The economic impact of Leeds Beckett University

Final Report for Leeds Beckett University

LE London Economics

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Executive Summary

London Economics were commissioned to analyse the economic impact of Leeds Beckett University on the UK economy, focusing on the 2018-19 academic year. Specifically, the analysis captures the economic impact generated by Leeds Beckett University's **teaching and learning** activity associated with the 2018-19 cohort of UK domiciled students; the impact of the University's **research activities**; the impact of **educational exports** generated by the international students in the 2018-19 cohort of Leeds Beckett University students; and the impact associated with the University's **operating and capital expenditures**.

The aggregate economic impact of Leeds Beckett University

The total economic impact on the UK economy associated with Leeds Beckett University's activities in 2018-19 was estimated at approximately **£1.43 billion** (see Table 1)[1]. In terms of the components of this impact, Leeds Beckett University's **teaching and learning activities** accounted for **£820 million** (**57**% of total), while the value of the University's **research activities** stood at **£23 million** (**2%**). The impact of the University's **educational exports** was estimated at **£80 million** (**6%**), while the total impact associated with the **spending of Leeds Beckett University** stood at **£508 million** (**35%**). Compared to the University's total operational costs of approximately **£233 million** in 2018-19[2], the total impact of Leeds Beckett University's activities on the UK economy was estimated at **£1.43 billion**[3], which corresponds to an impressive **benefit to cost ratio of 6.1:1.**

Table 1 Total economic impact of Leeds Beckett University's activities in the UK in 2018-19 (£m and % of total)

Type of impact		£m	%
	Impact of teaching and learning	**£820m**	**57%**
	Students	£421m	29%
	Exchequer	£399m	28%
	Impact of research	**£23m**	**2%**
	Research activities	£14m	1%
	Knowledge transfer activities (spinouts)	£9m	1%
	Impact of exports	**£80m**	**6%**
	Tuition fee income	£26m	2%
	Non-tuition fee income	£53m	4%
	Impact of the University's expenditure	**£508m**	**35%**
	Direct impact	£226m	16%
	Indirect and induced impacts	£282m	20%
	Total economic impact	**£1,431m**	**100%**

Note: All estimates are presented in 2018-19 prices, and rounded to the nearest £1m. Totals may not add up precisely due to rounding.
Source: London Economics' analysis

[1] All estimates here are presented in terms of economic output (equivalent to income/turnover). The impact of Leeds Beckett University's knowledge transfer activities, educational exports, and expenditures can also be converted into gross value added (GVA) and full-time (FTE) employment, and these additional findings are provided within the relevant sections throughout this report.
[2] Compared to the **£226 million** of direct impact of Leeds Beckett University's expenditures presented in Section 5 and Table 9, the **£233 million** of operating expenditure considered here *excludes* capital expenditure (**£50 million**) but *includes* depreciation costs (**£32 million**) and movements in pension provisions (**£25 million**).
[3] In addition to this total impact on the UK economy as a whole, *some* of the strands of impact considered in the analysis can be disaggregated by sector and region (and can be measured in economic output as well as GVA and (FTE) employment). In aggregate, approximately **£587 million** (**41%**) of Leeds Beckett University's total impact can be disaggregated in this way. For more information, see Annex 1.

The impact of the University's teaching and learning activities

The impact of the University's teaching and learning activities incorporates the **enhanced employment and earnings benefits to graduates**, and the **additional taxation receipts to the Exchequer** associated with higher education qualification attainment at the University[4]. The analysis is adjusted for the characteristics of the **9,535** UK domiciled students who started a qualification (or standalone module/credit) at Leeds Beckett University in the 2018-19 academic year.

Incorporating both the benefits and costs to students/graduates, the analysis suggests that the **net graduate premium** achieved by a representative English domiciled student in the 2018-19 cohort completing a **full-time first degree** at the University (with GCE 'A' Levels as their highest level of prior attainment) stands at approximately **£67,000** (in 2018-19 money terms, on average across men and women). Taking account of the benefits and costs to the public purse, the analysis indicates that the corresponding **net Exchequer benefit** associated with these students stands at **£60,000**.

The total economic impact of teaching and learning generated by the 2018-19 cohort of Leeds Beckett University students stands at £820 million.

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 Leeds Beckett University in 2018-19 and expected completion rates. The aggregate economic impact generated by the University's teaching and learning activities associated with the 2018-19 cohort stood at approximately **£820 million** (see Section 2.6). This is split equally between students and the Exchequer, with **£421 million** (**51%**) of the economic benefit accrued by students undertaking qualifications at Leeds Beckett University, and the remaining **£399 million** (**49%**) accrued by the Exchequer.

Table 2 Aggregate impact of Leeds Beckett University's teaching and learning activities associated with the 2018-19 cohort (£m), by type of impact, domicile, and level of study

Beneficiary and study level	Domicile				
	England	Wales	Scotland	Northern Ireland	Total
Students	**£412m**	**£5m**	**£1m**	**£3m**	**£421m**
Undergraduate	£365m	£5m	£1m	£2m	**£372m**
Postgraduate	£47m	£1m	£0m	£1m	**£48m**
Exchequer	**£390m**	**£4m**	**£1m**	**£4m**	**£399m**
Undergraduate	£315m	£3m	£1m	£3m	**£322m**
Postgraduate	£75m	£1m	£0m	£1m	**£77m**
Total	**£801m**	**£10m**	**£2m**	**£6m**	**£820m**
Undergraduate	£680m	£8m	£2m	£5m	**£695m**
Postgraduate	£122m	£2m	£1m	£2m	**£126m**

Note: All estimates are presented in 2018-19 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

[4] The estimation of the net graduate premiums and net Exchequer benefits is based on a detailed econometric analysis of the Labour Force Survey. The analysis considers the impact of higher education qualification attainment on earnings and employment outcomes; however, as no information is specifically available on the particular higher education institution attended, the analysis is not specific to Leeds Beckett University alumni. Rather, the findings from the econometric analysis are adjusted to reflect the characteristics of the 2018-19 cohort of Leeds Beckett University students (e.g. in terms of mode of study, level of study, subject mix, domicile, gender, average age at enrolment, duration of qualification, and average completion rates).

The impact of the University's research

To estimate the **direct** economic impact associated with Leeds Beckett University's research, we used information on the total research-related income accrued by the University in 2018-19 (including income from research grants and contracts, as well as quality related recurrent research grant funding provided by Research England). The total research-related income accrued by Leeds Beckett University in 2018-19 stood at **£8.3 million**. To arrive at the net impact of the University's research activities, we deducted the public costs of funding the University's research (including funding from the UK Research Councils, Research England, and from UK central government bodies, Local Authorities, and health and hospital authorities). Together, these public costs amounted to **£6.3 million** in 2018-19, resulting in a **net direct research impact** of **£2.1 million**.

Existing academic literature[5] suggests that there is strong evidence of the existence of **productivity spillovers** from public investment in university research. Applying estimates from the literature, our analysis implies a spillover multiplier of approximately **1.4** associated with Leeds Beckett University's research income in 2018-19. In other words, **every £1 million invested in research at Leeds Beckett University results in an additional economic output of £0.4 million across the UK economy**. Combining the **net direct impact** of the University's research activities (**£2.1 million**) with the resulting **productivity spillovers** accrued by other organisations across the UK (**£12 million**), the total impact of research conducted by the University in 2018-19 was estimated at **£14 million**.

In addition to Leeds Beckett University's research, the analysis estimated the impact associated with **knowledge transfer activities** (the activities of Leeds Beckett University's **spinout company**). The analysis considers the direct, indirect, and induced economic impacts associated with these activities. The **direct** impact of these activities was based on the turnover of Leeds Beckett University's active spinout company. The **total direct, indirect, and induced impacts** of this activity was then estimated using relevant **economic multipliers** derived from a (multi-regional) Input-Output model. Using this approach, the analysis estimates that Leeds Beckett University's spin-out activities generated a total of **£9 million** of impact across the UK economy in 2018-19.

The total economic impact associated with Leeds Beckett University's research activities in 2018-19 was estimated at **£23 million** (see Figure 1). Compared to the **£8 million** in research income received by the University in 2018-19, this suggests that **for each £1 million of its research income, Leeds Beckett University's research activities generated a total of £2.8 million in economic impact across the UK.**

The impact of Leeds Beckett University's research activities in 2018-19 stood at £23 million.

Figure 1 Total impact of Leeds Beckett University's research activities in 2018-19, £m

Note: All values are presented in economic output in 2018-19 prices, rounded to the nearest £1 million, and may not add up precisely to the totals indicated. ***Source: London Economics' analysis***

[5] See Haskel and Wallis (2010), and Haskel et al. (2014).

