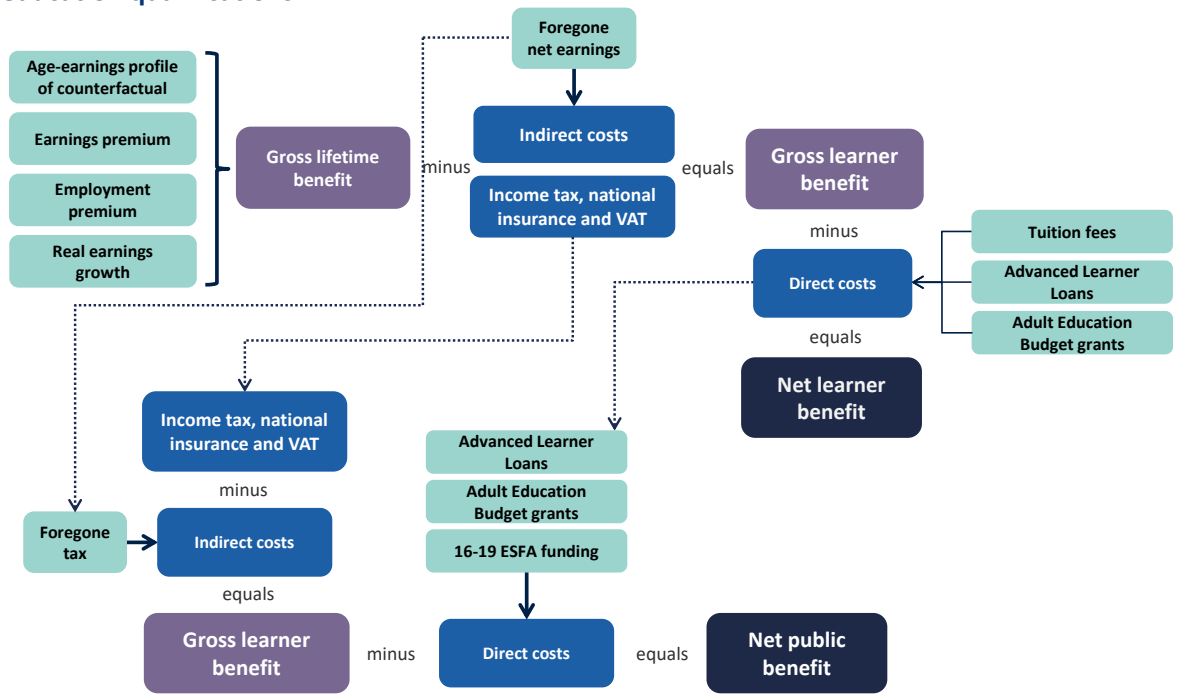
- Similarly, the ***net* benefit to the public purse** is defined as the gross public purse benefit minus the direct Exchequer costs of provision during the period of attainment.

Figure 8 Overview of gross and net graduate premium and Exchequer benefit for higher education qualifications



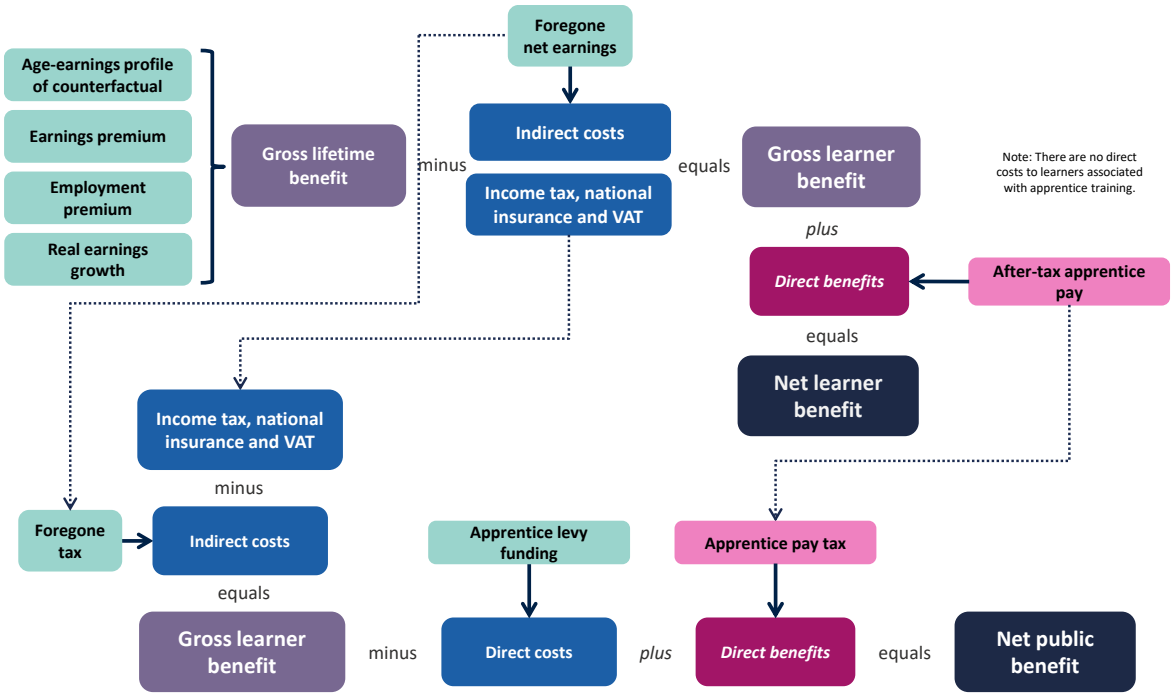
Source: London Economics' analysis based on Department for Business, Innovation and Skills (2011a)

Figure 9 Overview of gross and net learner benefit and Exchequer benefit for further education qualifications



Source: London Economics' analysis

Figure 10 Overview of gross and net learner benefit and Exchequer benefit for apprenticeship learners



Source: London Economics' analysis

2.4 Estimating the returns to higher education qualifications

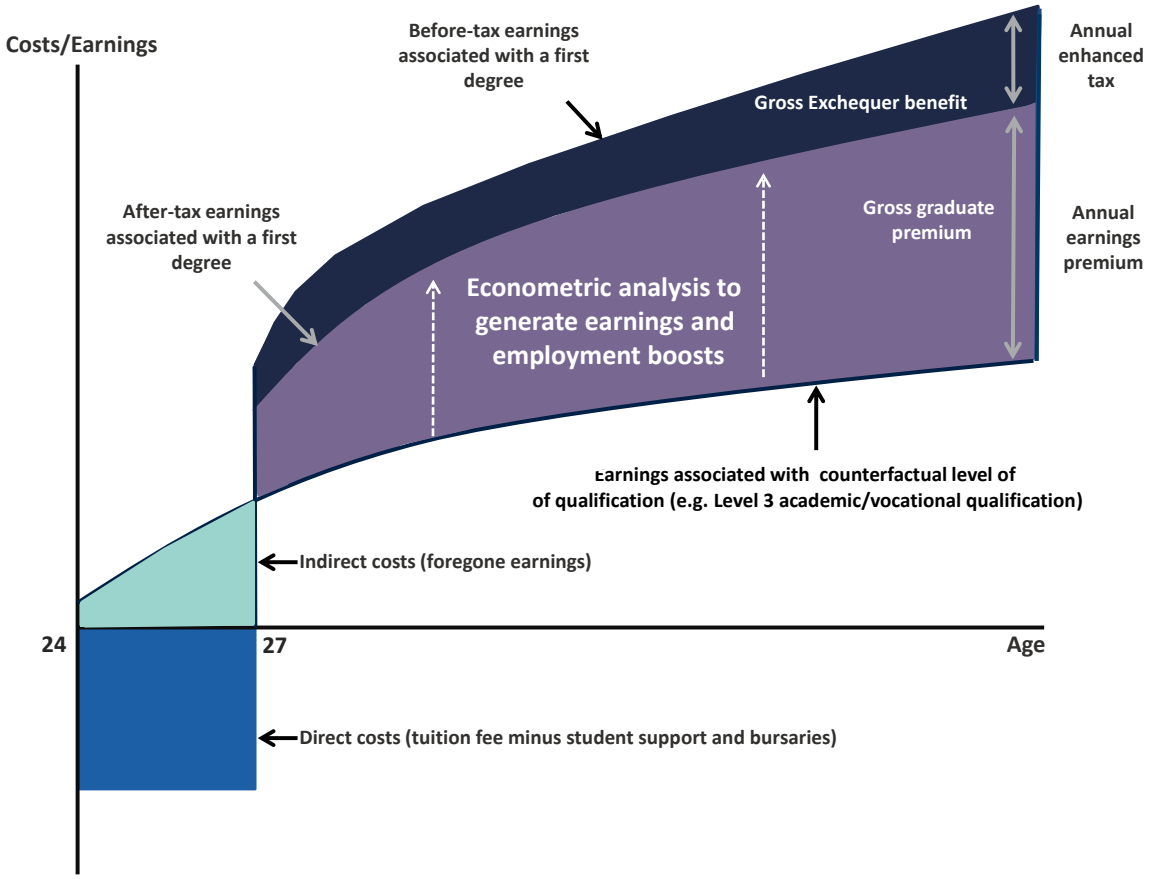
2.4.1 Estimating the gross graduate premium and gross public purse benefit

To measure the economic benefits to higher education qualifications, we estimate the **labour market value associated with particular education qualifications**, rather than simply assessing the labour market outcomes achieved by individuals *in possession* of the qualification. The standard approach to estimating this labour market value is to undertake an **econometric analysis** where the 'treatment' group consists of those individuals in possession of the qualification of interest, and the 'counterfactual' group consists of those individuals with comparable personal and socioeconomic characteristics but with the next highest level of qualification. The rationale for adopting this approach is that the comparison of the earnings and employment outcomes of the treatment group and the counterfactual group 'strips away' those other personal and socioeconomic characteristics that might affect labour market earnings and employment (such as gender, age, or sector of employment), leaving just the labour market gains attributable to the qualification itself (see Figure 11 for an illustration of this for full-time first degrees). The treatment and counterfactual groups and details of the econometric approach are presented in Annex A2.2.1 and A2.2.2, respectively.

Throughout the analysis, the assessment of earnings and employment outcomes associated with higher education qualifications, further education qualifications, and apprenticeship attainment (at all levels) is undertaken separately by **gender**, reflecting the different labour market outcomes between men and women. Further, the analysis for higher education qualifications (only) is undertaken **by subject** to illustrate the fact that there is significant variation in post-graduation labour market outcomes depending on the subject of study, but also to reflect the specific subject composition of HE students studying at University College Birmingham. In addition, given the fact that part-time students generally undertake and complete higher education qualifications later in life than full-time students (and given the fact that some full-time students at University College

Birmingham tend to undertake their qualifications at a relatively higher age than 'typical' students across the UK), the analysis applies a '**decay function**' to the returns associated with qualification attainment, to reflect the shorter period of time in the labour market[18].

Figure 11 Estimating the gross graduate premium/learner benefit and gross Exchequer benefit (example for full-time first degrees)



Note: The analysis assumes that the opportunity costs of foregone earnings associated with higher qualification attainment are applicable to full-time students only. For part-time students, we have assumed that these students are able to combine work with their academic studies and as such, do not incur any opportunity costs in the form of foregone earnings. This illustration is based on an analysis of University College Birmingham's student cohort data for 2020-21, where the mean age at enrolment for full-time first degree students stands at 24, and we have assumed that a full-time first degree requires 3 years to complete. ***Source: London Economics***

To estimate the **gross graduate premium/learner benefit**, based on the econometric results, we then estimate the **present value of the enhanced post-tax earnings** of individuals in possession of different HE qualifications, FE qualifications, or apprenticeships (i.e. after income tax, National Insurance and VAT are removed, and following the deduction of foregone earnings) relative to an individual in possession of the counterfactual qualification (see Annex A2.2.4 for more detail[19]).

The **gross benefits to the Exchequer** from the provision of higher education, further education, and apprenticeships are derived from the enhanced taxation receipts that are associated with a higher likelihood of being employed, as well as the enhanced earnings associated with more highly skilled

[18] See Annex A2.2.3 for more information.

[19] In terms of prior attainment, for HE students, note that for **11** students in the 2020-21 cohort of UK domiciled students, previous attainment levels were specified as either 'Mature student admitted on basis of previous experience and/or admissions test' or 'Other qualification level not known'. For these students, we imputed their prior attainment level using a group-wise imputation approach based on the most common prior attainment among students in the cohort undertaking qualifications at the same level, separately by study mode.

and productive employees. Based on the analysis of the lifetime earnings and employment benefits associated with qualification attainment, and combined with administrative information on the relevant taxation rates and bands (from HM Revenue and Customs), we estimated the **present value of additional income tax, National Insurance and VAT associated with HE qualification, FE qualification, and apprenticeship attainment** (by gender, level of study, mode of study[20], and prior attainment). Again, please refer to Annex A2.2.4 for more detailed information on the calculation of the gross Exchequer benefit.

2.4.2 Estimating the net graduate premium and net public purse benefit

The difference between the gross and net graduate premium/learner benefit relates to **students' direct costs** of qualification acquisition[21]:

- For **higher education qualifications**, these direct costs refer to the **proportion of the tuition fee paid by the student**[22] net of any **tuition fee support** or **maintenance support** provided by the Student Loans Company (SLC, for students from England, Wales and Northern Ireland) or the Students Awards Agency for Scotland (SAAS, for students from Scotland)[23] and minus any **fee waivers or bursaries** provided by University College Birmingham itself[24]. In this respect, the student benefit associated with tuition fee loan or maintenance loan support equals the **Resource Accounting and Budgeting charge** (RAB charge), capturing the proportion of the loan that is not repaid[25]. Given the differing

[20] Note again that the breakdown by study mode (i.e. full-time vs. part-time study) is only relevant to higher education qualifications, as all FE students in the 2020-21 cohort were undertaking their qualifications on a full-time basis.

[21] Note again that the *indirect* costs associated with qualification attainment, in terms of the foregone earnings during the period of study (for full-time students only), are already deducted from the gross graduate premium/learner benefit.

[22] To derive the average **tuition fee** per student per year, we made use of information published by the Higher Education Statistics Agency (2022a) on the total tuition fee income received by the University in 2020-21 (separately by study mode, domicile, and study level (with data provided for all undergraduate students combined, and for all postgraduate (taught) students combined)). We then divided this total fee income by the underlying number of total (first-year and continuing) HE students studying at University College Birmingham in 2020-21. To ensure that the estimated fees for part-time students accurately reflect the average study intensity among part-time students in the 2020-21 cohort, the fees per part-time student were calculated by multiplying the respective full-time rates by the ratio of the average study intensity among part-time students relative to full-time students in the cohort.
In turn, the average **study intensity** was calculated based on HESA data provided by University College Birmingham relating to its 2020-21 cohort of students, where we divided the number of students in the cohort (in FTE terms) by the corresponding number of students (headcount terms), separately by study mode, study level (undergraduate (combined), higher degree (taught), and students at 'other postgraduate level').

[23] The analysis makes use of *average* levels of support paid per HE student, separately by study mode, study level (i.e. undergraduate and higher degree (taught) (and we assume that no funding is available for students undertaking qualifications at 'other postgraduate' level)), and domicile. Our estimates are based on publications by the SLC on student support for higher education in England, Wales, and Northern Ireland in 2020-21 (see Student Loans Company, 2022a, 2022b and 2022c, respectively) and a publication by the Student Awards Agency for Scotland on student support for higher education in Scotland in 2020-21 (see Student Awards Agency for Scotland, 2022). To ensure comparability across the different Home Nations, we focus only on core student support in terms of tuition fee grants, tuition fee loans, maintenance grants and maintenance loans (where applicable), but *exclude* any Disabled Students' Allowance and other targeted support. Wherever possible, we focus on the average level of support for students in public providers only, for the most recent cohorts possible, split by domicile (i.e. 'Home' vs. EU). Furthermore, and again wherever possible, we adjusted the average levels of fee and maintenance loans for average loan take-up rates available from the same sources. In addition, the assumed average fee loan per undergraduate student has been capped at the level of tuition fee charged per University College Birmingham undergraduate student in 2020-21 (see Footnote 22).

[24] Average fee waivers per student were calculated based on information provided by University College Birmingham on average fee waivers/discounts provided to students by the University in 2020-21, by level and mode of study.

[25] For **undergraduate full-time** students, we have assumed a RAB charge of **31%** associated with tuition fee and maintenance loans for English domiciled students (based on information published by the Department for Education (2022a), which includes the impact on the RAB charge of the Department's recently announced policy changes in response to the Augar Review of Higher Education (for post-2012 English loan borrowers)). We have further assumed a RAB charge of approximately **26%** for Welsh domiciled students (based on London Economics' modelling of the costs associated with the Welsh higher education funding system, on behalf of the Welsh Government (*unpublished*)); **31%** for Scottish domiciled students (based on Audit Scotland (2020)); and **26%** for Northern Irish students (assumed to be the same as for Wales given the similar loan balance); and **31%** for EU students (studying in England, assumed to be the same as for English domiciled students).

approach to public support funding for students from each of the UK Home Nations, the direct costs incurred by students were assessed separately for students from England, Wales, Scotland, and Northern Ireland[26].

- For **further education qualifications**, the direct costs to students associated with attaining these qualifications include any **tuition fees paid by students themselves**[27], offset against any **Advanced Learner Loans** (provided to students by the Student Loans Company) and **Adult Education Budget grants** (provided to students by either the Education and Skills Funding Agency (ESFA) or the West Midlands Combined Authority)[28]. Again, Advanced Learner Loans were adjusted for the RAB charge (i.e. the proportion of these loans expected *not* to be repaid)[29];
- For **apprenticeships**, while these learners incur the *indirect* costs of foregone earnings associated with the counterfactual level of qualification during their training (which are already accounted for in the above-described *gross* graduate premium/learner benefit); **there are no direct costs incurred by apprentices associated with their training**. Instead, these learners ***benefit*** from receiving apprentice wages during their training, and these net (after-tax) wages constitute a significant benefit component associated with apprentice training[30].

Similarly, the difference between the gross and net Exchequer benefit relates to the **direct costs to the public purse** associated with funding education provision:

- For **higher education qualifications**, the direct costs[31] to the public purse include the **teaching grant funding** administered by the Office for Students (OfS)[32], the **student**

For **undergraduate part-time students**, based on the same sources, we have assumed a RAB charge of **33%** for English domiciled students (see Annex B in Department for Education (2022a); note however that this does *not* take account of the impact of the Department's response to the Augar Review); approximately **36%** for Welsh domiciled students; **0%** for Northern Irish students (given that these students have a very small loan balance) and **33%** for EU domiciled students studying in England (again, assumed to be the same as for English domiciled students). There is currently no student loan funding provided to Scottish domiciled undergraduate part-time students (so no RAB charge assumptions are required).

For the loans for **postgraduate taught students** from England, Wales, and Northern Ireland (and for EU students studying in England), we have assumed a RAB charge of **0%** for both full-time and part-time students (based on the Department for Education's (2022a) student RAB charge estimates for postgraduate Master's loans for English students (again see Annex B of Department for Education(2022a)). There were no postgraduate loans available for Scottish students studying outside Scotland.

[26] Note that, in a few instances, the total financial support provided to students (through tuition fee loans and grants, maintenance loans and grants, and fee waivers/other bursaries (where applicable)) *exceeds* the costs of their University College Birmingham tuition fees – i.e. the net graduate premium *exceeds* the gross graduate premium per student. For example, this is the case for Welsh domiciled students undertaking full-time first degrees at University College Birmingham in 2020-21, driven by the relatively high maintenance funding received by these students (including both maintenance loans and grants).

[27] i.e. for the (relatively small) number of students for whom no public funding is provided.

[28] Again, note that all FE students (as well as apprentice learners) in the 2020-21 University College Birmingham cohort were assumed to be English domiciled. The average level of funding per student per year for each of these types of FE funding (as well as for the additional direct Exchequer costs of provision, outlined below) was estimated by dividing the total amount of funding associated with FE students in the 2020-21 cohort (by type of funding and level of study) by the total number of students in the cohort (by level of study) – all based on information provided by University College Birmingham.

[29] We assumed a RAB charge of **60%** for Advanced Learner Loans, again based on information published by the Department for Education (2022b).

[30] As a result of these in-training benefits, for apprentice learners, the estimated 'net' learner benefits and Exchequer benefits (presented in Table 21 in Annex A2.2.5) are consistently *larger* than the estimated 'gross' learner and Exchequer benefits (presented in Table 19 in in Annex A2.2.5). For more information on our methodological approach for estimating apprentice pay during training, please refer to Annex A2.2.6.

[31] Again, any indirect costs to the public purse in terms of foregone income tax, National Insurance and VAT receipts foregone during the period of qualification attainment (applicable to full-time students only) are already incorporated in the gross public purse benefits as described above.

[32] This is based on published HESA financial information on the total OfS recurrent teaching grant received by University College Birmingham in 2020-21 (see HESA, 2022a), divided by the total number of students enrolled with University College Birmingham in 2020-21 (excluding any non-EU domiciled students, as there is no teaching funding associated with these students). We again adjusted for the average assumed study intensity among full-time and part-time students, to arrive at separate rates of teaching grant funding by study mode.

support provided in the form of maintenance/fee grants (where applicable) and the **interest rate or write-off subsidies** that are associated with maintenance and tuition fee loans (i.e. the RAB charge). Again, the analysis tailors the cost of student support to the student's specific Home Nation of domicile.