The impact of the University's educational exports

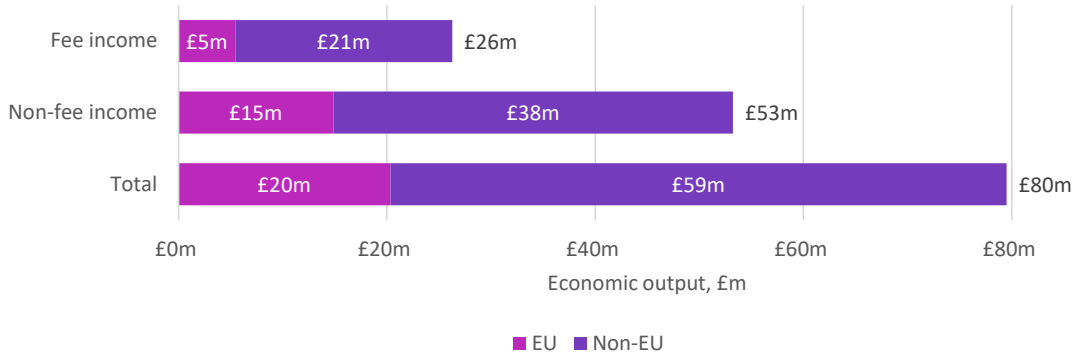
Leeds Beckett University's higher education offer represents a tradeable activity with imports and exports like any other tradeable sector. The economic impact of the University's contribution to educational exports is based on the **direct** injection of **tuition fee and non-tuition fee income** from 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 **710** non-UK domiciled students who started qualifications (or modules/credits) at Leeds Beckett University in the 2018-19 academic year. Of these students, **185** (**26%**) were EU domiciled, and **525** (**74%**) were from non-EU countries.

Combining the estimates of tuition fee income (net of any Exchequer or University costs of funding international students) and non-tuition fee income associated with international students in the 2018-19 cohort, the **total export income (i.e. direct impact)** generated by this cohort stood at **£31 million**. Approximately two-thirds of this income (**£21 million**) was generated from international students' non-tuition fee spending, while the other third (**£10 million**) was generated from international students' (net) tuition fees accrued by the University.

The impact of the export income generated by the 2018-19 Leeds Beckett University cohort stood at £80 million.

The total (direct, indirect, and induced) economic impact associated with this export income was again estimated using relevant economic multipliers, estimating 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 2018-19 Leeds Beckett University cohort amounts to **£80 million** (Figure 2). Of this total, **£26 million** of this impact was associated with international students' (net) **tuition fees**, and **£53 million** was associated with these students' **non-tuition fee expenditures** over the duration of their studies at Leeds Beckett University.

Figure 2 Impact of Leeds Beckett University's educational exports associated with international students in the 2018-19 cohort (£m), by domicile and type of income



Note: All estimates are presented in 2018-19 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 the University's expenditure

Leeds Beckett University's physical and digital footprint supports jobs and promotes economic growth throughout the UK economy. This is captured by the **direct, indirect, and induced impact** associated with the expenditures of the institution.

The **direct impact** of the University's physical and digital footprint was based on the operating and capital expenditures of Leeds Beckett University. In 2018-19, the University incurred a total of **£226 million** of expenditure (consisting of **£176 million** of operating expenses and **£50 million** of capital expenditure)[6].

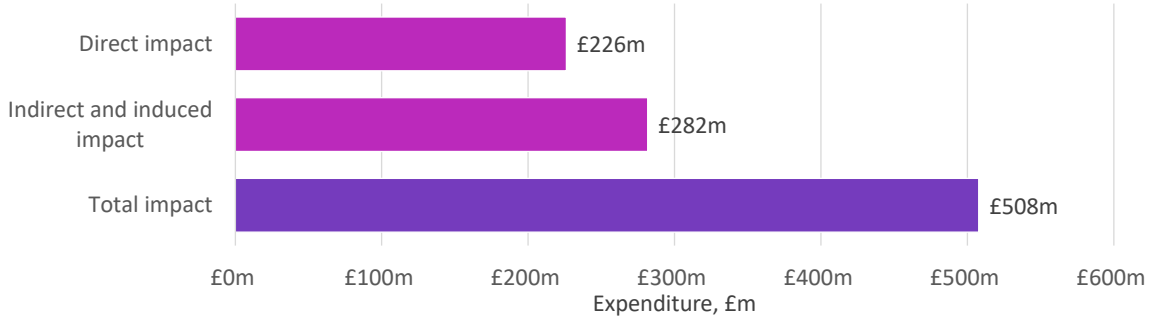
The impact of Leeds Beckett University's expenditure on the UK economy in 2018-19 stood at £508 million.

Again, the direct increase in economic activity resulting from the expenditures of Leeds Beckett University generates additional rounds of spending throughout the economy (through the University's supply chains, and the spending of staff). Applying the relevant economic multipliers, the **total direct, indirect, and induced impact** associated with Leeds Beckett University's expenditures in 2018-19 was estimated at **£508 million** (see Figure 3).

In terms of region, the majority of this impact (**£325 million**, **64%**) was generated in **Yorkshire and the Humber**, with **£183 million** (**36%**) 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 (**£241 million**, **47%**), there are also large impacts felt within other sectors, e.g. including the **distribution, transport, hotel, and restaurant sector** (**£65 million**, **13%**), the **production sector** (**£64 million**, **13%**), and the **real estate sector** (**£44 million**, **9%**).

In terms of the number of jobs supported (in FTE), the results indicate that Leeds Beckett University's spending supported a total of **4,015** FTE jobs across the UK economy in 2018-19 (of which **2,945** are located in Yorkshire and the Humber).

Figure 3 Impact associated with Leeds Beckett University's expenditure in 2018-19 (£m)



Note: All estimates are presented in 2018-19 prices, rounded to the nearest £1m, and may not add up precisely to the totals indicated.
Source: London Economics' analysis

[6] The total operational expenditure (excluding capital expenditure) of Leeds Beckett University in 2018-19 stood at **£233 million**. From this, for the purpose of the analysis, we excluded **£32 million** in depreciation costs (from non-staff expenditure) and **£25 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 **£176 million** in 2018-19.

Box 1 Anchor institutions in Leeds City Region

Despite being one of the wealthiest nations in the world, more than one in five people experience poverty in the UK.[7] One policy response has seen the emergence of **anchor institutions** as a means of addressing the persistent problem of poverty. Anchors – such as local authorities, hospitals and universities, make a **major contribution to the character of a local economy through the amount they spend and the number of people they employ**. At a time when public sector reform and greater devolution is creating space for these organisations to contribute to inclusive economic growth objectives, **Leeds Business School's (LBS) research identified major opportunities to alleviate poverty** through innovation, co-production and new forms of collaboration between local organisations within and across sectors.

This research is transforming how such organisations operate in the city of Leeds, providing an evidence-based foundation for policy that supports **inclusive economic growth**, ensuring fairer **distribution of income and employment opportunities** in the city.

Action learning with **12 anchor organisations** over a two-year period (2015-17) co-created an innovative framework that is used to assess 'good jobs' in the supply chain and has encouraged organisations to spend more of their procurement budgets locally, with one anchor institution increasing its discretionary spend **channelled into the local economy** from **25% to 60%**. Working together, the anchors participating in the project found that they spent more than **£1.4 billion** a year on procuring goods and services and identified the opportunity to shift more than 10% of this spending to suppliers in the Leeds City Region, worth an **additional £168-£196 million to the city** region economy.

The research has inspired Leeds City Council to establish a permanent anchor network within the city, informed its **City Region Inclusive Growth Strategy** and contributed to the policy approaches adopted by the West Yorkshire Combined Authority. The research has also been used to inform inclusive growth planning by the Welsh Government and the Key Cities Network's engagement with government. During 2020, the research contributed to regional planning for sustainable, post-pandemic recovery.

[7] Social Metrics Commission (2019), available here.

1 Introduction

London Economics were commissioned to assess the **economic impact of Leeds Beckett University in the United Kingdom**, focusing on the 2018-19 academic year. Leeds Beckett University contributes to the UK's national prosperity through a range of activities and channels, and the analysis is split into:

- The economic contribution of Leeds Beckett University's provision of **teaching and learning**;
- The impact of Leeds Beckett University's **research and knowledge transfer activity**;
- The contribution of Leeds Beckett University's to **educational exports**; and
- The total economic impact of Leeds Beckett University's **operating and capital expenditures**.