- For **further education qualifications**, the direct Exchequer costs of funding these qualifications include the (above-mentioned) cost of providing **Advanced Learner Loans**[33] (by the SLC) and **Adult Education Budget grants** (by the ESFA and WMCA) to students, as well as the **ESFA grant funding** provided to University College Birmingham to subsidise the provision of FE teaching and learning to learners aged 16-19[34].
- Finally, for **apprenticeships**, in addition to the *indirect* costs of foregone tax revenues during the training (associated with the counterfactual, and already accounted for in the *gross* public purse benefit), we deduct the **Exchequer costs of Apprentice Levy funding**[35]. In addition, and as a key **Exchequer benefit** during training (rather than a cost), the Exchequer accrues the tax receipts (again including income tax, National Insurance employee and employer contributions, and VAT), associated with the apprentice wages received by learners during their training[36].

These direct costs (and additional direct benefits, for apprentices) associated with qualification attainment to both students and the Exchequer (by qualification level, study mode and Home Nation domicile (where applicable)) are calculated from start to completion of a student's learning aim. Throughout the analysis, to ensure that the economic impacts are computed in **present value** terms (i.e. in 2020-21 money terms), all benefits and costs occurring at points in the future were **discounted** using the standard HM Treasury Green Book real discount rate of **3.5%** (see HM Treasury, 2022).

Deducting the resulting individual and Exchequer costs from the estimated gross graduate premium/learner benefit and gross public purse benefit[37], respectively, we arrive at the estimated **net graduate premium** and **net public purse benefit** per student.

2.5 Estimated net graduate premium and net Exchequer benefit

Table 7 presents the net graduate premiums and net Exchequer benefits achieved by English domiciled students[38] undertaking qualifications at University College Birmingham in the 2020-21 cohort (by study mode, study level, and on average across men and women[39]).

[33] Again, adjusted for the RAB charge – i.e. the cost to the Exchequer of providing Advanced Learner Loans is captured by the proportion of the loan outlay that is expected *not* to be repaid by students.
[34] Again, this is based on data provided by University College Birmingham (see Footnote 28 for more information).
[35] The average cost of Apprentice Levy funding per learner is based on data provided by University College Birmingham (see Footnote 28 for more information). The Apprentice Levy is a levy placed on employers with an annual pay bill in excess of £3 million; however, for small employers that do not meet this threshold, as well as for Levy-paying employers that want to invest more in apprenticeship training than they have available in their levy accounts, the Exchequer 'co-invests' 95% of the costs of provision, paid directly to the training provider (so that employers only have to cover the remaining 5% of the costs). For simplicity, in the absence of a breakdown of how much of the Apprentice Levy funding associated with the 2020-21 cohort provided to University College Birmingham was provided through employers' Levy accounts vs. co-invested by the government, we have included the entirety of the Apprentice Levy funding associated with the cohort as a cost to the Exchequer.
[36] Again, see Annex A2.2.6 for more information on the methodological approach for estimating apprentice wages during training.
[37] And, for apprentices, adding the benefits of apprentice pay (and associated tax receipts) during training.
[38] As presented in Section 2.1.1, among HE students in the 2020-21 University College Birmingham, the vast majority (99%) were domiciled in England. In addition, for FE students and apprenticeships, we assume that all students in the 2020-21 cohort were domiciled in England prior to starting their studies/training. Therefore, here, we *only* present the net graduate premiums/learner benefits and net Exchequer benefits associated with English domiciled students.
[39] For a full breakdown of the results by gender, as well as for more comprehensive results for *all* prior attainments/counterfactual levels of qualification, see Annex A2.2.5.

The net graduate premium for a representative full-time first degree English domiciled student stands at £64,000.

In terms of **higher education** qualifications, the analysis indicates that the **net graduate premium** achieved by a representative[40] English domiciled student in the 2020-21 cohort completing a **full-time first degree** at University College Birmingham (with a Level 3 academic or vocational qualification as their highest level of prior attainment) stands at approximately **£64,000** in 2020-21 money terms. At postgraduate level, the net (post)graduate premium for a representative[41] English domiciled student completing a **full-time postgraduate taught degree** at University College Birmingham (relative to a first degree) stands at approximately **£67,000**.

Table 7 Net graduate premium/learner benefit and net Exchequer benefit per English domiciled student at University College Birmingham, by study level and mode

Level of study (and prior attainment/counterfactual)	Net graduate premium/ learner benefit		Net public purse benefit	
	Full-time students	Part-time students	Full-time students	Part-time students
Higher education qualifications				
Other undergraduate (vs. Level 3)	£14,000	£16,000	£17,000	£8,000
First degree (vs. Level 3)[1]	£64,000	-	£74,000	-
Other postgraduate (vs. first degrees)	£14,000	£15,000	£24,000	£17,000
Higher degree (taught) (vs. first degrees)	£67,000	£61,000	£76,000	£64,000
Further education qualifications				
Level 1 vocational (vs. Entry/no qual)	£18,000	-	-£1,000	-
Level 2 vocational (vs. Level 1 vocational)	£59,000	-	£16,000	-
Level 3 vocational (vs. Level 2 vocational)	£42,000	-	£26,000	-
Level 4 vocational (vs. Level 3 vocational)	-£16,000	-	£0	-
Apprenticeships				
Intermediate App. (vs. Level 1 vocational)	£101,000	-	£60,000	-
Advanced App. (vs. Intermediate App.)	£12,000	-	£7,000	-
Higher App. (vs. Advanced App.)	£7,000	-	£3,000	-

Note: All estimates constitute weighted averages across men and women (weighted by the estimated number of student completers in the 2020-21 cohort) and are presented in 2020-21 prices, discounted to reflect net present values and rounded to the nearest £1,000. Gaps (denoted as "-") may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (of the given characteristics).

[1] Note that there are no part-time first degree students in the 2020-21 cohort with a Level 3 qualification as their highest prior attainment; instead, the majority of these students were in possession of a qualification at 'other undergraduate' level as their highest attainment prior to beginning their studies at University College Birmingham.

Source: London Economics' analysis

[40] The analysis is based on an average age at graduation of 27 for students undertaking full-time first degrees at University College Birmingham in the 2020-21 cohort (see Annex A2.2.3).

[41] This is based on an average age at graduation in the 2020-21 cohort of 29 for full-time higher degree (taught) students.

There are even larger corresponding net benefits to the Exchequer associated with these higher education qualifications. The **net Exchequer benefit** for a representative English domiciled **full-time first degree** student (again with a Level 3 qualification as their highest level of prior attainment) stands at **£74,000**. The corresponding net Exchequer benefit for a representative English domiciled student completing a **full-time postgraduate taught degree** (relative to a first degree) was estimated at approximately **£76,000**.

The net public purse benefit associated with a representative full-time first degree English domiciled student stands at £74,000.

Although typically lower than the above-described results for HE qualifications, there are also substantial net learner benefits and net Exchequer benefits associated with **further education qualifications**. The **net learner benefit** achieved by a representative English domiciled student in the 2020-21 cohort completing a **full-time Level 3 vocational qualification**[42] at University College Birmingham (with a Level 2 vocational qualification as their highest prior attainment) was estimated at **£42,000**. At Level 2, the corresponding net learner benefit per English domiciled student completing a **full-time Level 2 vocational qualification** at University College Birmingham (relative to a Level 1 vocational qualification) stands at approximately **£59,000**. The corresponding net Exchequer benefits were estimated at **£26,000 (Level 3)** and **£16,000 (Level 2)**, respectively[43].

Finally, considering **apprenticeships**, the analysis indicates that the net learner benefit associated with a representative English domiciled student in the 2020-21 cohort completing an **Advanced Apprenticeship**[44] at University College Birmingham (with an Intermediate Apprenticeship as their highest prior attainment) stands at **£12,000**, with a corresponding net Exchequer benefit of **£7,000**[45].

[42] Again, all FE students in the 2020-21 University College Birmingham cohort were undertaking their qualifications on a full-time basis, and we assume that all FE students in the cohort were English domiciled prior to starting their learning at University College Birmingham.
[43] Note that the negative estimated net learner benefit associated with Level 4 vocational qualifications is driven by the fact that students undertaking these qualifications typically enrol at a relatively high age (average age of 45 among students in the cohort, see Annex A2.2.3), so that they incur relatively low subsequent lifetime benefits associated with attaining the qualification, while facing relatively high costs of foregone earnings during their studies. Note that there is only a very small number of students (5, in rounded terms; see Section 2.1.2) in the cohort undertaking Level 4 vocational qualifications, so these negative estimates only apply to a very small share of the overall University College Birmingham student cohort (and, therefore, do not significantly impact the aggregate impact of teaching and learning). In addition, the (small) negative estimated net Exchequer benefit associated with Level 1 vocational qualifications is driven by the fact that the overall employment-adjusted earnings for individuals in possession of these qualifications are relatively low, so that they tend to only marginally exceed the corresponding income tax and National Insurance contribution thresholds. This results in relatively low enhanced tax revenues associated with these qualifications, which is essentially offset against the public cost of funding these qualifications (therefore resulting in a net public purse benefit that is close to £0). Again, note that this applies only to a very small share of the total University College Birmingham cohort, as there were only around 30 students who started these qualifications in the 2020-21 academic year.
[44] As for FE students, we assume that all apprentices in the cohort were English domiciled prior to starting their training at University College Birmingham.
[45] The relatively low estimates for *Advanced Apprenticeships* here are driven by the relatively low estimated marginal earnings and employment returns associated with these apprenticeships (see Annex A2.2.2, where a lot of the marginal returns were suppressed due to not being statistically significantly different from zero (which, in turn, could be driven by relatively low sample sizes within the LFS)). In addition, learners in the 2020-21 cohort started their apprenticeships at a relatively high age (31, on average, see Annex A2.2.3), so that they incur relatively low substantial lifetime benefits associated with completing their apprenticeship training.
Note that there are similar factors driving the (even lower) estimated net learner benefits and net Exchequer benefits associated with *Higher Apprenticeships* (estimated relative to individuals in possession of Advanced Apprenticeships as their highest attainment). In contrast, the relatively high estimates for *Intermediate Apprenticeships* (estimated relative to Level 1 vocational qualifications as the counterfactual) reflect the much more substantial marginal earnings and employment returns associated with these types of apprenticeship, and the much younger age (average of 22) at which students in the 2020-21 University College Birmingham cohort start their training.

2.6 Total impact of University College Birmingham's teaching and learning activities

Combining the information on the number of UK domiciled students in the 2020-21 University College Birmingham cohort, expected completion rates, and the net graduate premiums/learner benefits and net public purse benefits associated with the different qualification levels (relative to students' specific prior attainment), the analysis estimates that the **aggregate economic benefit of University College Birmingham's teaching and learning activities** associated with the 2020-21 UK domiciled cohort stands at approximately **£221 million**.

The total economic impact of teaching and learning generated by the 2020-21 cohort of University College Birmingham students stands at £221 million.

This total impact is split roughly equally between students and the Exchequer, with **£122 million** (**55%**) of the economic benefit accrued by students undertaking qualifications at University College Birmingham, and the remaining **£100 million** (**45%**) accrued by the Exchequer[46]. In terms of type of study, **58%** (**£128 million**) of the estimated economic impact is generated by students undertaking higher education qualifications at University College Birmingham, with another **41%** (**£90 million**) generated by students completing further education qualifications, and the remaining **1%** (**£3 million**; reflecting the relatively small number of apprenticeship learners in the cohort compared to HE and FE students).

Table 8 Total impact of University College Birmingham's teaching and learning activities associated with the 2020-21 cohort (£m), by beneficiary, type of study, and mode of study

Beneficiary and study mode	Type of study			
	HE qualifications	FE qualifications	Apprenticeships	Total
Students	**£58m**	**£62m**	**£2m**	**£122m**
Full-time	£55m	£62m	£2m	**£119m**
Part-time	£3m	-	-	**£3m**
Exchequer	**£70m**	**£29m**	**£1m**	**£100m**
Full-time	£68m	£29m	£1m	**£98m**
Part-time	£2m	-	-	**£2m**
Total	**£128m**	**£90m**	**£3m**	**£221m**
Full-time	£123m	£90m	£3m	**£217m**
Part-time	£5m	-	-	**£5m**

Note: All estimates are presented in 2020-21 prices, discounted to reflect net present values, rounded to the nearest £1m, and may not add up precisely to the totals indicated.
Source: London Economics' analysis

It is important to emphasise that these impacts are associated with the 2020-21 cohort of students *only*. Depending on the size and composition of subsequent cohorts of University College Birmingham students, a comparable estimate of the economic impact associated with teaching and learning activities would be associated with each successive cohort of starters (depending on the prevailing labour market conditions at the time).

[46] Numbers may not add up precisely to the totals indicated due to rounding.

A wide-ranging educational offer: From further education to higher education

University College Birmingham offers a unique teaching proposition, supporting students on their educational pathways whether they are studying towards a college course, undergraduate, postgraduate degree or apprenticeship. Hear from students, past and present, about their experience and where their course has taken them, as they progress from further education to higher education and beyond.

John Daniel, **Early Childhood Studies BA (Hons)**

John started at the University on the Level 3 Supporting Teaching and Learning course and progressed on to a degree. His studies have paved the way for a career that enables him to make an impact across society, working with children and young people as a youth residential support worker.

"I work with some very vulnerable young people and I credit University College Birmingham for equipping me with the tools to thrive in what has been a challenging, but extremely fulfilling, role."

Katie Garrett, **Bakery and Patisserie Technology BSc (Hons)**

Katie undertook a Level 2 Bakery and Level 3 Apprenticeship before progressing onto her degree. She also teaches the University's Young Bakers Academy for 14 to 15-year-olds and won the Rising Star award at the 2021 Baking Industry Awards.

"The University helped guide and drive my passion and gave me the skills and knowledge I needed to begin a successful career in the food industry."

Hannah Stevens, **Health and Social Care BSc (Hons)**

Hannah completed her Level 3 diploma at University College Birmingham and some eight years later, she returned to undertake her degree in health and social care. Now having finished her degree, Hannah would love to teach at the University to complete her educational journey.

"I had attended the University for my diploma and fell in love with the environment, which is inviting, friendly and safe. This was where I wanted to pursue my degree."

Ellie Baldwin, **Prosthetics for Film and Television MA** (previously **Specialist Hair and Media Make-up BA (Hons)**)

"...after graduating with first class honours, the MA was the natural next step. I already knew the lecturers well, and I knew their expertise would help kick-start my career."

Ela Hojsak, **Marketing Management for Events, Hospitality and Tourism MA** (previously **International Tourism Management BSc (Hons)**)

"We don't have universities like this one in Croatia and I like the fact my MA is assignment-based, not exam-based, as was my BSc."

3 The impact of University College Birmingham's educational exports

With the United Kingdom being an attractive destination for many overseas students, the higher education sector is a tradeable industry with imports and exports like any other tradeable sector. In this part of the analysis, we focus on the impact of educational exports through the injection of overseas funding into the UK generated by University College Birmingham. In particular, we analyse overseas income in the form of tuition fee spending (net of any Exchequer costs) and non-tuition fee (off-campus) expenditures by international (EU and non-EU domiciled) higher education students in the 2020-21 cohort of University College Birmingham students, over the entire course of their studies[47]. The analysis estimates the **direct, indirect, and induced economic impacts** associated with this export income, defined as follows:

- **Direct effect:** This is captured by the level of (net) fee income (accrued by University College Birmingham itself) and non-fee income (accrued by other organisations providing goods and services to international students) associated with non-UK students in the 2020-21 cohort.
- **Indirect effect ('supply chain impacts'):** University College Birmingham and local businesses providing other goods and services to international students spend their income on purchases of goods and services from their suppliers, which in turn use this revenue to buy inputs (including labour) to meet these demands. This results in a chain reaction of subsequent rounds of spending across industries, often referred to as a 'ripple effect'.
- **Induced effect ('wage spending impacts')**: The employees of University College Birmingham (supported by its tuition fee income) and of companies providing goods and services to University College Birmingham's international students use their wages to buy consumer goods and services. This in turn generates wage income for employees within the industries producing these goods and services, again leading to subsequent rounds of spending, i.e. a 'ripple effect' throughout the economy as a whole[48].

The total of the direct, indirect, and induced effects constitutes the *gross* economic impact of University College Birmingham's contribution to education exports. An analysis of the *net* economic impact ideally needs to account for two additional factors potentially reducing the size of any of the above effects:

- **Leakage** into other geographical areas, by taking account of how much of the additional economic activity actually occurs in the area of consideration; and
- **Displacement** of economic activity within the region of analysis, i.e. taking account of the possibility that the economic activity generated might result in the reduction of activity elsewhere within the region[49].

[47] Note that other types of export income accrued directly by University College Birmingham are taken account of in our analysis of the impact of the expenditures of University College Birmingham (Section 4), and are thus excluded from the analysis of exports to avoid double-counting.

[48] Our analysis excludes any similar direct, indirect, and induced effects associated with the non-fee expenditures of *UK* domiciled students. In this respect, we (conservatively) assume that these expenditures are *not* additional to the UK economy (i.e. that they would likely have occurred even if these students had not enrolled in programmes at University College Birmingham). The economic impact associated with UK students' tuition fee expenditures is instead (implicitly) included in the estimated direct, indirect, and induced impacts associated with University College Birmingham's own expenditures (see Section 4).

[49] It is important to note that, while the analysis takes account of *leakage* (e.g. adjusting for the extent to which any additional income for supplying industries might be spent on imports of goods and services from outside the UK), the estimated impacts here are *not* adjusted for *displacement* or additionality (e.g. the extent to which the tuition fee and non-tuition fee income associated with University

The direct, indirect, and induced impacts are measured in terms of monetary economic output[50], gross value added (GVA)[51], and full-time equivalent (FTE) employment supported. In addition to measuring these impacts on the UK economy as a whole, the analysis is broken down by geographic region and sector.

The direct, indirect, and induced impacts were estimated using **economic multipliers** derived from Input-Output tables, which measure the total production output of each industry in the UK economy, and the inter-industry (and intra-industry) flows of goods and services consumed and produced by each sector[52]. In other words, these tables capture the degree to which different sectors within the UK economy are connected, i.e. the extent to which changes in the demand for the output of any one sector impact on all other sectors of the economy. To be able to achieve a breakdown of the analysis by region, we developed a **multi-regional Input-Output model**, combining UK-level Input-Output tables (for 2016[53]) with a range of regional-level data[54] to achieve a granular breakdown by sector[55] *and* region[56].

In addition to the impacts associated with University College Birmingham's educational exports described in the following sections, a similar methodology is applied to estimate the direct, indirect, and induced economic effects associated with the operational and capital expenditures of University College Birmingham (see Section 4).

3.1 The 2020-21 cohort of international University College Birmingham students

Figure 12, Figure 13, and Figure 14 present information on the number of non-UK domiciled students included in the 2020-21 cohort of University College Birmingham students (by domicile, mode of study, and level of study, respectively).

In terms of domicile (Figure 12), of the total of **730** international students starting higher education qualifications at University College Birmingham in 2020-21, **450** (**62%**) were domiciled within the European Union, while **280** (**38%**) were from non-EU countries. In terms of study mode (Figure 13),

College Birmingham's international students might otherwise have been used for other purposes). Hence, our analysis effectively estimates the direct, indirect, and induced impacts associated with University College Birmingham's educational exports in *gross* terms.

[50] Here, economic output is equivalent to income/turnover (e.g. the direct economic output associated with international students' tuition fees is captured by the international fee income received by University College Birmingham).

[51] Gross value added is used in National Accounting to measure the economic contribution of different industries or sectors, and is defined as economic output minus intermediate consumption (i.e. the cost of goods and services used in the production process).

[52] Specifically, the analysis makes use of *Type II* multipliers, defined as [Direct + indirect + induced impact]/[Direct impact].

[53] See Office for National Statistics (2020a).

[54] The fundamental idea of the multi-regional Input-Output analysis is that region *i*'s demand for region *j*'s output is related to the friction involved in shipments from one region to another (which we proxy by the distance between the two regions), and that cross-regional trade can be explained by the relative gross value added of the sector in all regions. The multi-regional Input-Output model was derived by combining UK-level Input-Output tables with data on geographical distances between regions; GVA and compensation of employees by sector and region (Office for National Statistics, 2019); employment by sector and region (Office for National Statistics, 2020b); gross disposable household income by region (Office for National Statistics, 2020c); population by region (Office for National Statistics, 2020d); and UK imports into each region and exports by each region, by commodity (Office for National Statistics, 2018).

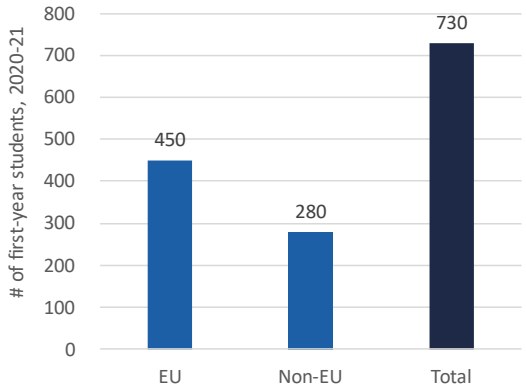
[55] In terms of sector breakdown, the original UK Input-Output tables are broken down into 64 (relatively granular) sectors. However, the (wide range of) regional-level data required to generate the multi-regional Input-Output model is not available for such a granular sector breakdown. Instead, the multi-regional Input-Output model is broken down into 10 more high-level sector groups (see Table 12 in A2.1 for more information).

[56] While Input-Output analyses are a useful tool to assess the total economic impacts generated by a wide range of activities, it is important to note several key limitations associated with this type of analysis. Input-Output analyses assume that inputs are complements, and that there are constant returns to scale in the production function (i.e. that there are no economies of scale). The interpretation of these assumptions is that the prevailing breakdown of inputs from all sectors (employees, and imports) in 2016 is a good approximation of the breakdown that would prevail if total demand (and therefore output) were marginally different. In addition, Input-Output analyses do not account for any price effects resulting from a change in demand for a given industry/output.

the vast majority of international students in the cohort (**695, 95%**) were undertaking their qualifications on a full-time basis, with the remaining **35** (**5%**) studying on a part-time basis.

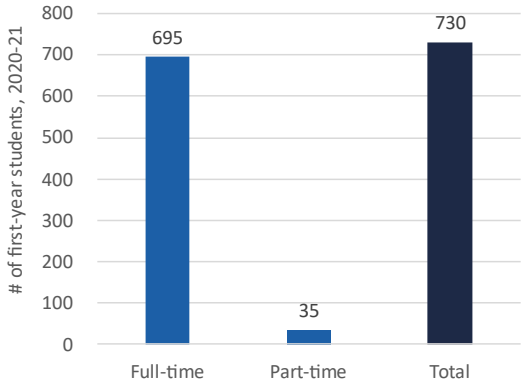
In terms of study level (Figure 14), a large share of non-UK domiciled HE students in the cohort were undertaking qualifications at undergraduate level, with **395** (**54%**) enrolled in first degrees, and **120** students (**16%**) undertaking other undergraduate learning. At postgraduate level, **205** (**28%**) students enrolled in postgraduate taught degrees, with the remaining **10** (**2%**) students undertaking other postgraduate learning[57].

Figure 12 Non-UK domiciled students in the 2020-21 cohort of University College Birmingham, by domicile



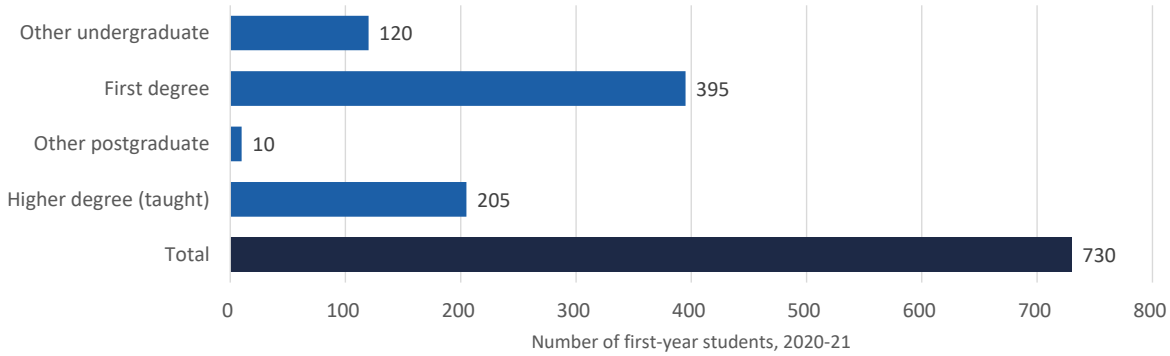
Note: All numbers are rounded to the nearest 5, and the total values may not add up precisely due to this rounding.
Source: London Economics' analysis based on University College Birmingham's HESA data

Figure 13 Non-UK domiciled students in the 2020-21 cohort of University College Birmingham students, by study mode



Note: All numbers are rounded to the nearest 5, and the total values may not add up precisely due to this rounding.
Source: London Economics' analysis based on University College Birmingham's HESA data

Figure 14 Non-UK domiciled students in the 2020-21 cohort of University College Birmingham students, by level of study



Note: All numbers are rounded to the nearest 5, and the total values may not add up precisely due to this rounding. 'Other undergraduate' learning includes mostly Foundation Degrees, as well as a small number of students undertaking other undergraduate qualifications or undergraduate-level credits. 'Other postgraduate' includes postgraduate diplomas (at Level M). Further note that there are no postgraduate research degrees offered by University College Birmingham.
Source: London Economics' analysis based on University College Birmingham's HESA data

[57] For more detailed information on University College Birmingham's 2020-21 cohort of non-UK domiciled students, please refer to Annex A2.3.1.

3.2 Direct impact

3.2.1 Net tuition fee income

To assess the level of ***gross* tuition fee income** associated with international students in the 2020-21 cohort, we made use of data on average tuition fees charged by University College Birmingham in 2020-21 (by study level, mode, and domicile[58]). Assuming the same average study durations as in the analysis of the impact of University College Birmingham's teaching and learning activities (see Section 2), we calculated the resulting tuition fee income per international student in the cohort from the start of a student's learning aim until completion. Expressing the total income until completion in 2020-21 prices and using the HM Treasury Green Book real discount rate of 3.5% (see HM Treasury, 2022), we arrived at an estimate of the gross tuition fee income per student (in present value terms over the total study duration).

To calculate the ***net* tuition fee income** per student, we then deducted the costs to the UK Exchequer associated with funding higher education for EU domiciled students studying in England[59]. These Exchequer costs include the subsidies associated with the tuition fee support provided by the Student Loans Company, in terms of:

- The RAB charge on **tuition fee loans provided to eligible EU domiciled full-time and part-time undergraduate students**;
- The RAB charge on **postgraduate loans provided to eligible EU full-time and part-time postgraduate students**; and
- The **recurrent teaching grant funding** paid to University College Birmingham in relation to the provision of teaching to EU domiciled students (by the Office for Students)[60].

In addition to these public purse costs, we also deducted any **fee waivers and bursaries** paid to international students by University College Birmingham itself[61]. Again, all of these costs were calculated over students' total study duration and estimated in present value terms[62].

Combining the estimates per student with information on the number of non-UK students in the 2020-21 cohort, and using the same assumptions on completion rates as for UK domiciled students (as part of the analysis of the impact of teaching and learning (see Section 2.2)), we arrived at estimates of the total net tuition fee income associated with EU and non-EU students in the 2020-21 cohort of University College Birmingham students. As presented in Figure 15, the **total net tuition fee income** generated by international students in the cohort was estimated at **£14 million**, of which approximately **£9 million** was generated by **EU students**, and **£4 million** was generated by **non-EU students**.

[58] As in the analysis of University College Birmingham's teaching and learning activities (see Section 2), to derive the average **tuition fee** per student per year, we made use of information published by the Higher Education Statistics Agency (2022a) on the total tuition fee income received by the University in 2020-21 (separately by study mode, domicile, and study level (with data provided for all undergraduate students combined, and for all postgraduate (taught) students combined)). We then divided this total fee income by the underlying number of total (first-year and continuing) HE students studying at university College Birmingham in 2020-21. To ensure that the estimated fees for part-time students accurately reflect the average study intensity among part-time students in the 2020-21 cohort, the fees per part-time student were calculated by multiplying the respective full-time rates by the ratio of the average study intensity among part-time students relative to full-time students in the cohort.

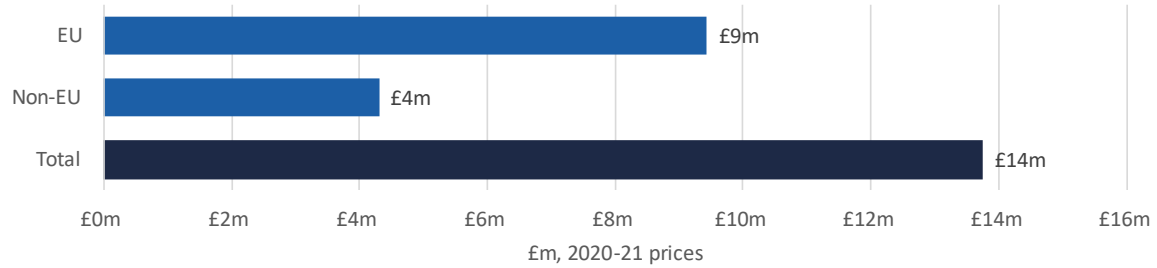
[59] Note that there is no such Exchequer funding associated with non-EU students.

[60] For more information on our assumptions in relation to public student support and recurrent teaching grants, please refer to Section 2.4.2.

[61] Again, see Section 2.4.2 for more information on our assumptions in relation to fee waivers and bursaries.

[62] For information on the estimated levels of net fee income per student, please refer to Annex A2.3.2.

Figure 15 Aggregate net tuition fee income associated with international students in the 2020-21 cohort, by domicile (£m)



Note: All estimates are presented in 2020-21 prices, discounted to reflect net present values, and rounded to the nearest £1m. Values may not add up precisely to the totals due to rounding.
Source: London Economics' analysis

3.2.2 Non-fee income

In addition to tuition fees, the UK economy benefits from export income from overseas students' **non-tuition fee (i.e. living cost) expenditures** incurred during their studies at University College Birmingham. These costs include:

- **Accommodation costs** (e.g. rent costs, council tax, household bills etc.);
- **Subsistence costs** (e.g. food, entertainment, personal items, non-course travel etc.);
- **Direct course costs** (e.g. course-related books, subscriptions, computers etc.);
- **Facilitation costs** (e.g. course-related travel costs); and
- **Spending on children** (including childcare that is not related to students' course participation).

The level of non-tuition fee expenditure by overseas students is often found to be greater than their tuition fee expenditure[63], making these living cost expenditures a significant component of the UK's export income from international students coming to study at UK higher education institutions.

To analyse the level of non-tuition fee expenditure associated with the 2020-21 cohort of international students studying at University College Birmingham, we used estimates from the **2014-15 Student Income and Expenditure Survey** (SIES)[64]. The survey provides estimates of the average expenditures of English domiciled undergraduate students (studying in England or Wales) on living costs, housing costs, participation costs (including tuition fees) and spending on children, separately for full-time and part-time students. For the purpose of this analysis, we made the following adjustments to the 2014-15 SIES estimates:

- We excluded estimates of **tuition fee expenditure** (to avoid double-counting with the analysis presented in Section 3.2.1).
- We deducted any **on-campus expenditure** that students might incur (to avoid double-counting with the analysis of the impacts of the expenditure of University College Birmingham itself (see Section 4))[65].

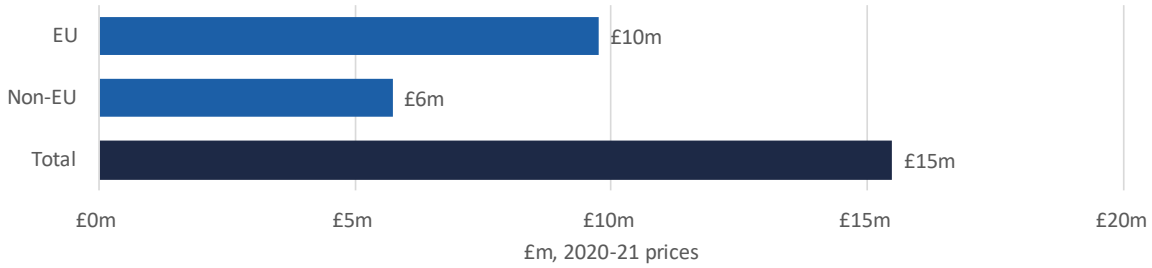
[63] See Department for Business, Innovation and Skills (2011b).
[64] See Institute for Employment Studies & National Centre for Social Research (2018). At the time of writing, estimates for a more recent academic year were not available.
[65] Specifically, following the approach undertaken by Oxford Economics (2017) in analysing the collective economic impact of all UK higher education institutions in 2014-15, we assume that **10%** of students' non-tuition fee expenditures are spent on campus (i.e. are accrued as income by University College Birmingham itself).

- Since the SIES results do not provide expenditure estimates for non-UK domiciled students, our analysis implicitly assumes that non-tuition fee expenditure levels do not vary significantly between UK and international students. We do however adjust the SIES estimates for the longer **average stay durations** in the UK of non-EU students compared to EU students[66].
- We further adjusted the estimates for any **foregone subsistence expenditures in the UK due to international students returning to their home countries during the Covid-19 pandemic** (and due to the suspension of in-person teaching across UK universities). Specifically, we assume that 50% of full-time students in the 2020-21 cohort returned home during the second and third terms of the 2020-21 academic year[67, 68]. We assume that, during this time, these students did not incur any subsistence expenditure in the UK (e.g. on food, entertainment, etc.), but still incurred all other types of non-fee spending in the UK listed above (e.g. we assume that these students were still liable to pay any accommodation costs in the UK). We assume that all academic years from 2021-22 onwards were unaffected by the Covid-19 pandemic.
- Finally, we **inflated** the estimates to 2020-21 prices[69].

Similar to tuition fees, we then calculated the non-tuition fee expenditure over the entire duration[70] of students' higher education courses (and discounted to reflect present values). The resulting estimates provide the total average (off-campus) non-fee expenditure per student in 2020-21 prices, by level of study, mode, and domicile[71].

Again combining the estimated non-tuition fee income per student with the number of international students in the 2020-21 cohort expected to complete qualifications (or credits/modules) at University College Birmingham, the total (off-campus) non-tuition fee expenditure associated with international students in the 2020-21 cohort was estimated at **£15 million** (Figure 16). Of this total, **£10 million** was associated with **EU students**, whereas **£6 million** was generated by **non-EU students** in the cohort.

Figure 16 Aggregate non-fee income associated with international students in the 2020-21 cohort, by domicile (£m)



Note: All estimates are presented in 2020-21 prices, discounted to reflect net present values, and rounded to the nearest £1m. Values may not add up precisely to the totals due to rounding.
Source: London Economics' analysis

[66] These adjustments are based on the approach outlined by the Department for Business, Innovation and Skills (2011b) in estimating the value of educational exports to the UK economy. For more information, please refer to Annex A2.3.3.
[67] In other words, we assume that due to the Covid-19 pandemic, the subsistence expenditures of full-time international students in the 2020-21 cohort were 33% lower in 2020-21 (i.e. 50% x 67%) than would otherwise have been the case.
[68] We assume that international part-time students in the cohort did *not* leave the UK due to the pandemic, given that part-time students typically combine their studies with work in the labour market.
[69] Inflation estimates are based on Consumer Price Index inflation estimates provided by the Office for National Statistics (2021).
[70] We assume that non-fee expenditures per student grow at an annual real rate of 1.6%, based on long-term forecasts of average real earnings growth published by the Office for Budget Responsibility (2022).
[71] For information on the estimated levels of non-tuition fee income per student, please refer to Annex A2.3.4.

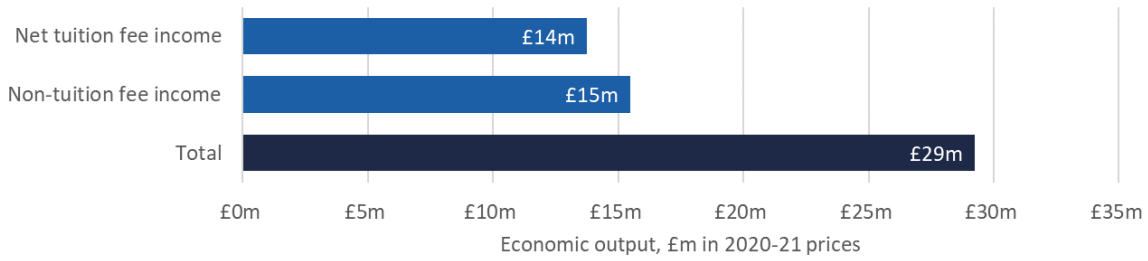
3.2.3 Total direct impact

Combining the above estimates of (net) fee and non-fee income, the total direct economic impact of the expenditures of international students in the 2020-21 University College Birmingham cohort (in economic output terms) was estimated at **£29 million** (Figure 17). Slightly more than half of this total (**£15 million**) was generated from international students' non-tuition fee spending, while just under a half (**£14 million**) was generated from international students' tuition fees accrued by University College Birmingham (net of any public costs of provision, or fee waivers/bursaries provided by University College Birmingham). In terms of student domicile, two thirds of this impact (**£19 million**, **66%**) was generated by EU domiciled students, while the remaining **£10 million** (**34%**) was associated with non-EU students.

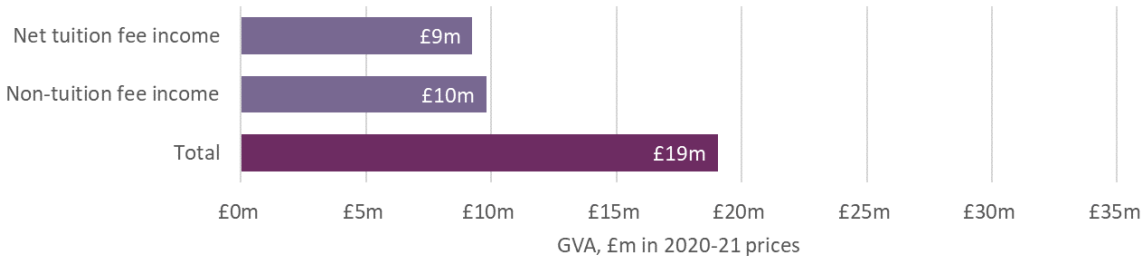
In addition to economic output (i.e. export income), it was possible to convert the above estimates into gross value added and the number of full-time equivalent jobs supported[72]. We thus estimate that the export income generated by international students in the 2020-21 University College Birmingham cohort directly generates **£19 million** in GVA (**£9 million** from international (net) fee income and **£10 million** from non-fee income), and supports **340 full-time equivalent jobs** (**215** from (net) tuition fee income and **125** from non-tuition fee income[73]).

Figure 17 Total direct impact associated with non-UK students in the 2020-21 University College Birmingham cohort, by type of impact

Output, £m



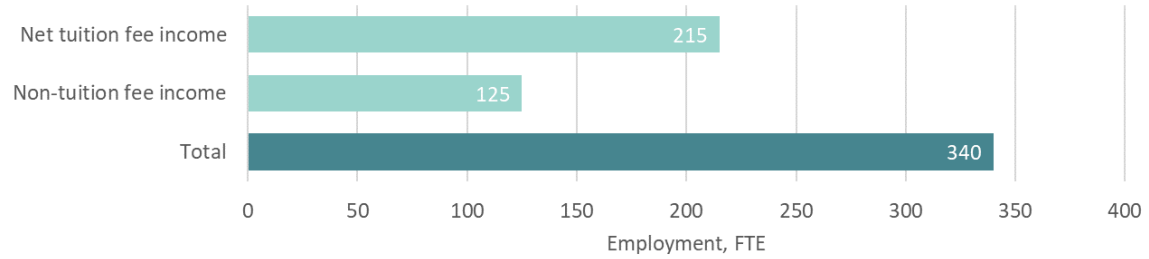
GVA, £m



[72] To estimate the direct GVA and employment associated with the (net) tuition fee income generated by University College Birmingham's international students, we multiplied this income by the average ratio of GVA to output and FTE employees to output within the West Midlands' government, health, and education sector as a whole (again based on the above-described multi-regional Input-Output model). To estimate the direct GVA and employment associated with the non-tuition fee income generated by University College Birmingham's international students, we instead multiplied this income by the average ratio of GVA to output and FTE employees to output associated with the expenditure of households located in the West Midlands (again based on the multi-regional Input-Output model). In other words, we assume that the non-tuition fee expenditures of University College Birmingham's international students support the same levels of GVA and employment (in relative/proportionate terms) as the expenditure of households located in the West Midlands more generally.

[73] The difference in direct employment supported by international students' tuition fee vs. non-tuition fee income is driven by the fact that the underlying ratio of FTE employees to output within the West Midlands' government, health, and education sector is considerably larger than the corresponding ratio for sectors producing consumer goods and services purchased by households located in the West Midlands (e.g. including the real estate or production sectors).

FTE employment



Note: All monetary estimates are presented in 2020-21 prices, discounted to reflect net present values, and rounded to the nearest £1m. Values may not add up precisely to the totals due to rounding. The employment figures are rounded to the nearest 5.
Source: London Economics' analysis

3.3 Total economic impact associated with University College Birmingham's educational exports

To estimate the total (direct, indirect, and induced) economic impact associated with the export income generated by international students studying at University College Birmingham, we used economic multipliers derived from the above-described multi-regional Input-Output model, estimating the extent to which the direct export income generates additional activity throughout the UK economy. Specifically, we applied two types of multipliers to the above-described tuition fee and non-tuition fee income associated with international students in the 2020-21 cohort, including:

- **Multipliers relating to international tuition fee income (accrued by University College Birmingham itself)**: The multipliers used to estimate the impact of University College Birmingham's international tuition fee income were calculated based on the inter- and intra-industry flows of goods and services for the West Midlands' government, health, and education sector as a whole[74].
- **Multipliers relating to income from international students' (off-campus) non-tuition fee expenditures**: These were calculated based on the final consumption expenditure patterns of households located in the West Midlands[75], and subsequently applied to the estimated off-campus non-tuition fee expenditures of overseas students in the 2020-21 cohort of University College Birmingham students.

Again, these multipliers are expressed in terms of **economic output**, **gross value added**, and (full-time equivalent) **employment**, and are calculated as **total multipliers**, capturing the aggregate impact on all industries in the UK economy arising from an initial injection relative to that initial injection.