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 higher education attainment at Leeds Beckett University. Through an assessment of the lifetime benefits and costs associated with educational attainment, we estimate the net economic benefits of the University's teaching and learning activity to students and the public purse (through enhanced taxation receipts), focusing on the cohort of **9,535** UK domiciled students who started higher education qualifications at Leeds Beckett University in 2018-19.

In **Section 3**, we outline our estimates of the impact of Leeds Beckett University's research and knowledge transfer activities. To estimate the impact of the world-leading research undertaken at the University, we combine information on the research-related income accrued by Leeds Beckett University in 2018-19 with estimates from the wider economic literature on the extent to which public investment in research activity results in additional private sector productivity (i.e. positive 'productivity spillovers').

In addition to the UK domiciled students, there were a further **710** international students in the 2018-19 cohort of Leeds Beckett University 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 4** assesses the direct, indirect, and induced economic impacts generated by this fee and non-fee income associated with the University's 2018-19 cohort of international students.

Given that Leeds Beckett University is a major employer and supports its core activities through significant expenditures, the University's substantial physical footprint also supports jobs and promotes economic growth throughout the UK economy. **Section 5** presents our estimates of the direct, indirect, and induced economic impacts associated with the staff and non-staff related operating and capital expenditures incurred by Leeds Beckett University in 2018-19.

Section 6 of this report **summarises** our main findings in respect of the economic contribution of Leeds Beckett University to the UK economy. The analysis is complemented throughout with case studies showcasing the wide-reaching activities undertaken at the University.

2 The impact of Leeds Beckett University's teaching and learning activities

Traditional economic impact analyses of higher education institutions typically 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), as well as 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 of the report, we detail our estimates of the economic impact of the teaching and learning activities undertaken at Leeds Beckett University, 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 2018-19 cohort of UK domiciled Leeds Beckett University students

The analysis of the economic impact of Leeds Beckett University's teaching and learning activities is based on the **2018-19 cohort of UK domiciled students**. In other words, instead of the University's entire student body of **23,275** students in 2018-19 (*irrespective* of when these individuals may have started their studies), the analysis in this section focuses on the **9,535** UK domiciled[8] students **starting higher education qualifications (or standalone modules/credits) in the 2018-19 academic year**[9].

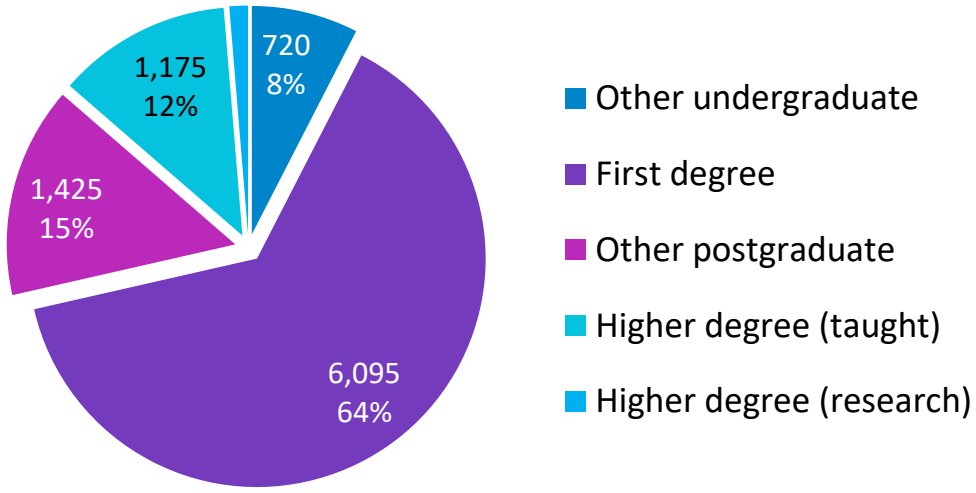
In terms of **level of study** (Figure 4), **64%** (**6,095** students) in this cohort of UK domiciled students were undertaking **first degrees**, with a further **1,175** students (**12%**) undertaking **postgraduate taught degrees**, and **125** students (**1%**) enrolled in **postgraduate research degrees**. An additional **720** students (**8%**) were enrolled in **other undergraduate qualifications**, and the remaining **1,425** (**15%**) were undertaking **other postgraduate qualifications**[10].

[8] It is likely that a proportion of EU and non-EU domiciled students undertaking their studies at Leeds Beckett University 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 Leeds Beckett University.

[9] We received HESA data on a total of **10,245** first-year students from Leeds Beckett University. Of these, we excluded **710** non-UK domiciled students (who are instead considered as part of the analysis of **educational exports** (Section 4)).

[10] 'Other undergraduate' learning includes Certificates of Higher Education, Foundation Degree, other undergraduate-level diplomas and certificates, and undergraduate-level credits. 'Other postgraduate learning' includes Postgraduate Certificates or Professional Graduate Diplomas in Education, taught work for credit at postgraduate level, and other certificates, diplomas, and qualifications at postgraduate level.

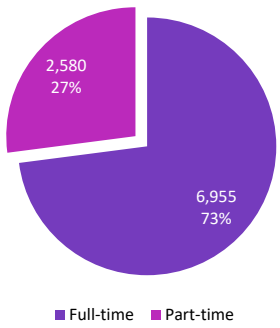
Figure 4 UK domiciled students in the 2018-19 cohort of Leeds Beckett University students, by level of study



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 Certificates of Higher Education, Foundation Degree, other undergraduate-level diplomas and certificates, and undergraduate-level credits. 'Other postgraduate learning' includes Postgraduate Certificates or Professional Graduate Diplomas in Education, taught work for credit at postgraduate level, and other certificates, diplomas, and qualifications at postgraduate level.
Source: London Economics' analysis based on Leeds Beckett University HESA data

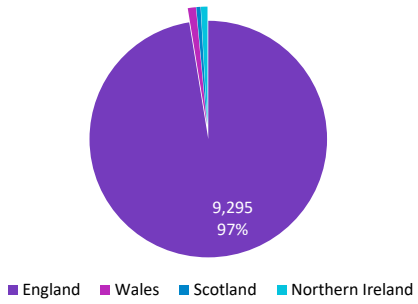
In relation to **mode of study** (Figure 5), **6,955** (**73%**) students in the cohort were undertaking their studies with Leeds Beckett University on a full-time basis, while the remaining **2,580** (**27%**) were enrolled on a part-time basis. As shown in Table 3, the majority of full-time students were undertaking first degrees (**83%**). The majority of part-time students in the cohort were enrolled in postgraduate degrees with **40%** undertaking other postgraduate learning and **24%** undertaking other undergraduate degrees.

Figure 5 UK domiciled students in the 2018-19 cohort of Leeds Beckett University 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 Leeds Beckett University HESA data

Figure 6 UK domiciled students in the 2018-19 cohort of Leeds Beckett University 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 Leeds Beckett University HESA data

In terms of **domicile** (Figure 6), the majority (**9,295**, **97%**) of UK domiciled students in the cohort were from England, with the remaining **245** (**3%**) students domiciled outside of England (including **105** students from Wales, **55** from Scotland, and **85** from Northern Ireland).

Table 3 UK domiciled students in the 2018-19 cohort of Leeds Beckett University students, by level of study, mode, and domicile

Level and mode of study	Domicile				
	England	Wales	Scotland	Northern Ireland	Total
Full-time					
Other undergraduate	100	-	-	-	**100**
First degree	5,645	60	15	50	**5,765**
Other postgraduate	400	-	-	-	**405**
Higher degree (taught)	615	5	5	10	**635**
Higher degree (research)	50	-	-	-	**50**
Total	**6,810**	**70**	**15**	**60**	**6,955**
Part-time					
Other undergraduate	605	10	5	-	**620**
First degree	325	-	5	-	**330**
Other postgraduate	965	10	25	20	**1,020**
Higher degree (taught)	520	10	5	5	**540**
Higher degree (research)	70	-	-	-	**70**
Total	**2,485**	**35**	**35**	**25**	**2,580**
Total					
Other undergraduate	705	10	5	-	**720**
First degree	5,970	65	15	50	**6,095**
Other postgraduate	1,365	15	25	20	**1,425**
Higher degree (taught)	1,135	15	5	15	**1,175**
Higher degree (research)	120	-	-	-	**125**
Total	**9,295**	**105**	**55**	**85**	**9,535**

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 Certificates of Higher Education, Foundation Degree, other undergraduate-level diplomas and certificates, and undergraduate-level credits. 'Other postgraduate learning' includes Postgraduate Certificates or Professional Graduate Diplomas in Education, taught work for credit at postgraduate level, and other certificates, diplomas, and qualifications at postgraduate level. ***Source: London Economics' analysis based on Leeds Beckett University HESA data***

Box 2 LBU's growing international reach

Leeds Beckett opened an office in **India** in 2004 to support recruitment of Indian students on to courses in the UK. Over the intervening years recruitment of Indian students into the UK has steadily increased from 102 in 2004/5 to 1220 in 2021/22.