Table 9 presents the economic multipliers applied to the income generated by international students at University College Birmingham (in terms of the impact on the West Midlands and the UK economy as a whole)[76]. In terms of economic output, the analysis assumes that every £1 million

[74] This approach is based on the fact that the tuition fee income from international students is accrued by University College Birmingham itself. In other words, we assume that the expenditure patterns of University College Birmingham are the same as for other institutions operating in the West Midlands' government, health, and education sector. Specifically, we apply these multipliers to the *gross* tuition fee income generated by international students in the 2020-21 University College Birmingham cohort, and then deduct the Exchequer/University College Birmingham's cost of provision (i.e. public teaching grants, public student support, and University College Birmingham fee waivers and bursaries) to arrive at the *net* direct, indirect and induced impact associated with this income.
[75] In other words, for the purpose of applying relevant economic multipliers, we assume that international students studying at University College Birmingham have similar expenditure patterns as households in the West Midlands more generally. To estimate these multipliers, we inserted a separate vector into the multi-regional Input-Output model, capturing the estimated final demand (again by industry and region) of households located in each region.
[76] While the table presents the multipliers for the impacts on the West Midlands and the UK as a whole, a full breakdown of the total impacts across all regions (as well as by sector) is provided in Figure 18.

of **tuition fee expenditure** incurred by international students generates an *additional* **£1.33 million** of impact throughout the UK economy, of which **£0.51 million** is generated in the West Midlands. In addition, we assume that every £1 million of **non-fee expenditure** incurred by international students generates an *additional* **£1.57 million** of impact throughout the UK, of which **£0.63 million** is located in the West Midlands.

Table 9 Economic multipliers associated with the income from international students in the 2020-21 cohort of University College Birmingham students

Location of impact and type of income	Output	GVA	FTE employment
Tuition fee income			
West Midlands	1.51	1.44	1.30
Total UK	2.33	2.12	1.73
Non-fee income			
West Midlands	1.63	1.61	1.66
Total UK	2.57	2.45	2.58

Note: All multipliers constitute Type II multipliers, defined as [Direct + indirect + induced impact]/[Direct impact].
Source: London Economics' analysis

Applying these multipliers to the above direct economic impacts[77], we estimate that the total economic impact on the UK generated by the (net) tuition fee income and non-tuition fee income associated with international students in the 2020-21 University College Birmingham cohort amounts to **£75 million** of **economic output** (see top panel of Figure 18):

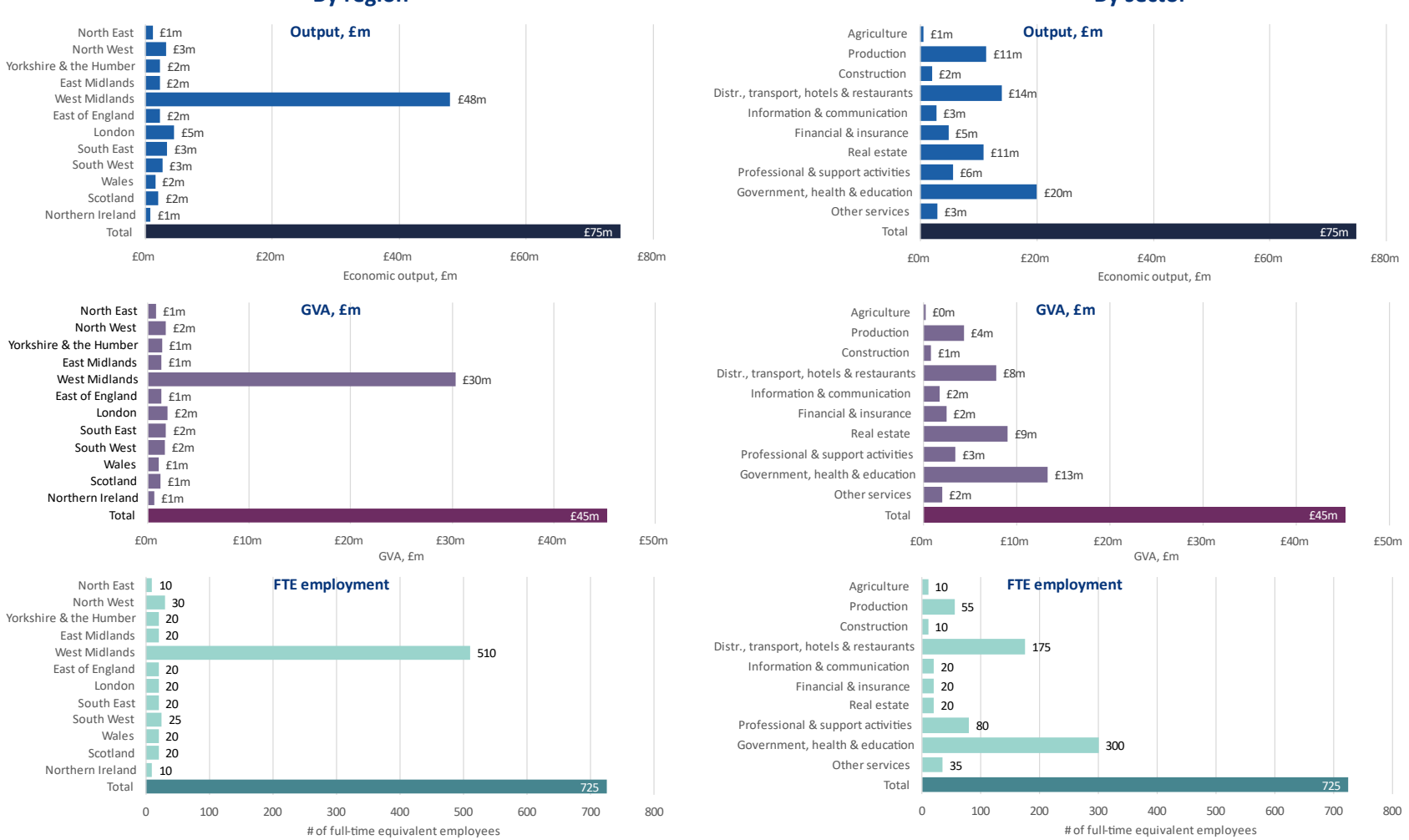
The impact of the export income generated by the 2020-21 University College Birmingham cohort stood at £75 million.

- In terms of the breakdown by type of income from international sources, **£35 million** of this impact was associated with international students' (net) **tuition fees**, and **£40 million** was associated with these students' **non-tuition fee expenditures** over the duration of their studies at University College Birmingham.
- In terms of the breakdown by region, the majority of this impact (**£48 million**, **64%**) was generated in the **West Midlands**, with the remaining **£27 million** (**36%**) occurring in **other regions** across the UK.
- In terms of sector, the tuition fee and non-tuition fee income generated from University College Birmingham's international students generated particularly large impacts within the **government, health, and education sector** (**£20 million** (**27%**), given that the cohort's tuition fee income is accrued as income by University College Birmingham itself. In addition, there are relatively large impacts felt within the **distribution, transport, hotel, and restaurant sector** (**£14 million**, **19%**), the **real estate industry** (**£11 million**, **15%**), and the **production sector** (**£11 million**, **15%**)[78].

The impact in terms of gross value added was estimated at **£45 million** across the UK economy as a whole (with **£30 million** generated within the West Midlands), while the corresponding estimates in terms of employment stood at **725 full-time equivalent jobs** across the UK as a whole, with **510 jobs** supported across the West Midlands.

[77] Again, in terms of tuition fee income, note that we apply the relevant multipliers to the *gross* tuition fee income generated by international students in the 2020-21 University College Birmingham cohort, and then deduct the Exchequer/University College Birmingham cost of provision (i.e. public teaching grants, public student support, and University College Birmingham fee waivers and bursaries) to arrive at the *net* direct, indirect and induced impact associated with this income.
[78] Again, for more detail on what industries are included in this high-level sector classification, please refer to Table 12 in Annex A2.1.

Figure 18 Total economic impact associated with international students in the 2020-21 University College Birmingham cohort, by region and sector



Note: Monetary estimates are presented in 2020-21 prices, discounted to reflect net present values, rounded to the nearest £1 million, and may not add up precisely to the totals indicated. Employment estimates are rounded to the nearest 5, and again may not add up precisely to the totals indicated. ***Source: London Economics' analysis***

A diverse international community with global reach

With a global student body of more than 1,400 students from over 60 countries, University College Birmingham's international students join a strong community, located in the heart of the UK's most diverse city, dubbed 'the superdiversity city'. Students are welcomed and supported by the University's dedicated International Centre whose staff have a wealth of experience providing assistance with orientation and living in the UK, as well as general academic and welfare support. The University also hosts an International Society, to meet others, learn about new cultures and share experiences.

Afroz Ahmed, **Hospitality and Business Management BA (Hons)**

After completing a culinary course at college in his home city of Mumbai, Afroz decided University College Birmingham was the right place for him to continue his studies and expand his skillset overseas. He credits the University's International team for facilitating a smooth transition between India to the UK (helping him with arranging his finances and accommodation) and the Academic Skills Centre for help with English skills for his assignments. Afroz now hopes to continue on track to become a successful businessman and hopefully fulfil his dream to run his own restaurant.

"The University has a great reputation inside and outside the country and I would recommend it."

Hristo Yanev, **Tourism Business Administration MA**[79]

Hailing from Bulgaria, Hristo was keen to study abroad. During his time at University College Birmingham, he made the most of opportunities, undertaking a placement in Northern Cyprus to investigate tourism during the 1974 crisis, and using his experience as an ex-professional ballroom dancer to set up the University's Dance Society. Since his degree, Hristo was voted one of the most inspiring and hard-working young entrepreneurs in Bulgaria. He owns and runs a successful online tour operator featuring over 500 experiences, alongside other businesses which create bespoke holidays in the region. Hristo now passes on the knowledge and skills he's acquired throughout his career as a guest lecturer in tourism and marketing for universities worldwide.

Ryan Pinto, **Culinary Arts Management MA**

To develop his skills further, Ryan decided he should explore opportunities beyond India. After meeting with the University's international agent, he was convinced that the Culinary Arts Management course and the city of Birmingham were for him.

"University College Birmingham gave me a clear vision of what I wanted my future to be, which is to stand out, break the mould, in the India market"

Since graduating with a first-class degree, Ryan has moved to San Francisco and worked in three top class restaurants, ONE65, Acquerello and Angler SF. In future, he would like to return to India to continue his success in the culinary industry.

[79] Now International Tourism Management

4 The impact of University College Birmingham's expenditures

Much of the existing literature on the economic impact of higher education institutions focuses (almost exclusively) on the **direct, indirect, and induced impact** of universities. Analyses of these impacts consider universities as economic units creating output within their local economies by purchasing products and services from their suppliers and hiring employees. Similar to the impact of University College Birmingham's educational exports (see Section 3), the direct, indirect, and induced economic impacts of a university's expenditures are defined as follows:

- **Direct effect:** This considers the economic output generated by University College Birmingham itself, by purchasing goods and services (including labour) from the economy in which it operates.
- **Indirect effect:** The University's purchases generate income for the supplying industries, which they in turn spend on their own purchases from suppliers to meet the University's demands. This again results in a chain reaction of subsequent rounds of spending across industries, i.e. a 'ripple effect'.
- **Induced effect**: The employees of University College Birmingham and of businesses operating in University College Birmingham's supply chain use their wages to buy consumer goods and services within the economy. This in turn generates wage income for employees within the industries producing these goods and services, who then spend their own income on goods and services – leading to a further 'ripple effect' throughout the economy as a whole.

In this section, we outline our estimates of the direct, indirect, and induced impacts associated with the operational and capital expenditures of University College Birmingham. In line with the other strands of impact, the analysis focuses on the 2020-21 academic year. As with the impact of University College Birmingham's educational exports, these impacts can be measured in terms of economic output, gross value added, and (full-time equivalent) employment.

4.1 Direct impact of University College Birmingham's expenditures

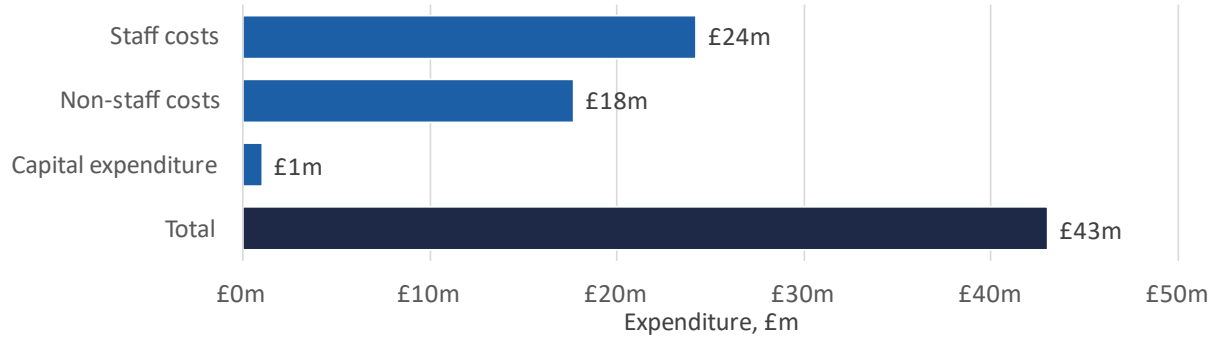
To measure the direct economic impact of the purchases of goods, services, and labour by University College Birmingham, we used information on University College Birmingham's operational expenditures (including staff and non-staff spending), capital expenditures, as well as the number of staff employed (in terms of full-time equivalent employees), for the 2020-21 academic year[80].

Based on this, in terms of monetary economic **output** (measured in terms of expenditure), **the direct economic impact** associated with University College Birmingham's expenditures stood at approximately **£43 million** in 2020-21. This includes **£24 million** of operating expenditure on staff related costs, **£18 million** of spending on other (non-staff) operating expenses[81], as well as **£1 million** of capital expenditure incurred in that academic year (see Figure 19).

[80] Based on staff and financial data published by the Higher Education Statistics Agency (see HESA (2022a) and HESA (2022b)).

[81] The total current operational expenditure (excluding capital expenditure) of University College Birmingham in 2020-21 stood at **£53 million**. From this, for the purpose of the analysis, we excluded **£4 million** in depreciation costs (from non-staff expenditure) and **£7 million** in movements in pension provisions (from staff expenditure), as it is assumed that these are not relevant from a procurement perspective (i.e. these costs are not accounted for as income by other organisations). This results in operational expenditure of **£42 million** in 2020-21.

Figure 19 Direct economic impact (in terms of output) of University College Birmingham's expenditure in 2020-21, by type of expenditure



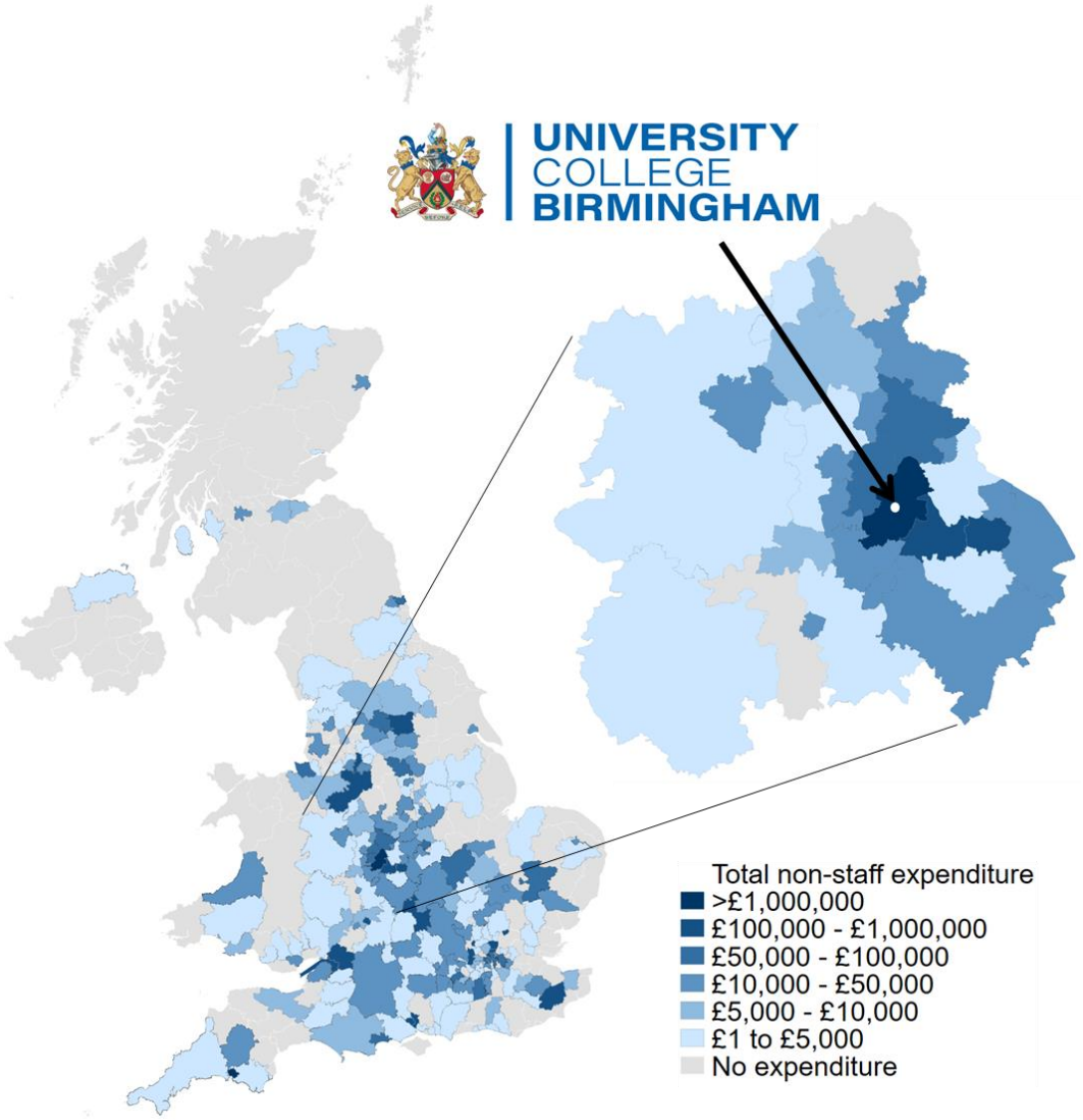
Note: We exclude a total of **£4 million** of non-staff costs associated with depreciation, and **£7 million** of staff costs associated with movements in pension provisions, as it is assumed that these are not relevant from a procurement perspective (i.e. these costs are not accounted for as income by other organisations). All estimates are presented in 2020-21 prices, and rounded to the nearest £1m.
Source: London Economics' analysis based on HESA (2022a) and data provided by University College Birmingham

In addition to these total expenditures, we investigated the **geographical breakdown** of University College Birmingham's procurement expenditures, number of staff, and staff expenditures, to demonstrate the breadth of University College Birmingham's impact across the West Midlands and the rest of the UK.

Figure 20 presents the distribution of University College Birmingham's procurement expenditures (based on invoice data for 2020-21 by postcode area). The map illustrates a clear concentration of procurement expenditure in England (**99% of expenditure**), particularly in Birmingham itself and the **West Midlands**, which accounts for approximately **one third of University College Birmingham's procurement expenditure**. Although this region accounts for the largest share of University College Birmingham's procurement expenditure, University College Birmingham also spends significant amounts on goods and services from suppliers in other regions, including the **North West**, **Yorkshire and the Humber**, **South East**, the **South West**, and **London**. In addition (though not depicted here), the University also spends a significant proportion of its procurement expenditures abroad, with expenditure attributed to Asia (including India, Malaysia, and Hong Kong), Europe (including the Czech Republic, The Netherlands and France), as well as countries further afield (such as Canada, Australia and the USA).

In addition to the analysis of University College Birmingham's procurement expenditure, Figure 21 and Figure 22 illustrate the distribution of University College Birmingham's staff, in terms of the number of staff and associated staff expenditures (respectively), based on the postcode area of employees' home address. As would be expected, the maps again show a large concentration of staff and staff expenditure around University College Birmingham (approximately **43%** of staff are based in Birmingham, and a further **50%** of staff are based across other local authorities in the West Midlands).

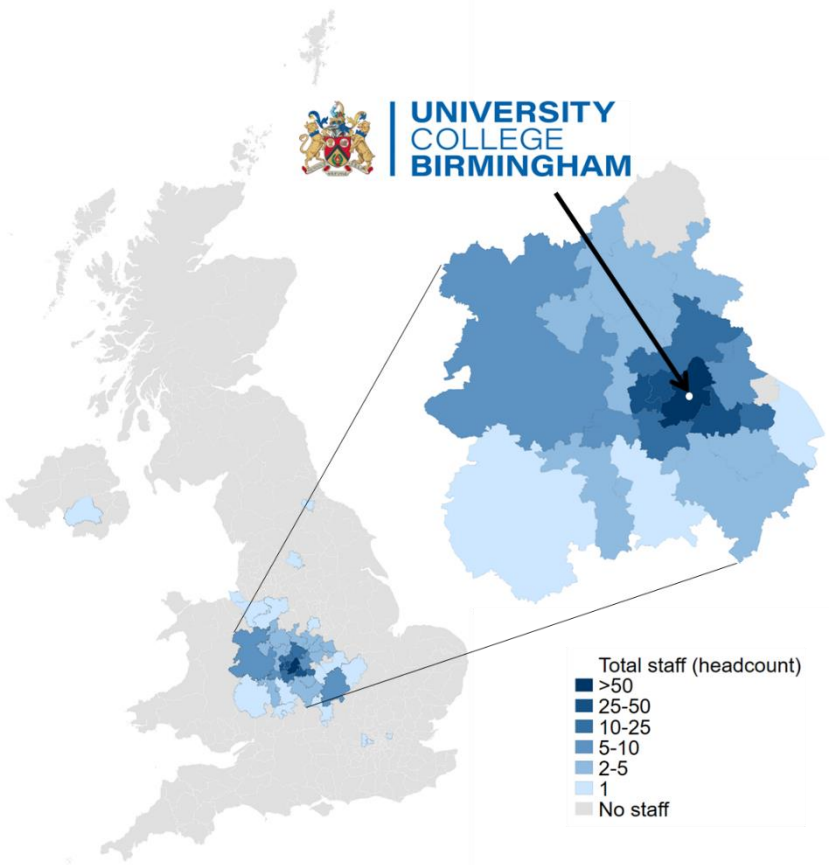
Figure 20 Distribution of University College Birmingham's procurement expenditure in 2020-21, by outward postcode area (of invoice address)



Note: We received data on the outward postcodes associated with £13.8 million of procurement expenditure by University College Birmingham in 2020-21 (which constitutes a subset of University College Birmingham's total non-staff spend where the outward postcode data for procurement expenditure is incomplete). Of this total, we excluded expenditure records with missing postcodes (1 record, £0.3m of expenditure), non-UK postcodes (32 records, £1 million), invalid postcodes (34 records, £0.7 million) and records with zero or negative expenditure (9 records). We also excluded approximately £400 of expenditure attributed to the Isle of Man as this area is not able to be mapped. As a result of these exclusions, the figure is based on a total of £11.9 million of procurement expenditure. We used the February 2022 ONS Postcode Directory to determine the Local Authority for each postcode included in the dataset. The data was then matched with the ONS digital vector boundaries for Local Authorities as of May 2021 to generate the map.

Source: London Economics' analysis based on University College Birmingham data and Office for National Statistics data. Contains National Statistics data, OS data, Royal Mail, Gridlink, LPS (Northern Ireland), ONS, NISRA data, NRS data and Ordnance Survey data © Crown copyright and database right 2022.

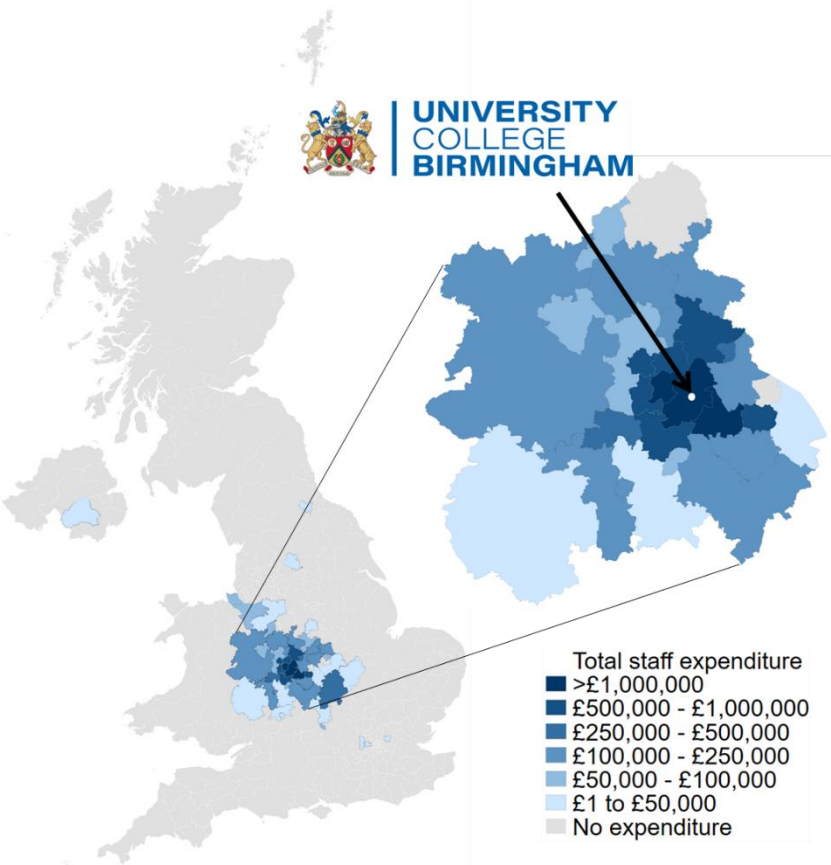
Figure 21 Distribution of University College Birmingham's staff, by postcode area (of home address)



Note: We received data on home address postcode districts for a total of 542 staff (in headcount) from University College Birmingham. Of this total, we excluded 10 staff records with invalid postcodes and 1 staff member based in Croatia. The figure is thus based on the home addresses of 531 staff.

Source: London Economics' analysis based on University College Birmingham data and Office for National Statistics data. Contains National Statistics data, OS data, Royal Mail, Gridlink, LPS (Northern Ireland), ONS, NISRA data, NRS data and Ordnance Survey data © Crown copyright and database right 2022.

Figure 22 Distribution of University College Birmingham's staff expenditure, by postcode area (of home address)



Note: We received data on home address postcode districts and salary bands for a total of 542 staff. From this we took the midpoint of the band to estimate a total of £17.6m of staff expenditure from University College Birmingham. Of this total, we excluded 10 staff records with invalid postcodes (approximately £0.3m of expenditure) and 1 record in Croatia.

Source: London Economics' analysis based on University College Birmingham data and Office for National Statistics data. Contains National Statistics data, OS data, Royal Mail, Gridlink, LPS (Northern Ireland), ONS, NISRA data, NRS data and Ordnance Survey data © Crown copyright and database right 2022.

4.2 Indirect and induced impacts of University College Birmingham's expenditures

As with the economic impact of University College Birmingham's educational exports (see Section 3), the assessment of the indirect and induced economic impacts associated with the expenditures of University College Birmingham is again based on economic multipliers derived from the above-discussed multi-regional Input-Output model[82]. In particular, we applied the estimated average economic multipliers associated with organisations in the West Midlands' government, health, and education sector. This mirrors the approach used to assess the impact of University College Birmingham's international tuition fee income, since this income was accrued (and subsequently spent) by University College Birmingham itself. Again, this approach asserts that the spending patterns of University College Birmingham reflect the average spending patterns across organisations operating in West Midlands' government, health, and education sector.

These multipliers (for the West Midlands and the UK as a whole[83]) are presented in Table 10, indicating that every £1 million of operational or capital expenditure incurred by University College Birmingham generates an *additional* **£1.33 million** of impact throughout the UK economy, of which **£0.51 million** is generated in the West Midlands[84]. In terms of employment, we assume that, for every **1,000** (FTE) staff employed directly by University College Birmingham, an *additional* **730** staff are supported throughout the UK, of which **300** are located in the West Midlands.

Table 10 Economic multipliers associated with the expenditures of University College Birmingham

Location of impact	Output	GVA	FTE employment
West Midlands	1.51	1.44	1.30
Total UK	2.33	2.12	1.73

Note: All multipliers constitute Type II multipliers, defined as [Direct + indirect + induced impact]/[Direct impact]. The figures match the assumed multipliers associated with University College Birmingham's international tuition fee income (see Table 9 in Section 3.3).
Source: London Economics' analysis

4.3 Adjustments for double-counting and transfers

Before arriving at the total direct, indirect, and induced impact associated with University College Birmingham's institutional spending, it is necessary to deduct two income and expenditure items to avoid double-counting, and to take account of the 'netting out' of the costs and benefits associated with University College Birmingham's activities between different agents in the UK economy. Specifically, we deducted:

- **£2 million** in University College Birmingham fee waivers for UK domiciled students[85], as this was included (as a benefit) in the analysis of University College Birmingham's teaching and learning activities (Section 2); and

[82] See Section 3 for more information.
[83] Again, in addition to the impacts on the West Midlands and the UK as whole, the analysis estimates a full breakdown across all regions, as well as by sector. These detailed results are presented in Section 4.4.
[84] This exactly matches the assumed multipliers associated with University College Birmingham's international tuition fee income (see Table 9 in Section 3.3).
[85] University College Birmingham's bursary support to UK domiciled students is considered as a benefit to the student in the analysis of the impact of teaching and learning (see Section 2). It was therefore necessary to deduct these bursaries from the direct impact of University College Birmingham's spending, to correctly take account of the fact that these bursaries are a transfer from University College Birmingham to its students, and not an additional benefit to the UK economy.

- The direct, indirect, and induced impacts generated by University College Birmingham's (gross) international fee income associated with the 2020-21 cohort of non-UK students (**£37 million**[86]), to avoid double-counting with the impact of University College Birmingham's educational exports (Section 3).

4.4 Aggregate impact of University College Birmingham's spending

Figure 23 presents the estimated total direct, indirect, and induced impacts associated with expenditures incurred by University College Birmingham in 2020-21 (after the above-described adjustments have been made). The aggregate impact of these expenditures was estimated at approximately **£61 million** in economic output terms (see top panel of Figure 23):

The impact of University College Birmingham's expenditure on the UK economy in 2020-21 stood at £61 million.

- In terms of region, as with the impact of exports (Section 3), the majority of this impact (**£40 million**, **65%**) was generated in the **West Midlands**, with **£21 million** (**35%**) occurring in **other regions** across the UK.
- In terms of sector, in addition to the impacts occurring in the **government, health, and education sector** itself (**£30 million**, **48%**[87]), there are also large impacts felt within other sectors, including the **distribution, transport, hotel, and restaurant sector** (**£8 million**, **13%**), the **production sector** (**£8 million**, **12%**), and **the real estate sector** (**£5 million**, **8%**)[88].

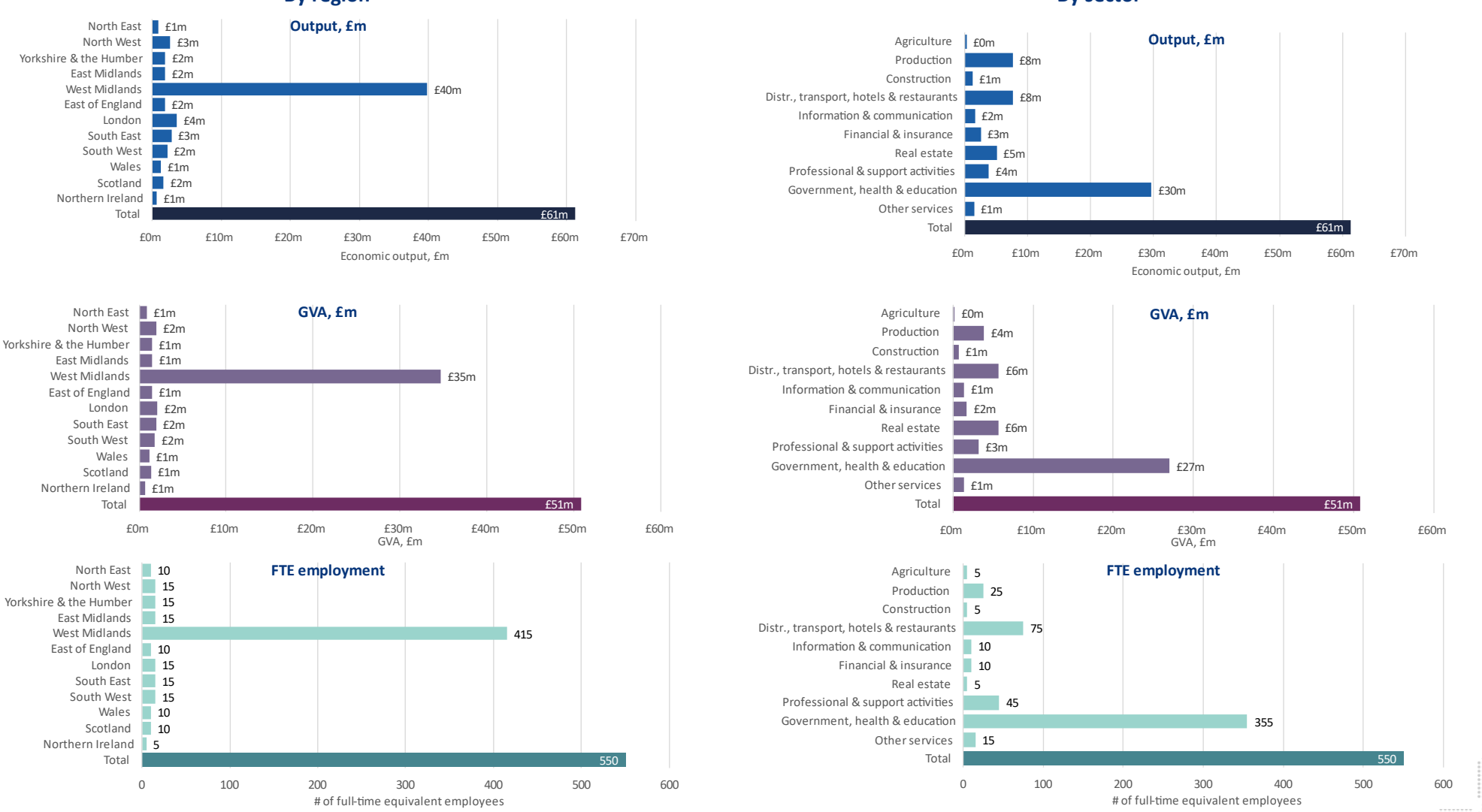
In terms of the number of jobs supported (in FTE), the results indicate that University College Birmingham's spending supported a total of **550** FTE jobs across the UK economy in 2020-21 (of which **415** are located in the West Midlands). In addition, the impact in terms of gross value added was estimated at **£51 million** across the UK economy as a whole (with **£35 million** generated within the West Midlands).

[86] This is slightly larger than the above impact of the *net* tuition fee income associated with international students in the 2020-21 cohort (**£35 million**; see Section 3.3), as the value deducted here relates to the impact of University College Birmingham's *gross* international fee income *before* the deduction of the Exchequer or University College Birmingham's funding costs associated with these students (since these costs are already deducted when estimating the impact of University College Birmingham's educational exports).

[87] The size of this impact is driven by the fact that, along with the indirect and induced impacts, it includes the *direct* level of expenditure of University College Birmingham (net of the above adjustments to avoid any double-counting).

[88] Again, for more detail on what industries are included in this high-level sector classification, please refer to Table 12 in Annex A2.1.

Figure 23 Total economic impact associated with University College Birmingham's expenditure in 2020-21, by region and sector



Note: Monetary estimates are presented in 2020-21 prices, rounded to the nearest £1 million, and may not add up precisely to the totals indicated. Employment estimates are rounded to the nearest 5, and again may not add up precisely to the totals indicated.

Source: London Economics' analysis

World class facilities benefiting practical learning

Supported by a £140 million investment in new campuses, equipment and resources, University College Birmingham's facilities provide ideal environments for industry-led teaching.

The latest of such investments is the new £44 million Moss House Campus located in the centre of Birmingham, and home to the Guild of Students, Human Performance Laboratory, 35-metre indoor running track and six-bed replica hospital ward.

From the training restaurants and aesthetics clinic to the state-of-the-art mock plane cabin, the cutting-edge sports facilities and financial trading suite – the University's facilities offer students a significant advantage when they complete their studies and pursue careers.

James Burgoyne, **Sport and Fitness Studies[89] BA (Hons)**

James progressed through University College Birmingham, starting out studying for his Extended Diploma in Sport and Level 1 Certificate in Coaching and moving up to degree level through his Level 2 Certificate in Fitness Instructing and Level 3 Certificate in Personal Training. Beyond his studies, James is a talented rugby player, playing for rugby union side Bournville RFC and managing to secure promotion to the National League 2. He puts his success on the field in part down to the facilities on offer while studying. Notably, a long-term partnership between Bournville RFC and University College Birmingham enables sports students' use of the £3 million Avery Fields development in Edgbaston. The 15-acre site features an all-weather pitch, two grass pitches and an impressive clubhouse with a function room, modern changing facilities and a physio suite. These facilities allowed James to apply and advance his knowledge and skillsets learnt in the classroom. For example, students are able use the technology available to assess and analyse player performance.

Kerry White, **Aviation and Airport Management BA (Hons)**

Studying for her qualification in aviation, Kerry was impressed by the newly opened Aviation and Tourism Suite, complete with replica fuselage and check-in desks for real-life practical experience. At the heart of the suite is a state-of-the-art mock plane cabin, while there are also check-in and security areas as well as the Galileo GDS system for training. As part of her course, Kerry spent 6 weeks in the suite and acknowledges this was the best part of the course for her. She is now planning to stay on at University College Birmingham to complete her postgraduate studies.

Sadam Koumi, **Sports Management FdA**

After competing alongside some of the world's top athletes in the 400m at the Tokyo Olympics, Sadam has his sights set to attend further athletics events including the Paris Olympics in 2024. Sadam is able to combine his training alongside his studies thanks to the University's Sporting Excellence Scholarship scheme (awarded to students deemed 'elite' or 'talented' performers in their field) and the gym facilities at the new campus at Moss House and The Maltings. Moreover, purpose-built sports injury and massage clinics offer a variety of services to professional athletes, students and members of the public.

[89] Now Sport, Coaching and Fitness

5 The total economic impact of University College Birmingham on the UK economy in 2020-21

The total economic impact on the UK economy associated with University College Birmingham's activities in 2020-21 was estimated to be approximately **£358 million** (Table 11). In terms of the components of this impact:

- The value of University College Birmingham's **teaching and learning** activities stood at **£221 million** (**62%**);
- The impact of University College Birmingham's **educational exports** was estimated at **£75 million** (**21%**); and
- The impact generated by the **operating and capital spending of University College Birmingham** stood at **£61 million** (**17%**).

Table 11 Total economic impact of University College Birmingham's activities in the UK in 2020-21 (£m and % of total)

Type of impact		£m	%
	Impact of teaching and learning	**£221m**	**62%**
	Students	£122m	34%
	Exchequer	£100m	28%
	Impact of exports	**£75m**	**21%**
	Impact of tuition fee income	£35m	10%
	Impact of non-tuition fee income	£40m	11%
	Impact of University College Birmingham's expenditure	**£61m**	**17%**
	Direct impact	£43m	12%
	Indirect and induced impacts	£18m	5%
	Total economic impact	**£358m**	**100%**

Note: All numbers are presented in 2020-21 prices (rounded to nearest £1m). Totals may not add up due to rounding. ***Source: London Economics.***

Compared to University College Birmingham's total operational costs of approximately **£53 million** in 2020-21[90], the total impact of University College Birmingham's activities on the UK economy was estimated at **£358 million**[91], which corresponds to a **benefit to cost ratio of 6.7:1**.

[90] Compared to the **£43 million** of direct impact of University College Birmingham's expenditures included in Section 4 in this section, the **£53 million** of operating expenditure here *excludes* capital expenditure (**£1 million**) but *includes* depreciation costs (**£4 million**) and movements in pension provisions (**£7 million**).

[91] In addition to this total impact on the UK economy as a whole, *some* of the strands of impact considered in the analysis (including the impact of educational exports, as well as the impact of the University's expenditures), can be disaggregated by sector and region (and can be measured in economic output as well as GVA and (FTE) employment). In aggregate, approximately **£136 million** (**38%**) of University College Birmingham's total impact can be disaggregated in this way. For more information, see Annex A2.4.

Enterprise Hive

The University's Enterprise Hive offers an array of support for budding student entrepreneurs, with the aim of promoting an entrepreneurial spirit and creative commercial thinking throughout the University. Students and graduates have access to enterprise workshops delivered by experienced professionals, tailored mentoring, networking opportunities and 1-to-1 support from experienced Enterprise Advisors.

"The Enterprise Hive did really kick-start off this journey that I am on at the moment, they directed me and gave me a lot of advice and got me thinking outside the box slightly"

Xavier Mathias, Student & Founder of 'XM Fitness'

Mentoring and 1-to-1 support

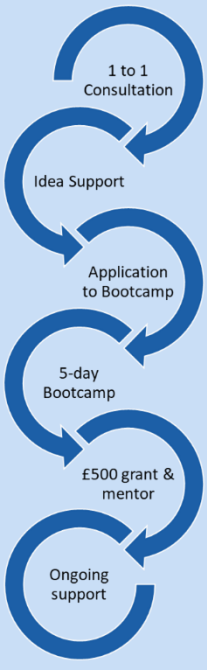
Mentors and Enterprise Advisors offer support at every stage of the business lifecycle, from acting as a sounding board during the ideas generation stage to giving unbiased guidance and helping set realistic goals as the business develops.

The Hive Network

Part of the Enterprise Hive, The Hive Network is a professional network launched by the University College Birmingham's Business School to connect student entrepreneurs, academics, and businesses. Through the collaborations established through the Hive Network, students are able to develop specialist and transferable skills for the workplace. Businesses within the network also benefit from direct access to thought-leadership, new ideas and student talent.

Birmingham Skills for Enterprise and Employability Network (BSEEN)

The BSEEN Programme is part-funded by the European Regional Development Fund and is a partnership between University College Birmingham, Aston University, Birmingham City University and Newman University. The 12-month programme supports student entrepreneurs through a package of initiatives that includes a training bootcamp, business grant, mentoring, networking opportunities and a co-working space.



The BSEEN programme

University College Birmingham student, Madiha Khusar, started her business LYF Cosmetics in 2018 while studying for her MSc in Enterprise Management. With a passion for both business and skincare, Madiha wanted to solve a problem she was facing: a lack of skincare products in the market that catered for wide-ranging skin concerns, while also being free from toxic and animal-derived ingredients. Identifying a gap in the market, she set up LYF Cosmetics, a vegan, organic and Halal certified skincare brand. Through the BSEEN programme, Madiha developed her presentational and pitching skills and she used the grant to build an initial brand identity and packaging design. Madiha is now looking to sell a growing range of products through her website and establish new brand partnerships to get her brand and products featured on the high street.

"The Enterprise Advisors have given me so much help [regarding] what business decisions I should take, advice on what the next steps I should be doing, and reassuring me that what I am doing is right."
Madiha Khusar, Student & Founder of 'LYF Cosmetics' and participant in BSEEN

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ANNEXES

Annex 1 References

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Annex 2 Technical Annex

A2.1 Industry classifications for multi-regional Input-Output analysis

Table 12 provides an overview of the high-level industry classifications used throughout the multi-regional Input-Output analysis.