Over the last five years the University recognised the opportunities to work in India beyond its initial recruitment ambitions and the Indian Office, now having a presence in New Delhi, Tamil Nadu and Maharashtra, has expanded its portfolio to recruit across the South Asia region, developing into LBU's strongest overseas hub. It has acted as a catalyst for partnerships with Indian universities and colleges enabling successful bids to be made for research activities and learning and teaching development.

Such partnerships include a UKIERI-supported research collaboration with University of Calcutta and IMI Kolkata on Fostering Entrepreneurship for Sustainable and Inclusive Agri-Food Innovation; working with Symbiosis International to increase student mobility, supported by the British Council; and, developing assistive technologies for medical systems, supporting age-related disorders and Parkinson's disease, with Axxonet System Technologies.

The success in India has also led to international mobility opportunities for staff and students from India and the UK to engage in academic and cultural activities. These include the participation of students in volunteering at the Commonwealth and Youth Commonwealth Games in India; student participation in the Bollywood Awards ceremony; and volunteering work for Social Organisation, a charity working with underprivileged women and children.

Finally, LBU's success has led to alumni returning to the region and setting up successful businesses. One example is Sanchit Vir Gogia (MSc Marketing) who is the founder and CEO of Greyhound Reach, an award-winning Digital and Technology Research and Advisory firm. Sanchit also serves as a FinTech advisor with the Digital Futurists Angel Network, where he advises and mentors start-ups and growth companies innovating in the sector. Another alumnus, Keyur Shah (MSc International Events Management), is the Founding Director at Usually Unusual Entertainment that manage events of national importance, including in collaboration with the Prime Minister's office and the mega sports event of India, IPL.

2.2 Adjusting for completion rates

The previous section provided an overview of the number of UK domiciled students *starting* qualifications or modules at Leeds Beckett University in the 2018-19 academic year. However, to aggregate individual-level impacts of the University's teaching and learning activity, it is necessary to adjust the number of 'starters' to account for **completion rates**.

To achieve this, we used information provided by Leeds Beckett University on the completion outcomes of the 2011/12 to 2019/20 Leeds Beckett University cohorts - broken down by domicile, study mode, study intention, and study completion. 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 without being awarded a qualification (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 higher degrees or other postgraduate qualifications)[11]).

Table 4 presents the resulting completion rates applied throughout the analysis. We assume that, of those students starting a full-time first degree at Leeds Beckett University in 2018-19, **79%** complete the first degree as intended, while the remaining **21%** undertake one or more of the credits/modules associated with their degree before discontinuing their studies (modelled as completion at 'other undergraduate' level). At postgraduate level, we assume that of those individuals starting a full-time postgraduate taught degree, **87%** complete the qualification as intended, while the remaining **13%** undertake one or more of the credits/modules associated with the intended degree before dropping out (in this case, modelled as completion at 'other postgraduate' level).

Table 4 Assumed completion rates of Leeds Beckett University students

Completion outcome	Study intention				
	Other undergraduate	First degree	Other postgraduate	Higher degree (taught)	Higher degree (research)
Full-time students					
Other undergraduate	96%	21%	-	-	-
First degree	4%	79%	-	-	-
Other postgraduate	-	-	100%	13%	38%
Higher degree (taught)	-	-	-	87%	-
Higher degree (research)	-	-	-	-	62%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
Part-time students					
Other undergraduate	100%	9%	-	-	-
First degree	-	91%	-	-	-
Other postgraduate	-	-	100%	26%	59%
Higher degree (taught)	-	-	-	74%	-
Higher degree (research)	-	-	-	-	41%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Note: Totals may not sum due to rounding.

Source: London Economics' analysis based on information on the completion outcomes of the cohorts of students (2011/12 to 2019/20) provided by Leeds Beckett University

[11] In other words, we assume that 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%.

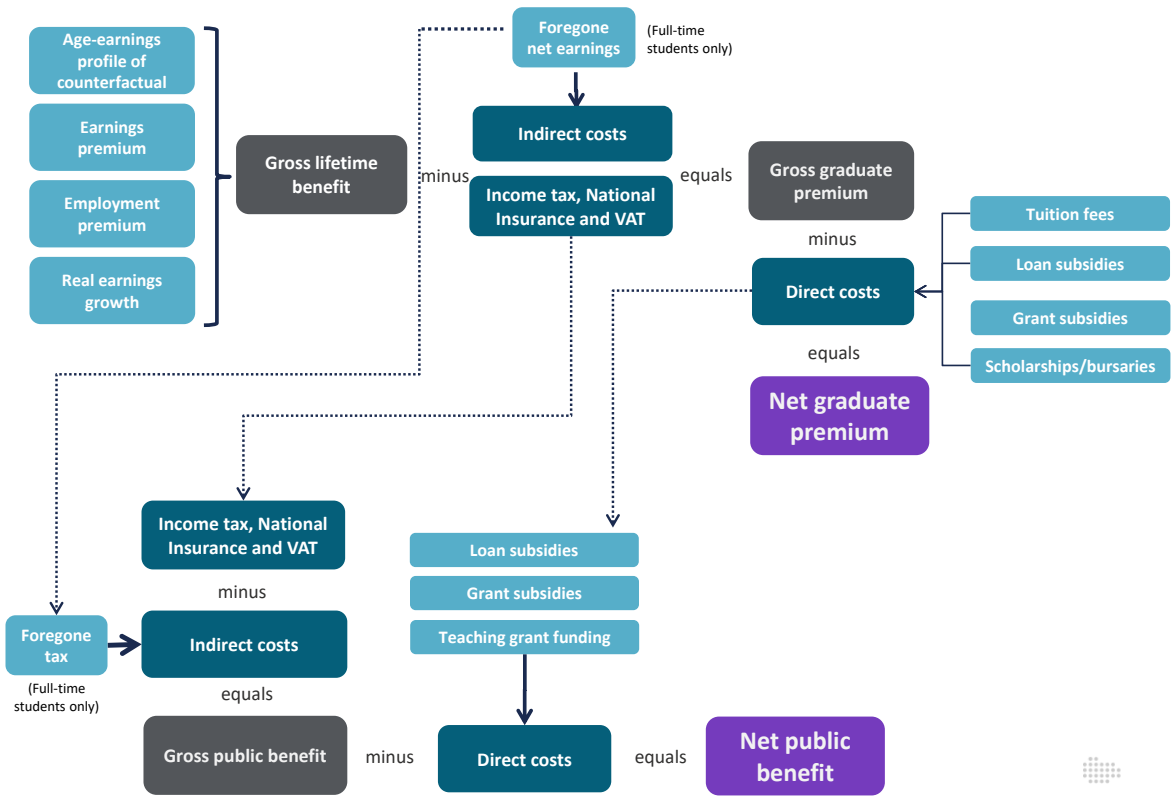
For those individuals starting a full-time postgraduate research degree, approximately **62%** complete the qualification as intended, with the remaining **38%** completing at 'other' postgraduate level. In all of these cases, **the analysis of the impact of teaching and learning calculates the estimated returns associated with the *completed* qualification/standalone module(s)**.