Table 12 Industry grouping used as part of the multi-regional Input-Output analysis

Industries included in original UK Input-Output table	High-level industry group [and UK SIC Codes]
Crop and animal production, hunting and related service activities	Agriculture [1-3]
Forestry and logging	
Fishing and aquaculture	
Mining and quarrying	Production [5-39]
Manufacture of food products, beverages, and tobacco products	
Manufacture of textiles, wearing apparel and leather products	
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	
Manufacture of paper and paper products	
Printing and reproduction of recorded media	
Manufacture of coke and refined petroleum products	
Manufacture of chemicals and chemical products	
Manufacture of basic pharmaceutical products and pharmaceutical preparations	
Manufacture of rubber and plastic products	
Manufacture of other non-metallic mineral products	
Manufacture of basic metals	
Manufacture of fabricated metal products, except machinery and equipment	
Manufacture of computer, electronic and optical products	
Manufacture of electrical equipment	
Manufacture of machinery and equipment n.e.c.	
Manufacture of motor vehicles, trailers and semi-trailers	
Manufacture of other transport equipment	
Manufacture of furniture; other manufacturing	
Repair and installation of machinery and equipment	
Electricity, gas, steam, and air conditioning supply	
Water collection, treatment and supply	
Sewerage; waste collection, treatment, and disposal activities; materials recovery; remediation activities and other waste management services	
Construction	Construction [41-43]
Wholesale and retail trade and repair of motor vehicles and motorcycles	Distribution, transport, hotels, and restaurants [45-56]
Wholesale trade, except of motor vehicles and motorcycles	
Retail trade, except of motor vehicles and motorcycles	
Land transport and transport via pipelines	
Water transport	
Air transport	
Warehousing and support activities for transportation	
Postal and courier activities	
Accommodation and food service activities	
Publishing activities	Information and communication [58-63]
Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities	
Telecommunications	
Computer programming, consultancy and related activities; information service activities	
Financial service activities, except insurance and pension funding	Financial and insurance [64-66]
Insurance, reinsurance and pension funding, except compulsory social security	
Activities auxiliary to financial services and insurance activities	
Real estate activities excluding imputed rents	Real estate [68.1-2-68.3]
Imputed rents of owner-occupied dwellings	
Legal and accounting activities; activities of head offices; management consultancy activities	Professional and support activities [69.1-82]
Architectural and engineering activities; technical testing and analysis	
Scientific research and development	

Advertising and market research	
Other professional, scientific, and technical activities; veterinary activities	
Rental and leasing activities	
Employment activities	
Travel agency, tour operator reservation service and related activities	
Security and investigation activities; services to buildings and landscape activities; office administrative, office support and other business support activities	
Public administration and defence; compulsory social security	Government, health & education [84-88]
Education	
Human health activities	
Social work activities	
Creative, arts and entertainment activities; libraries, archives, museums, and other cultural activities; gambling and betting activities	Other services [90-97]
Sports activities and amusement and recreation activities	
Activities of membership organisations	
Repair of computers and personal and household goods	
Other personal service activities	
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	

Note: 'n.e.c.' = not elsewhere classified

Source: London Economics' analysis, based on Office for National Statistics (2020a) and UK SIC Codes (see Office for National Statistics, 2016)

A2.2 Impact of University College Birmingham's teaching and learning activities

A2.2.1 Qualifications and counterfactuals considered in the econometric analysis

Our econometric analysis of the earnings and employment returns to higher education qualifications, further education qualifications, and apprenticeships (described in more detail in Annex A2.2.2) considered:

- **Four different higher education qualification groups** (i.e. four 'treatment' groups for HE qualifications): two at postgraduate level (higher degree (taught) and 'other' postgraduate qualifications[92]) and two at undergraduate level (first degrees and 'other' undergraduate qualifications[93]);
- **Four different further education qualification groups**, separately for Level 1 to Level 4 vocational qualifications; and
- **Three different apprenticeship levels**, including Intermediate Apprenticeships (Level 2), Advanced Apprenticeships (Level 3), and Higher Apprenticeships (Level 4).

Table 13 presents these different HE qualifications, FE qualifications, and apprenticeships (i.e. treatment groups) considered in the analysis, along with the associated **counterfactual group** used for the marginal returns analysis in each case. As outlined in Section 2.4.1, we compare the earnings of the group of individuals in possession of the HE/FE qualification or apprenticeship to the relevant counterfactual group, to ensure that we assess the economic benefit associated with the qualification itself (rather than the economic returns generated by the specific characteristics of the individual in possession of the qualification). This is a common approach in the literature and allows us to control for the effect of other

[92] This relates to Labour Force Survey variables HIQUAL8, HIQUAL11 and HIQUAL15 and HIQUAL22 value labels 'Postgraduate Certificate in Education', 'Other postgraduate degree or professional qualification' and 'Don't know', for individuals who selected 'Higher degree' (other than Masters or Doctorate degree).

[93] This relates to Labour Force Survey variables HIQUAL8, HIQUAL11 and HIQUAL15 value labels 'Other degree', 'Diploma in higher education' and 'Other higher education below degree level'. The category 'Other higher education below degree level' is used only if the respondent states that they have 'a qualification from higher education but they do not know what it is'. It is therefore not possible to provide examples of typical qualifications that would normally fall under this category. The response option serves the purpose of confirming that higher education qualifications have been achieved but that the respondent is unaware of the actual qualification title itself.

observable personal, regional, or socioeconomic characteristics that might influence *both* the determinants of qualification attainment as well as earnings/employment.

Table 13 Treatment and comparison groups used to assess the marginal earnings and employment returns to higher education qualifications

Treatment group – highest qualification	Comparison group - highest qualification
HE qualifications	
Higher degree (taught)	First degree
Other postgraduate	First degree
First degree	Level 3 (academic or vocational)
Other undergraduate	Level 3 (academic or vocational)
FE qualifications	
Level 4 vocational qualifications	Level 3 vocational qualification
Level 3 vocational qualifications	Level 2 vocational qualification
Level 2 vocational qualifications	Level 1 vocational qualification
Level 1 vocational qualifications	Entry-level/no qualification
Apprenticeships	
Higher Apprenticeships	Advanced Apprenticeship
Advanced Apprenticeships	Intermediate Apprenticeship
Intermediate Apprenticeships	Level 1 vocational qualification
Other	
2 or more GCE 'A' Levels	5 or more GCSEs at A*-C

Source: London Economics

For the analysis of marginal returns:

- For **HE qualifications**, postgraduate qualification holders are compared to first degree holders, while for individuals holding first degrees or 'other undergraduate' level qualifications, the counterfactual group consists of individuals holding a Level 3 (academic or vocational) qualification as their highest qualification[94, 95].
- For **FE qualifications**, individuals in possession of each vocational qualification level were compared to the next highest (lower) level of vocational qualification; e.g. Level 4 vocational qualification holders were compared to individuals in possession of Level 3 vocational qualifications as their highest attainment[96].
- Similarly, for **apprenticeships**, individuals in possession of each relevant level of apprenticeship were compared to individuals who completed apprenticeships at the next highest (lower) level

[94] Historically, (and looking across all UK higher education institutions), students starting first degrees or other undergraduate qualifications are in possession of 2 or more GCE 'A' Levels as their highest level of prior attainment. However, this is no longer the case, especially for career-focused HE institutions such as University College Birmingham (where most HE entrants are *not* in possession of 'A' Levels upon entry). Hence, the analysis reflects the fact that a relatively large proportion of undergraduate students in the 2020-21 University College Birmingham cohort started their qualifications with Level 3 qualifications *other than* 2 or more GCE 'A' Levels as their highest prior attainment – including both vocational as well as academic Level 3 qualifications.

[95] In terms of prior attainment for HE students, note that for **11** students in the 2020-21 cohort of UK domiciled students, previous attainment levels were specified as either 'Mature student admitted on basis of previous experience and/or admissions test' or 'Other qualification level not known'. For these students, we imputed their prior attainment level using a group-wise imputation approach based on the most common prior attainment among students in the cohort undertaking qualifications at the same level, separately by study mode.

[96] In this respect, while the data on higher education students enrolled at University College Birmingham in 2020-21 included detailed information on (most) students' highest level of prior attainment, there was no such information available for students undertaking further education qualifications or apprenticeships. In the absence of this information, we therefore assumed that all students starting a given level of FE qualification/apprenticeship at University College Birmingham in 2020-21 were in possession of the next highest (lower) level of qualification (based on the counterfactual groups presented in Table 13).

(e.g. individuals with Advanced Apprenticeships were compared to individuals in possession of Intermediate Apprenticeships as their highest attainment[97]).

In addition, we also included a separate specification comparing the earnings associated with GCE 'A' Levels to possession of 5 or more GCSEs at grades A*-C. This additional analysis was undertaken to take account of the fact that the academic 'distance travelled' by a (very small) proportion of higher education students in the 2020-21 University College Birmingham cohort is **greater** than might be the case compared to those in possession of levels of prior attainment 'traditionally' associated with higher education entry[98]. Similarly, for other students within the cohort, the academic 'distance travelled' is **lower** than the traditional prior attainment level (e.g. a relatively large proportion (41%) of students in the 2020-21 UK domiciled cohort intending to undertake a full-time first degree had previously already completed a sub-degree level (i.e. 'other undergraduate') qualification).

In instances where the level of prior attainment for HE students at University College Birmingham was higher or lower than the 'traditional' counterfactual qualifications outlined in Table 13, the analysis used a **'stepwise' calculation of additional lifetime earnings**. For example, to calculate the earnings and employment returns for a student **in possession of an 'other undergraduate' qualification undertaking a first degree at University College Birmingham**, we *deducted* the returns to undertaking an 'other undergraduate' qualification (relative to the possession of a Level 3 (academic or vocational) qualification) from the returns to undertaking a first degree (again relative to the possession of a Level 3 qualification)[99].

A2.2.2 Marginal earnings and employment returns to higher education qualifications

Marginal earnings returns

To estimate the impact of qualification attainment on earnings, using information from the Labour Force Survey, we estimated a standard **Ordinary Least Squares** linear regression model, where the dependent variable is the natural logarithm of hourly earnings, and the independent variables include the full range of qualifications held alongside a range of personal, regional, and job-related characteristics that might be expected to influence earnings. In this model specification, we included individuals who were employed on either a full-time or a part-time basis. This approach has been used widely in the academic literature.

The basic specification of the model was as follows:

$$ln\ (\omega_i) = \alpha + \beta X_i + \epsilon_i \qquad \text{for } i = 1 \text{ to n}$$

where ln(ω_i) represents the natural logarithm of hourly earnings, $\epsilon_i$represents an error term, α represents a constant term, i is an individual LFS respondent, and X_i provides the independent variables included in the analysis, as follows:

- Highest qualification held (using the selected treatment and counterfactual groups outlined in Table 13);

[97] Note that, for the Intermediate Apprenticeship treatment group, since there are no apprenticeships below this level, the analysis of the marginal earnings and employment returns to Intermediate Apprenticeships was undertaken relative to individuals in possession of Level 1 vocational qualifications as their highest attainment.

[98] Again, note that there was no prior attainment information available for students undertaking FE qualifications or apprenticeships, so we assumed that all students starting a given level of FE qualification/apprenticeship at University College Birmingham in 2020-21 were in possession of the next highest (lower) level of qualification (based on the comparison groups presented in Table 13).

[99] In some instances, this stepwise calculation would result in *negative* lifetime returns to achieving higher education qualifications. As this seems illogical and unlikely in reality, any negative returns in these instances were set to zero. Hence, the analysis implicitly assumes that all calculated gross returns (*before* the deduction of any foregone earnings or other costs) can only be greater than or equal to zero (i.e. there can be no wage or employment *penalty* associated with any higher education qualification, further education qualification, or apprenticeship attainment, irrespective of the level of prior education attainment).

- Gender;
- Age;
- Age squared;
- Ethnic origin;
- Disability status;
- Region of work;
- Marital status;
- Number of dependent children under the age of 16;
- Full-time / part-time employment;
- Temporary or permanent contract;
- Public or private sector employment;
- Workplace size; and
- Yearly Dummies.

Using the above specification, we estimated earnings returns in aggregate and **for men and women separately**. Further, to analyse the benefits associated with different education qualifications over the lifetime of individuals holding these qualifications, the regressions were **estimated separately across a range of specific age bands** for the working age population, depending on the qualification considered. Further note that the analysis of earnings premiums was undertaken at a national (UK-wide) level. However, to adjust for differences across the Home Nations, these UK-wide earnings premiums were then combined with the relevant differential direct costs facing the individual and/or the public purse for (higher education) students domiciled in the different Home Nations[100].

To estimate the impact of HE qualifications, FE qualifications, and apprenticeships on labour market outcomes using this methodology, we used information from **pooled Quarterly UK Labour Force Surveys between 2010 and 2021**.

The resulting estimates of the marginal wage returns to the different qualifications of interest are presented in Table 14. In the earnings regressions, the coefficients relating to the different qualifications represent the additional effect on hourly earnings associated with possession of the respective qualification relative to the counterfactual level of qualification. To take an example, the analysis suggests that men aged between 31 and 35 in possession of a first degree achieve a **33.4%** hourly earnings premium compared to comparable men holding an academic or vocational Level 3 qualification as their highest level of attainment. The comparable estimate for women aged between 31 and 35 stands at **37.0%**.

In addition to estimating marginal earnings returns on average across *all subjects* of study, for higher education students (only), we repeated the econometric analysis to estimate these returns *separately by subject*[101]. Combining these subject-level returns with the number of students in the 2020-21 cohort of University College Birmingham HE students by subject, we then calculated higher education **subject mix adjustment factors** (separately by gender and qualification level). These adjustment factors were then

[100] Again, for FE qualifications and apprenticeships, we assume that all students starting these qualifications in the 2020-21 cohort of University College Birmingham students were domiciled in England (see Section 2.1.2).

[101] The HESA Common Aggregation Hierarchy (CAH) was used to classify subject areas. The following subject groups were distinguished: (1) Medicine & dentistry, (2) Subjects allied to medicine, (3) Biological and sport sciences, (4) Psychology, (5) Veterinary science, (6) Agriculture, food and related studies, (7) Physical sciences, (8) Mathematical sciences, (9) Engineering & technology, (10) Computing, (11) Geography, earth and environmental studies, (12) Architecture, building and planning, (13) Social sciences, (14) Law, (15) Business and management, (16) Media, journalism and communications, (17) Language and area studies, (18) Historical, philosophical and religious studies, (19) Design, creative and performing arts, and (20) Education and teaching.

applied to the above average marginal wage returns for higher education qualifications (across all subjects) to **adjust for the specific subject composition of University College Birmingham's higher education student cohort**[102].

Table 14 Marginal earnings returns to HE qualifications, FE qualifications and apprenticeships (in all subjects), in % (following exponentiation), by gender and age band

Qualification level (vs. counterfactual)	Age band									
	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65
Men										
2 or more GCE A-levels (vs. 5+ GCSEs)*	12.9%	9.3%	13.3%	22.1%	23.7%	18.9%	24.5%	20.1%	24.0%	20.4%
Other undergraduate (vs. Level 3)				11.0%	12.3%	16.0%	7.7%	11.1%	32.0%	17.7%
First degree (vs. Level 3)		13.9%	19.5%	33.4%	38.4%	38.4%	39.8%	42.3%	41.1%	37.9%
Other postgraduate (vs. first degrees)		10.8%	10.1%	9.4%		3.8%				
Higher degree (taught) (vs. first degrees)		8.7%	12.2%	10.7%	9.4%	12.9%	16.1%	14.6%	17.4%	20.7%
Level 1 vocational (vs. Entry/no qual)										
Level 2 vocational (vs. Level 1 vocational)				11.0%	11.9%	16.0%	9.1%	10.6%		
Level 3 vocational (vs. Level 2 vocational)	6.7%	10.6%	14.3%	14.2%	22.1%	24.9%	19.6%	18.3%	21.3%	21.8%
Level 4 vocational (vs. Level 3 vocational)		9.7%	12.6%	21.0%	20.3%	22.3%	28.9%	32.7%	30.0%	31.5%
Intermediate App. (vs. Level 1 vocational)		24.6%	22.0%	30.9%	28.4%	36.2%	23.9%	29.6%	21.9%	
Advanced App. (vs. Intermediate App.)	15.8%	13.7%	11.3%	12.5%						
Higher App. (vs. Advanced App.)			19.6%	15.5%						
Women										
2 or more GCE A-levels (vs. 5+ GCSEs)*	12.3%	6.2%	10.0%	10.8%	19.6%	22.0%	15.6%	16.9%	14.6%	14.3%
Other undergraduate (vs. Level 3)			10.0%		13.2%	10.4%	11.5%	6.7%	14.7%	26.9%
First degree (vs. Level 3)		14.3%	25.1%	37.0%	43.9%	43.6%	42.6%	42.3%	38.5%	32.4%
Other postgraduate (vs. first degrees)		8.4%	7.8%	10.8%	12.6%	13.5%	14.2%	16.3%	15.3%	17.5%
Higher degree (taught) (vs. first degrees)		9.0%	6.5%	12.9%	15.7%	22.9%	26.9%	23.0%	30.9%	18.8%
Level 1 vocational (vs. Entry/no qual)						6.7%	8.0%		8.2%	7.9%
Level 2 vocational (vs. Level 1 vocational)	22.5%							11.7%		
Level 3 vocational (vs. Level 2 vocational)	5.7%	5.9%	8.1%	10.4%	13.5%	12.4%	10.5%	10.7%	12.5%	7.7%
Level 4 vocational (vs. Level 3 vocational)	13.1%	3.9%	10.3%	10.1%	19.1%	22.9%	23.9%	25.1%	20.2%	21.2%
Intermediate App. (vs. Level 1 vocational)			10.3%	15.8%		13.2%		16.1%		
Advanced App. (vs. Intermediate App.)	13.4%	7.5%	8.4%					35.3%		
Higher App. (vs. Advanced App.)						36.3%				

Note: Regression coefficients have been exponentiated to reflect percentage wage returns. In cases where the estimated coefficients are not statistically significantly different from zero (at the 10% level), the coefficient is assumed to be zero; these are displayed as gaps in the table.

* Returns to holding 2 or more GCE 'A' levels compared to 5 or more GCSEs at A*-C.

Source: London Economics' analysis of pooled Quarterly Labour Force Survey data for 2010Q1-2021Q4

Marginal employment returns

To estimate the impact of qualification attainment on employment, we adopted a **probit model** to assess the likelihood of different qualification holders being in employment or otherwise. The basic specification defines an individual's labour market outcome to be either in employment (working for payment or profit for more than 1 hour in the reference week (using the standard International Labour Organisation definition) or not in employment (being either unemployed or economically inactive)). The specification of the probit model was as follows:

$$Probit(EMPNOT_i) = \alpha + \gamma Z_i + \epsilon_i \qquad \text{for } i = 1 \text{ to n, where i is an individual LFS respondent}$$

[102] Note that the LFS data did not include information on subject for students undertaking 'other undergraduate' qualifications (i.e. predominantly Foundation Degrees, based on the 2020-21 University College Birmingham student cohort). Therefore, the subject mix adjustment factors for other undergraduate qualifications were instead based on the subject-level returns to first degrees, weighted by the number of students in the cohort undertaking other undergraduate qualifications, and multiplied by the overall ratio of the marginal earnings returns to other undergraduate qualifications relative to first degrees (across all subjects).

The dependent variable adopted represents the binary variable $EMPNOT_i$, which is coded 1 if the individual is in employment and 0 otherwise[103]. We specified the model to contain a constant term (α) as well as a number of standard independent variables including the qualifications held by an individual (represented by Z_i in the above equation) as follows:

- Highest qualification held (using the selected treatment and counterfactual groups outlined in Table 13);
- Gender;
- Age;
- Age squared;
- Ethnic origin;
- Disability status;
- Region of usual residence;
- Qualifications held;
- Marital status;
- Number of dependent children under the age of 16; and
- Yearly Dummies.

Again, ϵ_i represents an error term. Similar to the methodology for estimating earnings returns, the described probit model was estimated in aggregate and **separately for men and women**, with the analysis further split by respective **age bands**, and adjusted for the specific **subject mix** of students in the 2020-21 cohort of UK domiciled students attending University College Birmingham (where the subject mix adjustment was again made for HE qualification only). Further, and again similar to the analysis of earnings returns, employment returns were estimated at the national (i.e. UK-wide) level.

The resulting estimated marginal employment returns to higher education qualifications (again on average across *all subjects* of study (i.e. before adjusting for University College Birmingham's specific subject mix for HE students)) are presented in Table 15. In the employment regressions, the relevant coefficients provide estimates of the impact of the given qualification on the probability of being in employment (expressed in percentage points). Again, to take the same example as above, the analysis estimates that a man aged between 31 and 35 in possession of a first degree is **2.4 percentage points** more likely to be in employment than a man of similar age holding only a Level 3 (academic or vocational) qualification as his highest level of education. The corresponding estimate for women stands at **5.5 percentage points**.

[103] The probit function reflects the cumulative distribution function of the standard normal distribution.

Table 15 Marginal employment returns to HE qualifications, FE qualifications and apprenticeships (in all subjects), in percentage points, by gender and age band

Qualification level	Age band									
	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65
Men										
2 or more GCE A-levels (vs. 5+ GCSEs)*			4.5	2.5	1.4					
Other undergraduate (vs. Level 3)	-14.0									-5.7
First degree (vs. Level 3)		-1.9	2.0	2.4	3.5	1.8	1.1	2.1	-2.6	-4.1
Other postgraduate (vs. first degrees)		5.3				1.4		1.9		-6.1
Higher degree (taught) (vs. first degrees)			-1.8						3.1	
Level 1 vocational (vs. Entry/no qual)				7.5					8.2	
Level 2 vocational (vs. Level 1 vocational)	23.3	23.5	10.7	7.5	9.6	12.0	8.3	5.8		7.1
Level 3 vocational (vs. Level 2 vocational)		6.7	7.8	5.9	3.4	3.3	4.5	5.1		-6.4
Level 4 vocational (vs. Level 3 vocational)		3.1		2.3	3.7			2.2		
Intermediate App. (vs. Level 1 vocational)	35.3	31.8	21.8	9.1	10.9	8.8	8.5	8.0		
Advanced App. (vs. Intermediate App.)							7.9			
Higher App. (vs. Advanced App.)				17.9						
Women										
2 or more GCE A-levels (vs. 5+ GCSEs)*		4.1	4.6	2.5	2.5	2.3	3.2			
Other undergraduate (vs. Level 3)		3.9								
First degree (vs. Level 3)		1.7	5.5	5.5	5.4	4.1	3.1	2.0	-2.4	-4.9
Other postgraduate (vs. first degrees)		4.1		2.4		3.7	3.2	1.9	3.0	
Higher degree (taught) (vs. first degrees)		-3.2	-2.3			1.8		4.0	4.8	6.6
Level 1 vocational (vs. Entry/no qual)	12.8	7.2	6.3		7.2	11.2	14.0	18.2	11.0	5.6
Level 2 vocational (vs. Level 1 vocational)	18.8	16.9	18.4	23.9	17.7	18.4	10.3	6.0	12.4	11.4
Level 3 vocational (vs. Level 2 vocational)	13.4	12.4	8.6	6.9	8.2	5.0	5.4	2.6		
Level 4 vocational (vs. Level 3 vocational)			2.8	3.7		1.9			-4.7	-4.1
Intermediate App. (vs. Level 1 vocational)	31.1	27.0	18.7	29.2	21.8	17.8	8.8			
Advanced App. (vs. Intermediate App.)	10.4	6.4	7.8	9.6			16.9			
Higher App. (vs. Advanced App.)		10.2								

Note: In cases where the estimated coefficients are not statistically significantly different from zero (at the 10% level), the coefficient is assumed to be zero; these are displayed as gaps in the table.

* Returns to holding 2 or more GCE 'A' levels compared to 5 or more GCSEs at A*-C.

Source: London Economics' analysis of pooled Quarterly Labour Force Survey data for 2010Q1-2021Q4

A2.2.3 'Age-decay' function

Many existing economic analyses considering the lifetime benefits associated with higher education qualifications to date (e.g. Walker and Zhu, 2013) have focused on the returns associated with the 'traditional path' of higher education qualification attainment – i.e. progression directly from secondary level education and completion of a three or four year undergraduate degree from the age of 19 onwards (completing by the age of 21 or 22). These analyses assume that there are **direct costs** (tuition fees etc.), as well as an **opportunity cost** (the foregone earnings while undertaking the qualification full-time) associated with qualification attainment. More importantly, these analyses make the implicit assumption that any and all of the estimated earnings and/or employment benefit achieved accrues to the individual.

However, **the labour market outcomes associated with the attainment of higher education qualifications on a part-time basis are fundamentally different than those achieved by full-time students**. In particular, part-time students typically undertake higher education qualifications several years later than the 'standard' full-time undergraduate (e.g. the estimated average age at enrolment among students in the 2020-21 cohort completing first degrees at University College Birmingham on a part-time basis is **32**, compared to **24** for corresponding full-time students); generally undertake their studies over an extended period of time; and often combine their studies with full-time employment. Table 16 presents the assumed average age at enrolment, study/training duration, and age at completion for students undertaking HE

qualifications, FE qualifications, or apprenticeships in the 2020-21 University College Birmingham cohort[104, 105].

Table 16 Average age at enrolment, study duration, and age at completion for students in the 2020-21 University College Birmingham cohort

Qualification level	Full-time students			Part-time students		
	Age at enrolment	Duration (years)	Age at completion	Age at enrolment	Duration (years)	Age at completion
Other undergraduate	25	1	26	29	2	31
First degree	24	3	27	32	4	36
Other postgraduate	28	1	29	41	3	44
Higher degree (taught)	28	1	29	35	2	37
Level 1 vocational	18	1	19	-	-	-
Level 2 vocational	19	1	20	-	-	-
Level 3 vocational	19	2	21	-	-	-
Level 4 vocational	45	2	47	-	-	-
Intermediate Apprenticeship	22	1	23	-	-	-
Advanced Apprenticeship	31	2	33	-	-	-
Higher Apprenticeship	38	2	40	-	-	-

Note: All values have been rounded to the nearest integer.
Source: London Economics' analysis based on University College Birmingham data

Given these characteristics, we adjust the methodology when estimating the returns to part-time (and later-in-life full-time) education attainment at University College Birmingham, through the use of an **'age-decay' function**. This approach assumes that possession of a particular education qualification is associated with a certain earnings or employment premium, and that this entire labour market benefit accrues to the individual *if* the qualification is attained before the age of **24** (for undergraduate qualifications, FE qualifications, and apprenticeships) or **29** (for postgraduate qualifications).

However, as the age of attainment increases, it is expected that a declining proportion of the potential value of the estimated earnings and employment benefit accrues to the individual[106]. This calibration ensures that those individuals completing qualifications at a relatively older age will see relatively lower earnings and employment benefits associated with higher education qualification attainment (and perhaps reflect potentially different motivations among this group of learners). In contrast, those individuals attaining qualifications earlier in their working life will see a greater economic benefit (potentially reflecting the investment nature of qualification acquisition).

[104] The assumed average age at enrolment for higher education students is based on the number of individuals in the cohort assumed to *complete* a given qualification at University College Birmingham (based on the assumption that some students might complete a different qualification than initially intended, or instead only complete several standalone credits/modules associated with the intended qualification (see Section 2.2.1 for more information)). In particular, the age at enrolment per qualification (based on the HESA data provided by University College Birmingham) is calculated as the weighted average age at enrolment across students in the 2020-21 cohort expected to *complete* the given qualification (weighted by the number of students starting different qualification aims and completing each given qualification, separately by study mode).

[105] The average duration of study for full-time higher education and further education students (by qualification level) is based on London Economics' assumptions; the average study durations for part-time students (applicable to higher education students only) were calculated by multiplying the assumed full-time ratio by the ratio of the estimated average study intensity among full-time students relative to part-time students (see Section 2.4.1 for more information on how we arrived the estimated average study intensity for each qualification level).
The average training duration for apprenticeships is based on data on the average expected training duration among apprentices (by RQF level) in 2020-21 published by the Department for Education (2022b).

[106] E.g. Callender et al. (2011) suggest that the evidence points to decreasing employment returns with age at qualification: older graduates are less likely to be employed than younger graduates three and a half years after graduation; however, there are no differences in the likelihood of graduates undertaking part-time and full-time study being employed according to their age or motivations to study.

Table 17 presents the assumed age-decay adjustment factors which we apply to the marginal earnings and employment returns to students undertaking qualifications at University College Birmingham in the 2020-21 cohort. To take an example, we have assumed that a student undertaking a postgraduate taught degree on a full-time basis achieves close to (**97%** of) the full earnings and employment premium identified in the econometric analysis (for their entire working life). However, for a part-time postgraduate taught degree student, we assume that because of the late attainment (at age 37 (on average)), these students recoup only **74%** of the corresponding full-time earnings and employment premiums throughout their working lives.

Note that the returns for *all* full-time (as well as part-time) HE students studying at University College Birmingham are adjusted downwards in this manner, given the fact that these students typically undertake their qualifications relatively late in life. In addition, note that the application of the 'age-decay' function implies that, for *all* HE qualification levels at University College Birmingham, the estimated employment and earnings returns for part-time students are lower than the returns for comparable full-time students. These differences reflect the (relatively limited) wider economic literature on the returns to part-time study[107].

[107] In general, these studies suggest that the economic returns to studying part-time are lower than the economic returns associated with studying full-time. This is in part because part-time students are often already employed when undertaking their studies, so the marginal (or additional) impact of the higher education qualification is lower. For instance, six months after graduation, graduates undertaking part-time study were three percentage points more likely to be employed than graduates undertaking full-time study, and less than half as likely (3% compared to 7%) to be unemployed. See Callender et al. (2011).
According to the same study, the salaries of graduates from part-time study grow at a slower pace compared with their full-time peers. Part-time graduates are less likely to see their salaries increase and are more likely to see their salaries stagnate between 6 months and 42 months after graduation: specifically, during this period, 78% of part-time graduates and 88% of full-time graduates saw their salaries rise, while 16% of part-time and 8% of full-time graduates experienced no change in salaries, and 6% of part-time and only 2% of former full-time students saw a drop in their salaries.

Table 17 Assumed age decay adjustment factors for higher education students in the 2020-21 University College Birmingham cohort

Age	Other undergraduate	First degree	Other postgraduate	Higher degree (taught)	Level 1 voc.	Level 2 voc.	Level 3 voc.	Level 4 voc.	Intermediate App.	Advanced App.	Higher App.
18	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
19	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
21	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
23	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24	98%	98%	100%	100%	98%	98%	98%	98%	98%	98%	98%
25	95%	95%	100%	100%	95%	95%	95%	95%	95%	95%	95%
26	93%	93%	100%	100%	93%	93%	93%	93%	93%	93%	93%
27	90%	90%	100%	100%	90%	90%	90%	90%	90%	90%	90%
28	88%	88%	100%	100%	88%	88%	88%	88%	88%	88%	88%
29	85%	85%	97%	97%	85%	85%	85%	85%	85%	85%	85%
30	83%	83%	94%	94%	83%	83%	83%	83%	83%	83%	83%
31	80%	80%	91%	91%	80%	80%	80%	80%	80%	80%	80%
32	78%	78%	89%	89%	78%	78%	78%	78%	78%	78%	78%
33	75%	75%	86%	86%	75%	75%	75%	75%	75%	75%	75%
34	73%	73%	83%	83%	73%	73%	73%	73%	73%	73%	73%
35	70%	70%	80%	80%	70%	70%	70%	70%	70%	70%	70%
36	68%	68%	77%	77%	68%	68%	68%	68%	68%	68%	68%
37	65%	65%	74%	74%	65%	65%	65%	65%	65%	65%	65%
38	63%	63%	71%	71%	63%	63%	63%	63%	63%	63%	63%
39	60%	60%	69%	69%	60%	60%	60%	60%	60%	60%	60%
40	58%	58%	66%	66%	58%	58%	58%	58%	58%	58%	58%
41	55%	55%	63%	63%	55%	55%	55%	55%	55%	55%	55%
42	53%	53%	60%	60%	53%	53%	53%	53%	53%	53%	53%
43	50%	50%	57%	57%	50%	50%	50%	50%	50%	50%	50%
44	48%	48%	54%	54%	48%	48%	48%	48%	48%	48%	48%
45	45%	45%	51%	51%	45%	45%	45%	45%	45%	45%	45%
46	42%	42%	49%	49%	42%	42%	42%	42%	42%	42%	42%
47	40%	40%	46%	46%	40%	40%	40%	40%	40%	40%	40%
48	37%	37%	43%	43%	37%	37%	37%	37%	37%	37%	37%
49	35%	35%	40%	40%	35%	35%	35%	35%	35%	35%	35%
50	32%	32%	37%	37%	32%	32%	32%	32%	32%	32%	32%
51	30%	30%	34%	34%	30%	30%	30%	30%	30%	30%	30%
52	27%	27%	31%	31%	27%	27%	27%	27%	27%	27%	27%
53	25%	25%	29%	29%	25%	25%	25%	25%	25%	25%	25%
54	22%	22%	26%	26%	22%	22%	22%	22%	22%	22%	22%
55	20%	20%	23%	23%	20%	20%	20%	20%	20%	20%	20%
56	17%	17%	20%	20%	17%	17%	17%	17%	17%	17%	17%
57	15%	15%	17%	17%	15%	15%	15%	15%	15%	15%	15%
58	12%	12%	14%	14%	12%	12%	12%	12%	12%	12%	12%
59	10%	10%	11%	11%	10%	10%	10%	10%	10%	10%	10%
60	7%	7%	9%	9%	7%	7%	7%	7%	7%	7%	7%
61	5%	5%	6%	6%	5%	5%	5%	5%	5%	5%	5%
62	2%	2%	3%	3%	2%	2%	2%	2%	2%	2%	2%

Note: Adjustment factors from age 63 onwards are assumed to be 0%. Shaded areas indicate relevant average graduation age per full-time / part-time student at each level of study at University College Birmingham: Full-time students Part-time students (applicable to HE students only). ***Source: London Economics' analysis based on University College Birmingham data***

A2.2.4 Estimating the gross graduate premium and gross public purse benefit

The gross graduate premium/learner benefit associated with qualification attainment is defined as the **present value of enhanced post-tax earnings** (i.e. after income tax, National Insurance and VAT are removed, and following the deduction of foregone earnings) relative to an individual in possession of the counterfactual qualification. To estimate the value of the gross graduate premium, it is necessary to extend the econometric analysis (presented above; see Annex A2.2.2) by undertaking the following elements of analysis (separately by qualification level, gender, and study mode):

1. We estimated the employment-adjusted **annual earnings** achieved by individuals in the counterfactual groups (e.g. an academic or vocational qualification at Level 3, as the counterfactual for first degrees (see Annex A2.2.1 for more detail)).
2. We inflated these baseline or counterfactual earnings using the marginal earnings premiums and employment premiums (presented in Table 14 and Table 15 in Annex A2.2.2), adjusted to reflect late attainment (as outlined in Annex A2.2.3), to produce **annual age-earnings** profiles associated with the possession of each particular qualification.
3. We adjusted these age-earnings profiles to account for the fact that earnings would be expected to increase in real terms over time (at an assumed rate of **1.6%** per annum (based on long-term average earnings growth rate forecasts estimated by the Office for Budget Responsibility (2022)[108].
4. Based on the earnings profiles generated by qualification holders, and income tax and National Insurance rates and allowances for the relevant academic year[109], we computed the future stream of net earnings (i.e. post-tax)[110]. Using similar assumptions, we further calculated the stream of (employment-adjusted) foregone earnings (based on earnings in the relevant counterfactual group[111]) during the period of study, again net of tax, for full-time students only.
5. We calculated the **discounted** stream of additional (employment-adjusted) future earnings compared to the relevant counterfactual group (using a standard real-terms discount rate of **3.5%** as presented in HM Treasury Green Book (HM Treasury, 2022)), and the discounted

[108] Specifically, we make use of the Office for Budget Responsibility's most recent long-term forecasts of nominal average earnings growth (for 2021-22 to 2071-72); see Office for Budget Responsibility (2022). The assumed **1.6%** rate captures the compound annual growth rate in real earnings over the total period (adjusted from nominal to real terms based on projected Consumer Price Index (CPI) inflation over the same period (and based on the same source).

[109] i.e. 2020-21. Note that the analysis assumes fiscal neutrality, i.e. it is asserted that, in subsequent years, the earnings tax and National Insurance income bands grow at the same rate of annual real earnings growth of **1.6%**. In terms of National Insurance employee and employer contribution rates, from the 2022-23 tax year onwards, these rates were increased from 12% and 2% (depending on income) to 13.25% and 3.25% (for employee contributions), and from 13.8% to 15.05% (for employer contributions). Here, for simplicity, we apply these higher contribution rates to *all* years considered (i.e. from 2020-21 onwards). While this assumption impacts the relative size of the gross and net graduate premium/learner benefit as compared to the gross and net Exchequer benefit, since National Insurance contributions constitute a *transfer* between students/graduates and the Exchequer, the total estimated impact associated with University College Birmingham's teaching and learning activities is unaffected by this assumption.

[110] The tax adjustment also takes account of increased VAT revenues for HMG, by assuming that individuals consume **94.3%** of their annual income, and that **50%** of their consumption is subject to VAT at a rate of **20%**. The assumed proportion of income consumed is based on estimates/forecasts of the household savings rate published by the Office for Budget Responsibility (2022), while the proportion of consumption subject to VAT is based on VAT estimates published by the Office for Budget Responsibility (no date).

[111] For higher education students, the foregone earnings calculations are based on the baseline or counterfactual earnings associated with either a Level 3 (academic or vocational) qualification or first degrees. Specifically, as outlined in Annex A2.2.1, some HE students in the 2020-21 University College Birmingham cohort were in possession of other levels of prior attainment (e.g. students starting first degrees who were in possession other undergraduate qualifications as their highest prior attainment). To accommodate this, as a simplifying assumption, the foregone earnings for students previously in possession of other undergraduate qualifications (other than first degrees) are based on the earnings associated with possession of a Level 3 qualification as their highest qualification (adjusted for the age at enrolment and completion associated with the relevant qualification obtained). In addition, the estimated foregone earnings for (the small number of) students previously in possession of postgraduate qualifications are based on the level of earnings associated with first degrees.
Note again that for further education students and apprenticeships in the 2020-21 University College Birmingham cohort, there was no prior attainment information available. In the absence of this information, we therefore assumed that all students starting a given level of FE qualification/apprenticeship at University College Birmingham in 2020-21 were in possession of the next highest (lower) level of qualification (based on the counterfactual groups presented in Table 13).

stream of foregone earnings during qualification attainment (for full-time students), to generate a present value figure. We thus arrive at the **gross graduate premium** (or equivalent for other qualifications).

6. The **discounted** stream of enhanced taxation revenues minus the tax income foregone during students' qualification attainment (where relevant) derived in element 4 provides an estimate of the **gross public benefit** associated with the attainment of HE qualifications, FE qualifications, or apprenticeships.

Note that the gross graduate premium/learner benefit and gross public benefit for students undertaking qualifications at a level equivalent to or lower than the highest qualification that they are already in possession of was assumed to be zero. For example, it is assumed that a student in possession of a first degree undertaking an additional undergraduate degree at University College Birmingham will *not* accrue any wage or employment benefits from this additional qualification attainment, but still incur the costs of foregone earnings during the period of study (if they studied on a full-time basis).

Further note that the analysis of gross graduate premiums and public purse benefits was undertaken at a **national** (UK-wide) level. To adjust for differences across students from different Home Nations (for higher education students only[112]), these UK-wide premiums were then combined with the relevant differential student support costs facing the individual and/or the Exchequer for students domiciled in the different Home Nations and studying in England.

The resulting gross graduate premiums/gross learner benefits and gross public purse benefits per student are presented in Table 18 for higher education qualifications (by study mode, level of study, gender, and prior attainment), and in Table 19 for further education qualifications and apprenticeships (by level of study, gender, and prior attainment[113]).

A2.2.5 Net graduate premium and net public benefit

The following tables provide detailed information on the net graduate premiums/learner benefits and net public benefits for English domiciled students associated with higher education qualifications (Table 20) and further education qualifications and apprenticeships (Table 21) offered by University College Birmingham[114]. Each table provides detailed information on the net graduate premiums/net Exchequer benefits by study level, prior attainment, gender, and study mode (where the breakdown by mode is applicable to HE students only)[115].

[112] Again, as outlined in Section 2.1.2, student data for FE students and apprenticeship learners did not provide any detail on these students' domicile prior to starting their qualifications/apprenticeship training, so we assumed that *all* of these students were English domiciled prior to starting their learning/training at University College Birmingham.

[113] In terms of mode of study, note again that all FE students in the 2020-21 University College Birmingham cohort were undertaking their qualifications on a full-time basis.

[114] In terms of domicile, all values are presented for English domiciled students only. We assume that there are no *FE students or apprentices* in the 2020-21 cohort who are from Home Nations other than England. Estimates for the (small) number of *higher education students* from Wales, or Scotland, or Northern Ireland have not been presented.

[115] In terms of gender, it is important to note that the economic benefits associated with qualification attainment - expressed in *monetary terms* - are often lower for women than men, predominantly as a result of the increased likelihood of spending time out of the active labour force. However, reflecting the wider economic literature, the *marginal benefits* associated with qualification attainment - expressed as either the *percentage increase* in hourly earnings or enhanced probability of employment - are often greater for women than for men (see Annex A2.2.2).