2.3 Defining the returns to higher education qualifications

The fundamental objective of the analysis of the impact of Leeds Beckett University's teaching and learning activities is to estimate the **gross and net graduate premium** to the individual and the **gross and net public purse benefit** to the Exchequer associated with higher education qualification attainment, defined as follows (and presented in Figure 7):

- The ***gross* graduate premium** 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) 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** is defined as the gross graduate premium *minus* the present value of the direct costs associated with qualification attainment; and
- 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 7 Overview of gross and net graduate premium, and gross and net Exchequer benefit



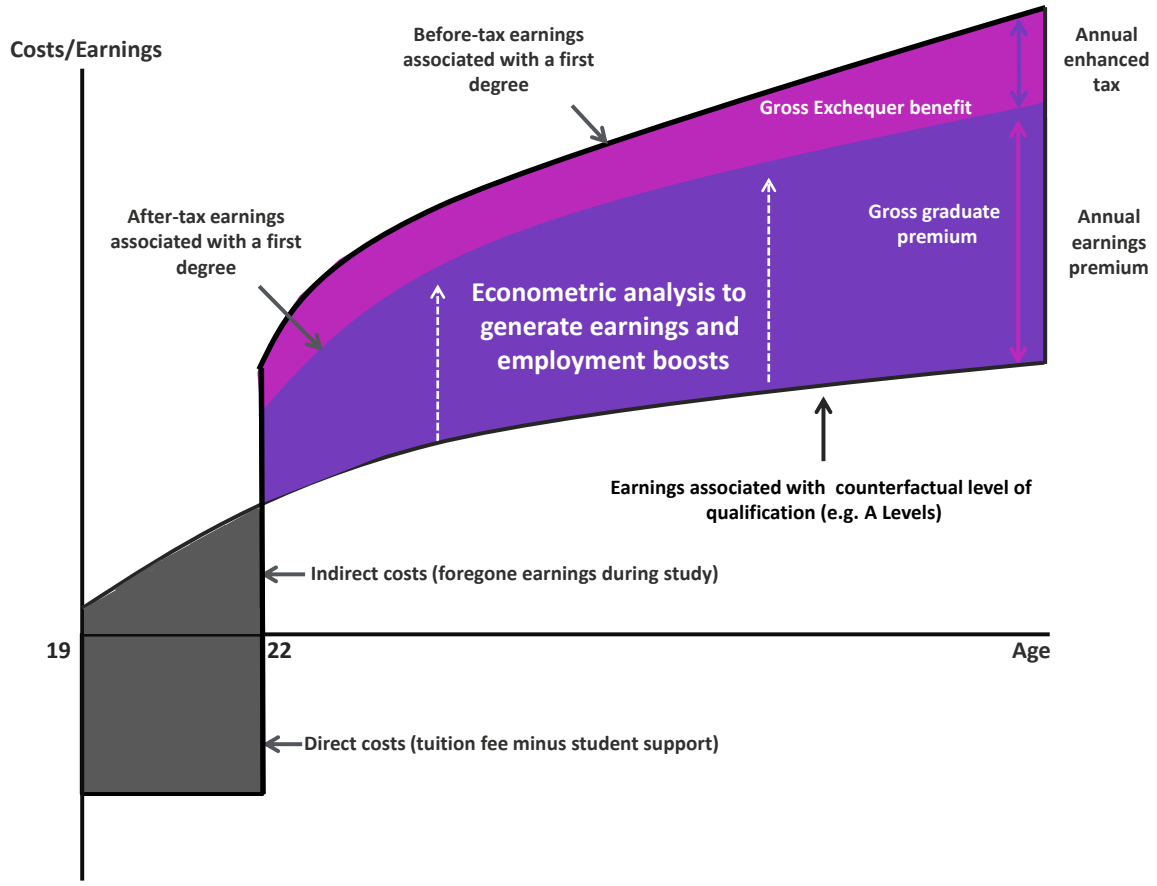
Source: London Economics' analysis based on Department for Business, Innovation and Skills (2011a)

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 a higher education 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 8 for an illustration of this). The treatment and counterfactual groups, and details of the econometric approach, are presented in Annex A2.1.1 and A2.1.2, respectively.

Figure 8 Estimating the gross graduate premium and gross Exchequer benefit



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 Leeds Beckett University's student cohort data for 2018-19, where the mean age at enrolment for full-time first degree students stands at 19, and we have assumed that a full-time first degree requires 3 years to complete. ***Source: London Economics***

Throughout the analysis, the assessment of earnings and employment outcomes associated with higher education qualification attainment (at all levels) is undertaken separately by **gender**,

reflecting the different labour market outcomes between men and women. Further, the analysis 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 students studying at Leeds Beckett University. In addition, given the fact that part-time students generally undertake and complete higher education qualifications later in life than full-time students, the analysis for part-time students applies a '**decay function**' to the returns associated with qualification attainment, to reflect the shorter period of time in the labour market[12].

To estimate the **gross graduate premium**, based on the econometric results, we then estimate the **present value of the enhanced post-tax earnings** of individuals in possession of different higher education qualifications (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 A2.1.4 for more detail[13]).

The **gross benefits to the Exchequer** from the provision of higher education 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 and productive employees. Based on the analysis of the lifetime earnings and employment benefits associated with higher education 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 higher education qualification attainment** (by gender, level of study, mode of study, and prior attainment). Again, please refer to Annex A2.1.4 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 relates to **students' direct costs** of qualification acquisition[14]. These direct costs refer to the **proportion of the tuition fee paid by the student**[15] net of any **tuition fee support** or **maintenance support** provided by the Student Loans Company (SLC, for students from England and Wales and Northern Ireland) or the Students Awards Agency for Scotland (SAAS, for students from Scotland)[16] and minus any **fee waivers or bursaries**

[12] See Annex A2.1.3 for more information.

[13] In terms of prior attainment, for **250** students in the 2018-19 cohort of UK domiciled students, previous attainment levels were specified as either 'Other qualification level not known', or '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 undertaking qualifications at the same level, separately by study mode.

[14] 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.

[15] We made use of information provided by Leeds Beckett University on the total **tuition fees** (net of bursaries and fee waivers) charged to students in the 2018-19 academic year, separately by domicile, study mode, and study level (with data provided for all undergraduate students combined, postgraduate (taught) students, and postgraduate (research) students (and we assume that students undertaking learning at 'other postgraduate' level are included in the postgraduate (taught) category)). To ensure that the estimated fees for part-time students accurately reflect the average study intensity amongst part-time students in the 2018-19 cohort, the fees per part-time student were calculated by multiplying the respective full-time rates by the ratio of the average study intensity amongst part-time students relative to full-time students in the cohort.

The average **study intensity** was calculated based on HESA data provided by Leeds Beckett University relating to its 2018-19 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), higher degree (research), and students at 'other postgraduate level').

[16] The analysis makes use of *average* levels of support paid per student, separately by study mode, study level (i.e. undergraduate, higher degree (taught) and higher degree (research) (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 2018-19 (see Student Loans Company 2019a, 2019b and 2019c, respectively) and a publication by the Student Awards Agency for Scotland on student support for higher education in Scotland (see Student Awards Agency for Scotland, 2019). 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

provided by Leeds Beckett University itself[17]. In this respect, the student benefit associated with tuition fee loan or maintenance loan support equals the **Resource Accounting and Budgeting charge** (RAB charge)[18], capturing the proportion of the loan that is not repaid. Given the differing 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[19].

The **direct costs**[20] **to the public purse** include the **teaching grant funding** administered by the Office for Students (OfS)[21], the **student 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.

These direct costs associated with qualification attainment to both students and the Exchequer (by qualification level, study mode and Home Nation domicile) 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 2018-19 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, 2018).

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

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 student has been capped at the level of tuition fee charged per Leeds Beckett University student in 2018-19 (see Footnote 15).

[17] Data on total tuition fee income, net of bursaries and fee waivers was provided by Leeds Beckett University. We therefore did not need to deduct any fee waivers or bursaries provided by Leeds Beckett University, as these are implicitly excluded in the data provided to us.

[18] For **undergraduate full-time** students, we have assumed a RAB charge of **53%** associated with tuition fee and maintenance loans for English domiciled students (based on data published by the Department for Education (2020)), approximately **40-45%** for Welsh domiciled students (based on information provided by the Welsh Government), **31%** for Scottish domiciled students (see Audit Scotland (2020)), **31%** for Northern Irish students (assumed to be the same as for Scotland given the similar loan balance) and **53%** for EU students (assumed to be the same as for English domiciled students). For **undergraduate part-time students**, based on the same sources, we have assumed a RAB charge of **45%** for English domiciled students, approximately **35-40%** for Welsh domiciled students, **0%** for Northern Irish domiciled students (given that these students have a very small loan balance) and **45%** for EU domiciled students (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 (relatively recently introduced) loans for **postgraduate taught students** from England 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 (2020) student loan forecasts for Master's loans for English students). For Welsh students, we have assumed a RAB charge of approximately **10-15%**. There were no postgraduate loans available for Scottish students studying outside Scotland.

Finally, for (full-time and part-time) **postgraduate research students** from England and the EU, we assumed a RAB charge of **42%** (again based on based on Department for Education (2020)). For Welsh postgraduate research students, we assumed a RAB charge of between **40-45%** across both full-time and part-time students. There were no Doctorate loans available for Scottish domiciled or Northern Irish domiciled students.

[19] Note that, in some 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 Leeds Beckett University 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 other undergraduate qualifications at Leeds Beckett University in 2018-19, which is driven by the generous maintenance funding received by these students (in terms grants for Welsh domiciled students). This results in the net graduate premium being (slightly) higher than the gross graduate premium (see the results presented in Table 15 and Table 16 in Annex A2.1.5).

[20] 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.

[21] This is based on published HESA financial information on the total OfS recurrent teaching grant received by Leeds Beckett University in 2018-19 (see HESA, 2020a), divided by the total number of students enrolled with Leeds Beckett University in 2018-19 (excluding any non-EU domiciled students and higher degree (research) students (i.e. it is assumed that 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.

Box 3 LBU Business Engagement Services

Leeds Beckett University's approach to **business engagement** is centred on its commitment to the **regional economy**, and the distinct needs of employer partners. As such, it focuses on offering a differentiated and diagnostic approach to external engagement, built upon an informed conversation with the organisations it partners with, to understand what their priorities are.

LBU seeks to apply innovation in developing collaborative solutions to the challenges faced by external partners. Its strategy is designed to ensure partners are not restricted or hindered by a rigidly defined 'menu of service', but instead ensures external collaborations are '**client centred'** and thereby maximise access and exposure to LBU's academic expertise and student/ graduate talent. In such a way, LBU aspires to develop 'broad and deep' connections with partners, with multi-faceted relationships which cut across the institution for the benefit of the economy, external stakeholders, academic disciplines, and students.

One example of LBU's successful business engagement comes from **Dynamic**, one of the country's leading design and eLearning companies who create high impact online learning resources and materials. The success of this relationship has been achieved through strong collaborative working relationships between the Leeds Beckett's Business Engagement team and academic colleagues.

Dynamic's initial motivation for engaging with Leeds Beckett was heavily focused on its placement recruitment activities in 2007. The relationship has evolved significantly into a **comprehensive and broad partnership** which stretches across LBU's Business Engagement team as well as multiple subject disciplines and Schools whilst at the same time, supporting the broader business needs of its organisation.

More recently, Dynamic has taken advantage of **LBU's Business Recovery Internship programme**, which was introduced to support SME organisations to meet their skills requirements throughout the economic challenges presented by the global pandemic. As a result, Dynamic has managed to continue to build its resources and meet its skills requirements to sustain the business, at a time in which many SME organisations were struggling to fund such investment. As a result, Dynamic recruited two new Leeds Beckett graduates into its organisation.

LBU's consultative approach to employer engagement has allowed it to work in partnership with Dynamic to build momentum and presence on campus, which has enabled successful year on year recruitment campaigns. Creating such productive working partnerships across the University provie3w the team at Dynamic with opportunities to offer live briefs and guest lectures, mock interviews, project work, pitches, and a presence at graduate showcase events. Such a breadth of engagement has inevitably enhanced Dynamic's visibility and presence with LBU students in a **mutually beneficial stakeholder relationship** – developing strong ties across a growing number of subject disciplines and within LBU's central services. This not only ensures that LBU students are aware of Dynamic's brand and identity but provides a vehicle for the company to understand the diverse talent at Leeds Beckett.

2.5 Estimated net graduate premium and net Exchequer benefit

Table 5 presents the net graduate premiums and net Exchequer benefits achieved by English domiciled students[22] undertaking qualifications at Leeds Beckett University in the 2018-19 cohort (by study mode, on average across men and women[23]).

The net graduate premium for a representative full-time first degree English domiciled student stands at £67,000.

The analysis indicates that the **net graduate premium** achieved by a representative[24] English domiciled undergraduate student in the 2018-19 cohort completing a **full-time first degree** at Leeds Beckett University (with GCE 'A' Levels or equivalent as their highest level of prior attainment) is approximately **£67,000** in today's money terms. At postgraduate level, the net (post)graduate premium for a representative[25] student completing a full-time postgraduate taught degree at Leeds Beckett University (relative to a first degree) stands at approximately **£49,000**.

Table 5 Net graduate premium and net Exchequer benefit per English domiciled student at Leeds Beckett University, by study level and mode

Level of study	Net graduate premium		Net public purse benefit	
	Full-time students	Part-time students	Full-time students	Part-time students
Other undergraduate[1]	£54,000	£36,000	£52,000	£17,000
First degree[1]	£67,000	£61,000	£60,000	£35,000
Other postgraduate[2]	£1,000	£14,000	£27,000	£20,000
Higher degree (taught)[2]	£49,000	£55,000	£57,000	£55,000
Higher degree (research)[2]	-£15,000	£18,000	£27,000	£23,000

Note: All estimates constitute weighted averages across men and women (weighted by the estimated number of student completers in the 2018-19 cohort) and are presented in 2018-19 prices, discounted to reflect net present values and rounded to the nearest £1,000.
[1] Net graduate premiums and net public purse benefits associated with qualifications at 'other undergraduate' and first degree level are estimated relative to possession of GCE 'A' Levels.
[2] Net graduate premiums and net public purse benefits associated with qualifications at 'other postgraduate', higher degree (taught) and higher degree (research) level are estimated relative to the possession of first degrees.
Note that the negative net graduate premium associated with higher degrees (by research) is in consequence of the relatively high earnings associated with undergraduate degrees, but also the opportunity costs associated with undertaking research degrees. These opportunity costs are particularly significant given the average age at which higher degrees by research are undertaken at Leeds Beckett University stands at 33 with the average duration being 4 years. We assume full time students do not undertake any form of paid work during study.
Source: London Economics' analysis

There are also substantial **net graduate premiums** for **part-time** students. For instance, the estimate for a representative student completing a part-time postgraduate taught degree (again relative to a first degree) stands at approximately **£55,000** (compared to **£49,000** for full-time students), while the estimate for part-time first degrees stands at **£61,000** (compared to **£67,000** for full-time students). The fact that part-time students tend to complete their studies later in life[26] (resulting in

[22] The full set of net graduate premiums and net Exchequer benefits for all domiciles (as well as study levels, study modes, and prior attainment levels) is presented in Annex A2.1.5.
[23] For a breakdown of the results by gender, again see Annex A2.1.5.
[24] The analysis is based on an average age at graduation of 22 for students undertaking full-time first degrees at Leeds Beckett University in the 2018-19 cohort (also see Annex A2.1.3 for further information).
[25] This is based on an average age at graduation in the 2018-19 cohort of 27 for full-time higher degree (taught) students and 37 for full-time higher degree (research) students.
[26] Again, see Annex A2.1.3 for more information.

fewer years spent in the labour market post-graduation) results in a reduction in the net graduate premiums for part-time students compared to full-time students. However, it is assumed that part-time students are able to combine work with their academic studies and thus do not incur any *opportunity costs* in the form of foregone earnings, which results in increased net graduate premiums relative to full-time students. Depending on which of these effects dominates, the net graduate premiums for part-time students can be either lower or higher than the net graduate premiums achieved by full-time students.

The net public purse benefit associated with a representative full-time first degree English domiciled student stands at £60,000.

In terms of the benefits to the public purse, the **net Exchequer benefit** for a representative English domiciled **full-time** first degree student (again with GCE 'A' levels or equivalent as their highest level of prior attainment) stands at approximately **£60,000** in 2018-19 money terms. Reflecting the lower level of public subsidy associated with postgraduate qualifications, the net Exchequer benefits for a representative student completing a full-time postgraduate taught or postgraduate research degree (relative to a first degree) were estimated at approximately **£57,000** and **£27,000**[27], respectively.

Again, there are also substantial net Exchequer benefits associated with **part-time students**. For instance, the net Exchequer benefits for a representative part-time student from England undertaking a postgraduate taught degree or postgraduate research degree (relative to a first degree) stand at approximately **£55,000** and **£23,000** (respectively). For a representative part-time student from England undertaking a first degree (relative to GCE A level or equivalent) the net Exchequer benefit stands at approximately **£35,000**.

2.6 Total impact of Leeds Beckett University's teaching and learning activities

Combining the information on the number of UK domiciled students in the 2018-19 Leeds Beckett University cohort, expected completion rates, and the net graduate and public purse benefits associated with the different qualification levels (relative to students' specific prior attainment), the analysis estimates that the **aggregate economic benefit of Leeds Beckett University's teaching and learning activities** associated with the 2018-19 cohort in the UK stands at approximately **£820 million**.

[27] Compared to corresponding net graduate premium for postgraduate research degree students (-**£15,000**), the relatively large net Exchequer benefit (**£27,000**) reflects the limited direct costs (in terms of public funding) and low indirect costs (in terms of foregone taxation during study) associated with these qualifications.

The total economic impact of teaching and learning generated by the 2018-19 cohort of Leeds Beckett University students stands at £820 million.

This total impact is split approximately equally between students and the Exchequer, with **£421 million** (**51%**) of the economic benefit accrued by students undertaking qualifications at Leeds Beckett University, and the remaining **£399 million** (**49%**) accrued by the Exchequer. In terms of study level, **85%** (**£695 million**) of the estimated economic impact is generated by Leeds Beckett University's undergraduate students, with the remaining **15%** (**£126 million**) generated by postgraduate students. In terms of domicile, **98%** (**£801 million**) of the estimated economic benefit is associated with students from England, while the remaining **2%** (**£19 million**) is generated by students from other Home Nations.