Table 18 Gross graduate premiums and Exchequer benefits per student associated with HE qualification attainment at University College Birmingham, by study mode, level, gender, and prior attainment

Level and mode of study	Previous qualification and gender													
	GCSE		Any Level 3 qualification		Other undergraduate		First degree		Other postgraduate		Higher degree (taught)		Higher degree (research)	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Gross graduate premiums														
Full-time students														
Other undergraduate	£131,000		£29,000	£10,000	-£19,000	-£12,000	-£19,000	-£16,000						
First degree			£102,000	£56,000	£56,000	£36,000	-£53,000	-£50,000						
Other postgraduate							-£5,000	£31,000						
Higher degree (taught)					£173,000		£70,000	£72,000		£22,000				
Part-time students														
Other undergraduate				£17,000	£0	£0	£0	£0						
First degree					£68,000	£43,000		£0		£0				
Other postgraduate								£20,000				£0		
Higher degree (taught)							£63,000	£67,000		£33,000				
Gross Exchequer benefits														
Full-time students														
Other undergraduate	£126,000		£34,000	£14,000	-£9,000	-£3,000	-£9,000	-£7,000						
First degree			£114,000	£73,000	£73,000	£57,000	-£25,000	-£22,000						
Other postgraduate							£5,000	£35,000						
Higher degree (taught)					£180,000		£87,000	£70,000		£26,000				
Part-time students														
Other undergraduate				£13,000	£0	£0	£0	£0						
First degree					£61,000	£39,000		£0		£0				
Other postgraduate								£17,000				£0		
Higher degree (taught)							£71,000	£57,000		£28,000				

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (with the given characteristics). Grey shading indicates instances where the level of study at University College Birmingham is equal to or lower than the level of previous attainment. In these instances, the analysis implicitly assumes that all calculated gross returns (*before* the deduction of any foregone earnings or other costs) can only be larger or equal to zero (i.e. there can be no wage or employment penalty associated with any higher education qualification attainment). Hence, each grey-shaded cell displays only the assumed underlying foregone earnings. ***Source: London Economics' analysis***

Table 19 Gross learner benefits and Exchequer benefits per student associated with FE qualification and apprenticeship attainment at University College Birmingham, by level, gender, and prior attainment

Level of study	Previous qualification and gender											
	Entry and No Qualifications		Level 1 Vocational		Level 2 Vocational		Level 3 Vocational		Intermediate Apprenticeship		Advanced Apprenticeship	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Gross learner benefits												
Level 1 Vocational	£4,000	£33,000										
Level 2 Vocational			£61,000	£57,000								
Level 3 Vocational					£68,000	£32,000						
Level 4 Vocational							-£16,000	-£15,000				
Intermediate Apprenticeship			£117,000	£60,000								
Advanced Apprenticeship									-£29,000	-£6,000		
Higher Apprenticeship											-£49,000	-£15,000
Gross Exchequer benefits												
Level 1 Vocational	£5,000	£3,000										
Level 2 Vocational			£47,000	£10,000								
Level 3 Vocational					£74,000	£20,000						
Level 4 Vocational							£0	£1,000				
Intermediate Apprenticeship			£105,000	£12,000								
Advanced Apprenticeship									-£11,000	£7,000		
Higher Apprenticeship											-£29,000	£2,000

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (with the given characteristics).
In terms of prior attainment, note again that there was no prior attainment information available for further education students and apprentice learners in the 2020-21 cohort, so we assumed that all students starting a given level of FE qualification/apprenticeship at University College Birmingham in 2020-21 were in possession of the next highest (lower) level of qualification. While grey shading indicates instances where the level of study at University College Birmingham would be equal to or lower than the level of previous attainment, given these assumptions, there are no FE students or apprentice learners in the cohort whom this applies to.
In terms of study mode, note again that all further education students in the 2020-21 cohort were undertaking their qualifications on a full-time basis (so that estimates for part-time students are not applicable).
Source: London Economics' analysis

Table 20 Net graduate premiums and Exchequer benefits per English domiciled student associated with HE qualification attainment at University College Birmingham

Level and mode of study	Previous qualification and gender													
	GCSE		Any Level 3 qualification		Other undergraduate		First degree		Other postgraduate		Higher degree (taught)		Higher degree (research)	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Net graduate premiums														
Full-time students														
Other undergraduate	£128,000		£27,000	£8,000	-£21,000	-£14,000	-£21,000	-£19,000						
First degree			£95,000	£50,000	£49,000	£30,000	-£60,000	-£57,000						
Other postgraduate							-£10,000	£26,000						
Higher degree (taught)					£168,000		£65,000	£67,000		£17,000				
Part-time students														
Other undergraduate				£16,000	-£1,000	-£1,000	-£1,000	-£1,000						
First degree					£60,000	£35,000		-£8,000		-£8,000				
Other postgraduate								£15,000				-£5,000		
Higher degree (taught)							£59,000	£63,000		£29,000				
Net Exchequer benefits														
Full-time students														
Other undergraduate	£122,000		£30,000	£10,000	-£13,000	-£7,000	-£13,000	-£11,000						
First degree			£102,000	£60,000	£61,000	£45,000	-£37,000	-£35,000						
Other postgraduate							£5,000	£34,000						
Higher degree (taught)					£180,000		£87,000	£70,000		£26,000				
Part-time students														
Other undergraduate				£8,000	-£6,000	-£6,000	-£6,000	-£6,000						
First degree					£50,000	£29,000		-£11,000		-£11,000				
Other postgraduate								£17,000				-£1,000		
Higher degree (taught)							£70,000	£57,000		£27,000				

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (with the given characteristics). Grey shading indicates instances where the level of study at University College Birmingham is equal to or lower than the level of previous attainment. In these instances, the analysis implicitly assumes that all calculated gross returns (*before* the deduction of any foregone earnings or other costs) can only be larger or equal to zero (i.e. there can be no wage or employment penalty associated with any higher education qualification attainment). Hence, each grey-shaded cell displays only the assumed underlying direct or indirect costs associated with qualification attainment.
All values are presented for English domiciled students only (and estimates for the (small) number of HE students from Wales, or Scotland, or Northern Ireland have not been presented here[116]). ***Source: London Economics' analysis***

[116] As discussed in Section 2.1.1, 99% of higher education students in the 2020-21 University College Birmingham cohort were English domiciled students.

Table 21 Net learner benefits and Exchequer benefits per English domiciled student associated with FE qualification and apprenticeship attainment at University College Birmingham

Level of study	Previous qualification and gender											
	Entry and No Qualifications		Level 1 Vocational		Level 2 Vocational		Level 3 Vocational		Intermediate Apprenticeship		Advanced Apprenticeship	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Net learner benefits												
Level 1 Vocational	£4,000	£33,000										
Level 2 Vocational			£62,000	£57,000								
Level 3 Vocational					£68,000	£33,000						
Level 4 Vocational							-£16,000	-£15,000				
Intermediate Apprenticeship			£129,000	£72,000								
Advanced Apprenticeship									£3,000	£25,000		
Higher Apprenticeship											-£12,000	£19,000
Net Exchequer benefits												
Level 1 Vocational	£0	-£2,000										
Level 2 Vocational			£42,000	£5,000								
Level 3 Vocational					£65,000	£12,000						
Level 4 Vocational							£0	£1,000				
Intermediate Apprenticeship			£107,000	£13,000								
Advanced Apprenticeship									£1,000	£17,000		
Higher Apprenticeship											-£14,000	£14,000

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (with the given characteristics).
In terms of prior attainment, note again that there was no prior attainment information available for further education students and apprentice learners in the 2020-21 cohort, so we assumed that all students starting a given level of FE qualification/apprenticeship at University College Birmingham in 2020-21 were in possession of the next highest (lower) level of qualification. While grey shading indicates instances where the level of study at University College Birmingham would be equal to or lower than the level of previous attainment, given these assumptions, there are no FE students or apprentice learners in the cohort whom this applies to.
In terms of study mode, note again that all further education students in the 2020-21 cohort were undertaking their qualifications on a full-time basis (so that estimates for part-time students are not applicable).
All values are presented for English domiciled students only (and we assume that all FE students and apprentice learners in the 2020-21 University College Birmingham cohort were English domiciled prior to starting their learning/training at the University).
Source: London Economics' analysis

A2.2.6 Estimating net apprentice pay during training

During their training, while incurring the (indirect) *costs* of foregone earnings associated with the baseline/counterfactual group level of qualification, apprentice learners receive **apprentice wages over the period of their training**.

To estimate these benefits for learners in the 2020-21 cohort of learners starting apprenticeships at University College Birmingham, we made use of the Department for Business, Energy, and Industrial Strategy's **2018-19 Apprenticeship Pay Survey for England**[117]. The survey provides detailed information on the average hourly pay[118] and number of contracted hours per week[119] among apprentices in England, with separate breakdowns available by gender, age band (16-18, 19-20, 21-24, and 25+), and RQF level (Level 2 (i.e. Intermediate Apprenticeships), Level 3 (i.e. Advanced Apprenticeships), and Level 4 (i.e. Higher Apprenticeships)).

Given that the original survey results are only published separately by *either* gender, age band or level, we first **estimated a combined breakdown** of apprentice wages across all three of these dimensions. Specifically, we first estimated a breakdown *by age band and level*, by multiplying the pay rates by level by the ratio of overall average hourly pay for each age band relative to the overall average hourly pay at each level. In other words, we assume the same pay distribution by age band across all apprenticeship levels. We then proceeded similarly to estimate the breakdown *by level and age band and gender*, assuming the same pay distribution by gender across all age bands and levels.

Table 22 presents our resulting estimated combined breakdown of hourly apprentice pay rates by gender, age band and level.

Table 22 Average apprentice pay per hour in England: Estimated combined breakdown by gender, age band and apprenticeship level

Age band	Male			Female		
	Level 2 (Intermediate)	Level 3 (Advanced)	Level 4 (Higher)	Level 2 (Intermediate)	Level 3 (Advanced)	Level 4 (Higher)
16-18	£4.81	£6.08	-	£4.51	£5.70	-
19-20	£6.11	£7.72	£8.53	£5.73	£7.24	£7.95
21-24	£7.75	£9.80	£9.79	£7.27	£9.19	£9.12
25+	£8.92	£11.27	£12.88	£8.36	£10.56	£12.00

Note: All hourly pay rates are presented in 2018-19 prices. Pay rates for Level 4 (Higher) Apprenticeships for age band 16-18 were not available (as these learners are typically older when undertaking their apprenticeships).
Source: London Economics' analysis based on Department for Business, Energy, and Industrial Strategy (2020)

To estimate aggregate (net) apprentice pay over the total study duration, we then undertook the following calculation steps:

1. By combining the above average hourly pay rates with the associated average number of contracted hours per week (36.6 hours for Levels 2/3 and 37.1 hours for Level 4, again based on the 2018-19 Apprenticeship Pay Survey for England) and the average number of weeks per year (52.2[120]), we calculated **average *annual* earnings**.

[117] See Department for Business, Energy, and Industrial Strategy (2020). The survey was conducted between 27th November 2018 and 10th March 2019.
[118] We use information on basic hourly pay, excluding any overtime pay (or other income, e.g. through tips from customers).
[119] Contracted hours per week exclude any paid or unpaid overtime.
[120] As part of the same survey, 87% of all Level 2 and Level 3 apprentices in England indicated that they had written contracts with their employers covering the full year.

2. Using the assumptions on the average age at which apprentice learners in the 2020-21 University College Birmingham cohort start their training and the assumed average duration of training (by level)[121], we estimated the **annual gross (i.e. pre-tax) apprentice earnings per learner over the total study duration**.
3. As with earnings post-completion, we adjusted the estimates to account for OBR **real average earnings growth forecasts** for the UK[122].
4. Based on the relevant income tax and National Insurance employee contribution rates and thresholds, we computed the stream of **net (post-tax) apprentice earnings**.
5. Finally, we discounted the results to **NPV terms in 2020-21 prices**.

A2.3 Impact on educational exports

A2.3.1 Additional information on the 2020-21 cohort of non-UK domiciled higher education students studying at University College Birmingham

Table 23 presents a detailed breakdown of the 2020-21 non-UK domiciled University College Birmingham higher education cohort, by domicile, level, and mode of study.

Table 23 Non-UK domiciled students in the 2020-21 cohort of University College Birmingham students, by level of study, mode of study and domicile

Level and mode of study	Domicile		
	EU	Non-EU	Total
Full-time			
Other undergraduate	85	10	**95**
First degree	270	115	**385**
Other postgraduate	0	10	**10**
Higher degree (taught)	70	135	**205**
Total	**425**	**270**	**695**
Part-time			
Other undergraduate	20	5	**25**
First degree	5	5	**10**
Other postgraduate	0	0	**0**
Higher degree (taught)	0	0	**0**
Total	**25**	**10**	**35**
Total			
Other undergraduate	105	15	**120**
First degree	275	120	**395**
Other postgraduate	0	10	**10**
Higher degree (taught)	70	135	**205**
Total	**450**	**280**	**730**

Note: All numbers are rounded to the nearest 5, and the total values may not add up precisely due to this rounding. 'Other undergraduate' learning includes mostly Foundation Degrees, as well as a small number of students undertaking other undergraduate qualifications or undergraduate-level credits. 'Other postgraduate' includes postgraduate diplomas (at Level M). Further note that there are no postgraduate research degrees offered by University College Birmingham.

Source: London Economics' analysis based on University College Birmingham's HESA data

[121] See Annex A2.2.3 for more detail.

[122] Again, we assume an average real annual earnings growth rate of **1.6%** (based on long-term average earnings growth rate forecasts estimated by the Office for Budget Responsibility (2022).

A2.3.2 Net tuition fee income per international student

Table 24 presents estimates of the net tuition fee income per international student in the 2020-21 University College Birmingham cohort (over the entire study duration), by domicile, level of study, and mode of study.

Table 24 Net tuition fee income per international student in the 2020-21 cohort of University College Birmingham students, by level of study, mode, and domicile

Level	EU domiciled students		Non-EU domiciled students	
	Full-time	Part-time	Full-time	Part-time
Other undergraduate	£12,000	£11,000	£13,000	£13,000
First degree	£33,000	£33,000	£36,000	£35,000
Other postgraduate	£9,000		£3,000	
Higher degree (taught)	£9,000	£8,000	£3,000	£3,000

Note: Gaps may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (of the given characteristics). All estimates are presented in 2020-21, discounted to reflect net present values, and rounded to the nearest £1,000.

Source: London Economics' analysis

A2.3.3 Assumed average stay durations among international students

As outlined in Section 3.2.2, to estimate the non-tuition fee income associated with non-UK students in the 2020-21 University College Birmingham cohort, we adjusted the estimates of non-tuition fee expenditure per academic year from the Student Income and Expenditure Survey (based on English domiciled students) to reflect longer stay durations in the UK for international students.

Table 25 Assumed average stay durations (in weeks) for non-UK domiciled students, by study level and study mode

Level of study	Domicile	
	EU (outside UK)	Non-EU
Undergraduate	39 weeks	42 weeks
Postgraduate	52 weeks	52 weeks

Source: London Economics' analysis based on Department for Business, Innovation and Skills (2011b)

In particular, following a similar approach as a study for the (former) Department for Business, Innovation and Skills (2011b), we assume that **EU domiciled postgraduate** and **non-EU domiciled undergraduate and postgraduate students** spend a larger amount of time in the UK than prescribed by the duration of the academic year (39 weeks), on average[123]. Hence, we assume that all international postgraduate students (both EU and non-EU domiciled) spend **52 weeks** per year in the UK (as they write their dissertations during the summer). Further, we assume that non-EU domiciled and EU domiciled undergraduate students spend an average of **42** and **39 weeks** per year in the UK (respectively). The lower stay duration for EU undergraduate students reflects the expectation that these students, given the relative geographical proximity to their home countries and the resulting relative ease and low cost of transport, are more likely to return home during holidays. These assumptions are summarised in Table 25.

[123] There may be significant variation around these assumed average stay durations depending on individual students' circumstances, such as country of origin, parental income etc. Further note that we have made separate adjustments to the non-tuition fee expenditures of international students in the cohort during the 2020-21 academic year to account for the increased likelihood of students returning to their home countries during the Covid-19 pandemic (see Section 3.2.2).

A2.3.4 Non-fee income per international student

Table 26 presents estimates of the non-tuition fee income per international student in the 2020-21 University College Birmingham cohort (over the entire study duration), by domicile, level of study, and mode of study.

Table 26 Non-fee income per international student in the 2020-21 cohort of University College Birmingham students, by level of study, mode, and domicile

Level	EU domiciled students		Non-EU domiciled students	
	Full-time	Part-time	Full-time	Part-time
Other undergraduate	£9,000	£28,000	£10,000	£31,000
First degree	£32,000	£56,000	£35,000	£60,000
Other postgraduate	£13,000		£13,000	
Higher degree (taught)	£13,000	£38,000	£13,000	£38,000

Note: Gaps may arise where there are no students in the 2020-21 University College Birmingham cohort expected to complete the given qualification (of the given characteristics). All estimates are presented in 2020-21, discounted to reflect net present values, and rounded to the nearest £1,000.

Source: London Economics' analysis

A2.4 Total impact by region and sector (where available)

In addition to the total impact on the UK economy as a whole (presented in Section 5), it was possible to disaggregate 2 out of the three strands of University College Birmingham's economic impact by sector and region (and estimate the impacts in terms of economic output *as well as* GVA and FTE employment), including:

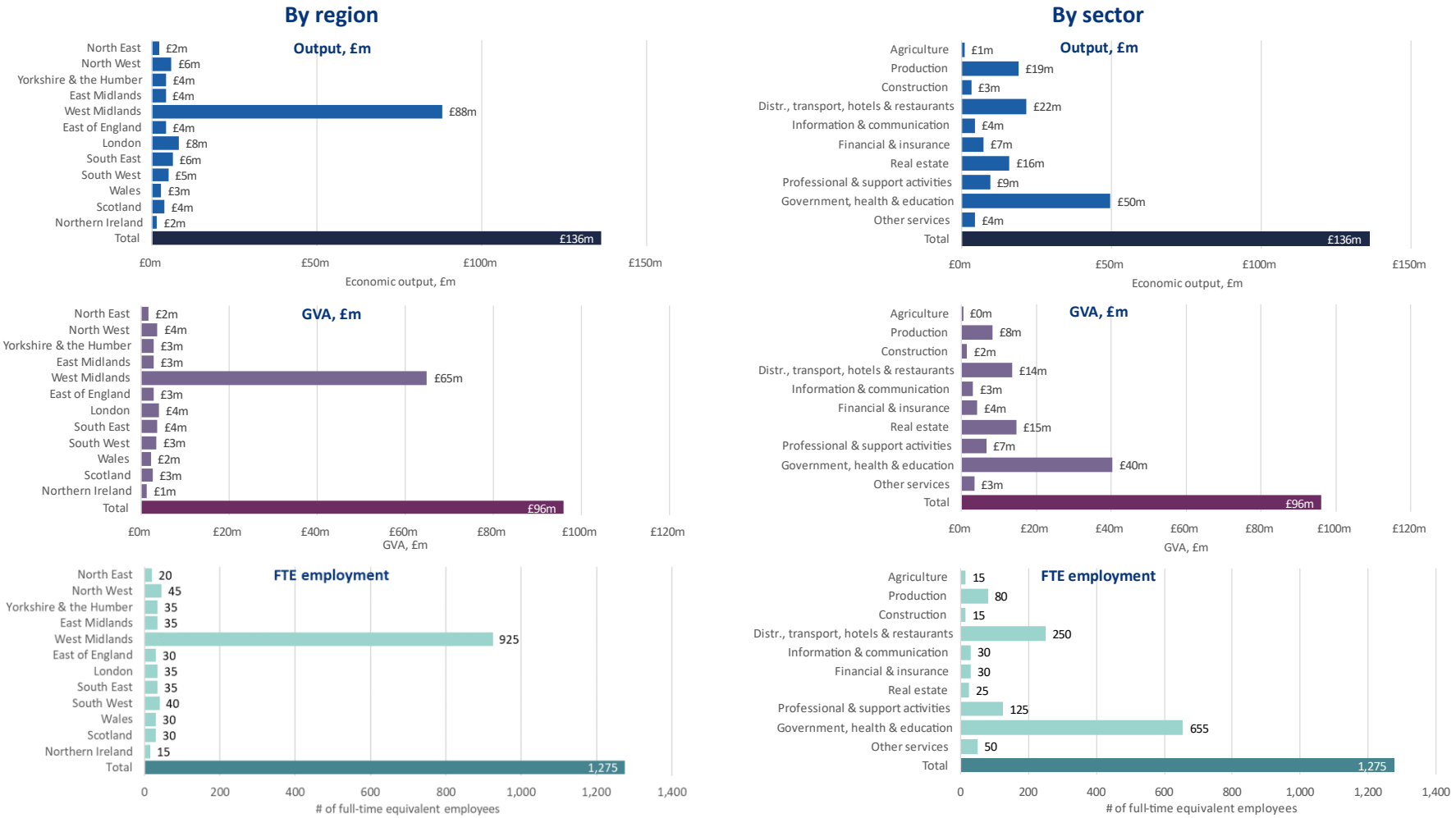
- The impact of University College Birmingham's **educational exports** (**£75 million**, see Section 3); and
- The impact associated with the **operating and capital expenditure of University College Birmingham** (**£61 million**, see Section 4).

Hence, approximately **£136 million** (**38%**) of University College Birmingham's total impact of **£358 million** can be disaggregated in this way[124] (see Figure 24).

In terms of the breakdown by region, the analysis indicates that of this total of **£136 million**, **£88 million** (**65%**) was generated in the **West Midlands**, with **£48 million** (**35%**) occurring in **other regions** across the UK. In terms of sector, University College Birmingham's activities resulted in particularly large impacts within the government, health, and education sector (**£50 million**, **37%**), the distribution, transport, hotel, and restaurant sector (**£22 million**, **16%**), the production sector (**£19 million**, **14%**), and the real estate sector (**£16 million**, **12%**).

[124] The remaining **£221 million** of impact includes relates to the impact of **teaching and learning activities**, where a breakdown by region or sector is not available due to graduate mobility (i.e. it is very difficult to determine the region/sector of employment that graduates end up in).

Figure 24 Total economic impact of University College Birmingham's activities in 2020-21, by region and sector (where possible)



Note: Monetary estimates are presented in 2020-21 prices, discounted to reflect net present values (where applicable), rounded to the nearest £1 million, and may not add up precisely to the totals indicated. Employment estimates are rounded to the nearest 5, and again may not add up precisely to the totals indicated. ***Source: London Economics' analysis***

LE London Economics

Somerset House, New Wing, Strand
London, WC2R 1LA, United Kingdom
info@londoneconomics.co.uk
londoneconomics.co.uk
: @LE_Education @LondonEconomics
+44 (0)20 3701 7700