Table 6 Aggregate impact of Leeds Beckett University's teaching and learning activities associated with the 2018-19 cohort (£m), by type of impact, domicile, and level of study

Beneficiary and study level	Domicile				
	England	Wales	Scotland	Northern Ireland	Total
Students	**£412m**	**£5m**	**£1m**	**£3m**	**£421m**
Undergraduate	£365m	£5m	£1m	£2m	**£372m**
Postgraduate	£47m	£1m	£0m	£1m	**£48m**
Exchequer	**£390m**	**£4m**	**£1m**	**£4m**	**£399m**
Undergraduate	£315m	£3m	£1m	£3m	**£322m**
Postgraduate	£75m	£1m	£0m	£1m	**£77m**
Total	**£801m**	**£10m**	**£2m**	**£6m**	**£820m**
Undergraduate	£680m	£8m	£2m	£5m	**£695m**
Postgraduate	£122m	£2m	£1m	£2m	**£126m**

Note: All estimates are presented in 2018-19 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 2018-19 cohort of students only. Depending on the size and composition of subsequent cohorts of Leeds Beckett University 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).

3 The impact of Leeds Beckett University's research

In this section, we outline our analysis of the **economic impact of Leeds Beckett University's research.** We estimate both the **direct effects** of this research (captured by the research income accrued by Leeds Beckett University, net of any public funding), as well as the **productivity spillover effects** from Leeds Beckett University's research activities to the rest of the UK economy. Additionally, we undertake an analysis of the knowledge transfer activities of the University, which is contained within Section 3.3.1.

3.1 Direct research impact

To estimate the **direct impact** generated by Leeds Beckett University's research activities, we used information on the total research-related income accrued by Leeds Beckett University in the 2018-19 academic year, including:

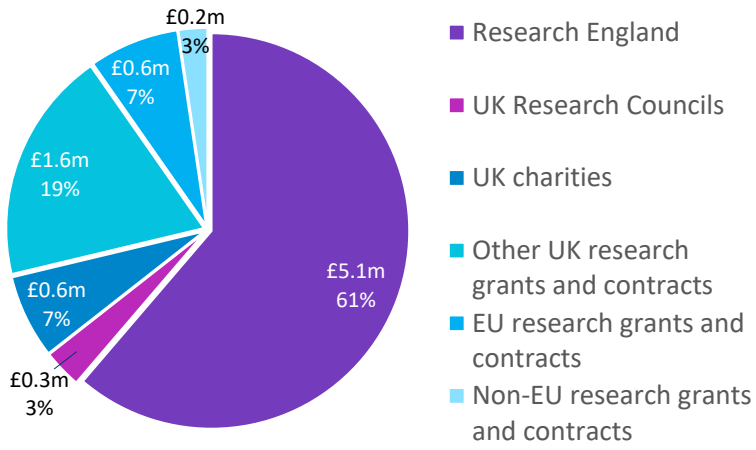
- Income from **research grants and contracts** provided by:
  - **UK sources**, including the UK Research Councils; UK-based charities; central government bodies, Local Authorities, and health and hospital authorities; industry and commerce; and other UK sources;
  - **EU sources**, including government bodies, charities, industry and commerce, and other sources; and
  - **Non-EU sources**, including charities, industry and commerce, and other sources; and
- **Recurrent research funding** allocated to Leeds Beckett University by Research England.

Aggregating across these sources, the total research-related income accrued by Leeds Beckett University in the 2018-19 academic year stood at **£8.3 million** (see Figure 9). Approximately **71%** of this income was received through recurrent research grant funding from Research England (**£5.1 million**, **61%**), UK Research Councils (**£0.3 million, 3%**) and UK charities (**£0.6 million**, **7%**). In addition to the **£1.6 million** (**19%**) accrued from other UK sources[28], Leeds Beckett University also received research income from both EU (**£0.6 million**, **7%**) and non-EU sources (**£0.2 million**, **3%**).

To arrive at the net direct impact of Leeds Beckett University's research activities on the UK economy, we deducted the **costs to the public purse** of funding Leeds Beckett University's research activities from the above total research income in 2018-19. These public costs include the funding provided by the UK Research Councils (**£0.3 million**), recurrent research grants provided by Research England (**£5.1 million**), and other research income from UK central government bodies, Local Authorities, and health and hospital authorities (**£0.9 million**). Deducting these total public purse costs (**£6.3 million**) from the above total research-related income (**£8.3 million**), we thus estimated that the **net direct impact** associated with Leeds Beckett University's research activity in the 2018-19 academic year stands at **£2.1 million**.

[28] This includes **£0.9 million** in other research income from UK central government bodies, Local Authorities, and health and hospital authorities. As discussed in further detail below, to arrive at the net direct impact of Leeds Beckett University's research activities, this funding is deducted from Leeds Beckett University's total research income, as it represents a cost to the public purse.

Figure 9 Research income received by Leeds Beckett University in 2018-19, £m by source of income



Note: All values are presented in 2018-19 prices and rounded to the nearest £1 million.
Source: London Economics' analysis based on data provided by the Higher Education Statistics Agency (HESA, 2020a)

3.2 Productivity spillovers

In addition to the direct impact of research, the wider academic literature indicates that investments in Research & Development (R&D) and other intangible assets may induce positive **externalities**. Economists refer to the term 'externality' to describe situations in which the activities of one 'agent' in the market induces (positive or negative) external effects on other agents in that market (which are not reflected in the price mechanism). In the context of the economic impact of research activities, existing academic literature assesses the existence and size of **positive productivity and knowledge spillovers**, where knowledge generated through the research activities of one agent enhances the productivity of other organisations.

There are many ways in which research generated at universities can induce such positive spillover effects to the private sector[29]. For example, spillovers are enabled through direct R&D collaborations between universities and firms (such as Knowledge Transfer Partnerships), the publication and dissemination of research findings, or through university graduates entering the labour market and passing on their knowledge to their employers.

Of particular interest in the context of research conducted by universities, a study by Haskel and Wallis (2010)[30] investigates evidence of **spillovers from publicly funded Research & Development activities**. The authors analyse productivity spillovers to the private sector from public spending on R&D by the UK Research Councils and public spending on civil and defence-related R&D[31, 32], and the relative effectiveness of these channels of public spending in terms of their impact on the 'market sector'. They find strong evidence of the existence of market sector productivity spillovers from public R&D expenditure originating from the UK Research Councils[33]. Their findings imply that, while

[29] Note that there are also clearly significant economic and social spillovers to the public sector associated with university research. However, despite their obvious importance, these have been much more difficult to estimate robustly, and are not included in this analysis.
[30] Also, see Imperial College London (2010) for a summary of Haskel and Wallis's findings.
[31] The authors use data on government expenditure published by the (former) Department for Business, Innovation and Skills for the financial years between 1986-87 and 2005-06.
[32] This is undertaken by regressing total factor productivity growth in the UK on various measures of public sector R&D spending.
[33] Note that the authors' regressions only test for correlation, so their results could be subject to the problem of reverse causation (i.e. it might be the case that increased market sector productivity induced the government to raise public sector spending on R&D). To address this issue, the authors not only test for 1-year lags, but for lags of 2 and 3 years respectively, and produce similar estimates. These time

there is no spillover effect associated with publicly funded civil and defence R&D, the marginal spillover effect of public spending on research through the Research Councils stands at **12.7 (i.e. every £1 spent on research through the Research Councils results in an additional annual output of £12.70 within the UK private sector)**.

Another study by Haskel et al. (2014) provides additional insight into the size of potential productivity spillovers from university research. Rather than estimating effects on the UK economy as a whole, the authors analyse the size of spillover effects from public research across different UK industries[34]. The authors investigate the correlation between the combined research conducted by the Research Councils, the higher education sector, and central government itself (e.g. through public research laboratories)[35], interacted with measures of industry research activity, and total factor productivity within the different market sectors[36]. Their findings imply a total rate of return on public sector research of **0.2 (i.e. every £1 spent on public R&D results in an additional annual output of £0.20 within the UK private sector)**.

In order to estimate the productivity spillovers associated with Leeds Beckett University's research activities, we apply these productivity spillover multipliers from the existing literature to the different types of research-related income received by Leeds Beckett University in 2018-19 (again see Figure 9). Specifically, assigning the multiplier of **12.7** to the research funding that Leeds Beckett University received from **UK Research Councils and UK charities**[37] in 2018-19 (amounting to **£0.8 million**), and assigning the multiplier of **0.2** to **all other research funding** received by Leeds Beckett University in that academic year (amounting to **£7.5 million**)[38], we estimate that the research conducted by Leeds Beckett University in 2018-19 resulted in **total market sector productivity spillovers of £12.1 million**.

In other words, we infer a weighted average spillover multiplier associated with Leeds Beckett University's research activities of approximately **1.4** – i.e. **every £1 invested in Leeds Beckett University's research activities generates a total annual economic output of £1.40 across the UK economy**.

lags imply that if there was a reverse causation issue, it would have to be the government's *anticipation* of increased total factor productivity growth in 2 or 3 years which would induce the government to raise its spending on research; as this seems an unlikely relationship, Haskel and Wallis argue that their results appear robust in relation to reverse causation.

[34] Haskel et al. (2014) use data on 7 industries in the United Kingdom for the years 1995 to 2007.

[35] A key difference to the multiplier for Research Council spending provided by Haskel and Wallis (2010) lies in the distinction between *performed* and *funded* research, as outlined by Haskel et al. (2014). In particular, whereas Haskel and Wallis (2010) estimated the impact of research *funding* by the Research Councils on private sector productivity, Haskel et al. (2014) instead focus on the *performance* of R&D. Hence, they use measures of the research undertaken by the Research Councils and the government, rather than the research funding which they provide for external research, (e.g. by higher education institutions). The distinction is less relevant in the higher education sector. To measure the research performed in higher education, the authors use Higher Education Funding Council funding where research is both funded by and performed in higher education.

[36] In particular, the authors regress the three-year natural log difference of total factor productivity on the three-year and six-year lagged ratio of total research performed by the Research Councils, government, and the Higher Education Funding Councils over real gross output per industry. To arrive at the relevant multiplier, this ratio is then interacted with a measure of co-operation of private sector firms with universities and public research institutes, capturing the fraction of firms in each industry co-operating with government or universities. The lagged independent variables are adjusted to ensure that the resulting coefficients can be interpreted as annual elasticities and rates of return.

[37] Where the vast majority of funding provided by UK charities relates to projects commissioned through an open competitive process.

[38] In terms of the large difference in magnitude between these multipliers, explaining the size of the 12.7 multiplier in particular, Haskel and Wallis (2010) argue that they would expect the productivity spillovers from Research Council funding to be large, 'given that the support provided by Research Councils is freely available and likely to be basic science'. To the best knowledge of the authors, there exists no further and recent empirical evidence to support this. As a result, we apply the separate multipliers to the different income strands.

Box 4 Changing policy and practice in dementia workforce education and training

Dementia is an international public health priority, affecting over 850,000 people in the UK and over 50 million people worldwide. Ensuring the health and social care workforce has the right knowledge, attitudes and skills is crucial for the delivery of good quality, compassionate dementia care, which has been the UK Governments' priority for over a decade. While numbers of staff receiving dementia training have grown, following mandated (2015-17) targets from Government, concerns about training quality and successful design, delivery and implementation have consistently been raised in literature and practice, with little understood about these issues.

During 2015-17, a team led by **Professor Claire Surr**, **Dr Sarah Smith** and **Dr Sarah Burden** from Leeds Beckett University, in collaboration with partners from the Universities of Bradford and Leeds, delivered a **national study** to inform this knowledge gap.

The study identified that in 2016 there were over 380 separate dementia training programmes available in the UK with high variability in both content and delivery methods. Furthermore, content frequently failed to align with national recommendations, particularly for those in specialist dementia roles. Overall, the findings indicated that the workforce receives inadequate training to enable delivery of good dementia care. A core contribution of the research was to **synthesise this evidence to determine key features of effective dementia training**: face-to-face delivery; interactive teaching methods with content tailored to the learner's service setting and role; in-depth, focused content on key subjects; use of discussion, case example-based exercises and opportunities to apply learning in practice-related scenarios; delivery by an experienced training facilitator; and, training length of at least half a day, with individual sessions of at least 90-120 minutes.

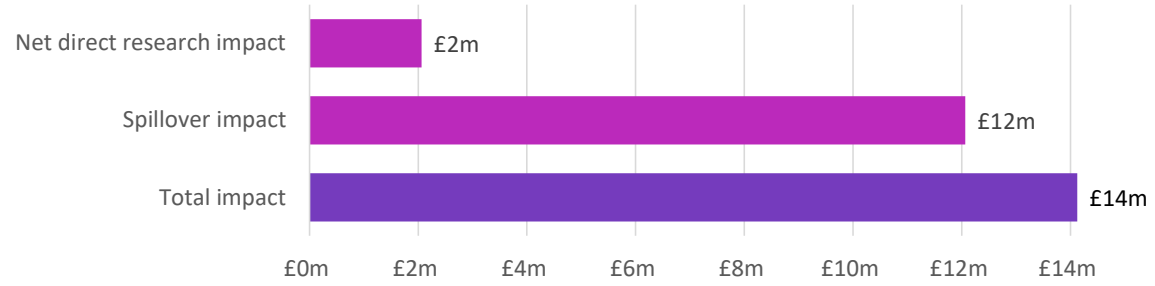
The study also **identified optimal conditions for, and key barriers and facilitators to, embedding dementia training in practice** across health (primary, mental health and acute) and social care services, which must be addressed in considering efficacy of workforce development in dementia care. These were: features of the training design and delivery; skills and qualities of staff tasked with implementation; allocation of resources to training; staffing (turnover, vacancies etc); degree of management support for training attendance and implementation; dedicated leadership for dementia training delivery and oversight; and the presence of an organisational ethos that values training.

The prominence of the study's findings in national policy and guidance on dementia training quality assurance has facilitated **widespread adoption** by training and health and care service providers across the spectrum of provision, changing the way training is designed, delivered and implemented nationally, with evidence of wider interest beyond the UK. Thus, the results have reach across training provided across NHS acute and mental health services and within care homes, impacting the training received by thousands of staff. This has led to impacts for health and social care staff attending training including, increased knowledge, skills and confidence to deliver dementia care and changes to behaviours in practice.

3.3 Aggregate impact of the University's research

Combining the direct economic impact of Leeds Beckett University's research (**£2 million**) with the estimated productivity spillovers associated with this research (**£12 million**), we estimate that the total economic impact associated with Leeds Beckett University's research activities in 2018-19 stands at approximately **£14 million** (see Figure 10).

Figure 10 Total impact of Leeds Beckett University's research activities in 2018-19, £m



Note: All values are presented in 2018-19 prices, rounded to the nearest £1 million, and may not add up precisely to the totals indicated.
Source: London Economics' analysis

3.3.1 Knowledge transfer activities

In addition to its research activities, Leeds Beckett University generates significant economic impacts through its knowledge transfer activities, in particular through the operations of the spin-out company whose activities are based on Leeds Beckett University's Intellectual Property (IP). As in Section 5 (and described in more detail), the analysis of the operations of the spin-out company captures the direct, indirect, and induced economic impacts associated with the spin-out's activities.[39]

To assess the direct impact associated with Leeds Beckett University's spin-out company, we made use of information on the turnover (as a measure of economic output), FTE employment, and GVA associated with the spin-out company which was active in 2018-19 (and for which data was available)[40]. The direct gross value added generated was estimated by multiplying the turnover of the firm by the average ratio of GVA to output among organisations within the company's industry sector and region[41]. Based on this approach, the direct impact associated with the activities of Leeds

[39] The direct effect captures the turnover of the spin-out company, the indirect effect captures the 'ripple effect', whilst the induced impact captures the additional spending (and associated 'ripple effects') from wages. The total of the direct, indirect, and induced effects constitutes the gross economic impact of Leeds Beckett University's knowledge transfer activities. 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 IP income received by Leeds Beckett University might otherwise have been used for other purposes by the organisations from which the income is received). Hence, our analysis effectively estimates the direct, indirect, and induced impacts associated with Leeds Beckett University's knowledge transfer activities in *gross* terms.

[40] The analysis excludes companies that were dissolved prior to 2018-19, or those that are primarily non-UK based. Further note that the information is based on the 2018-19 financial year, which does not necessarily coincide with the 2018-19 academic year. Information on the turnover and employment of the spin-out was provided by Leeds Beckett University and supplemented by data from Bureau van Dijk's FAME database (based on Companies House information).

[41] These ratios were derived based on the multi-regional Input-Output model. Each firm's main industry classification was based on information provided by the FAME database. Each firm's main regional location was based on the region of the main registered address of the company recorded in FAME.

Beckett University's spin-out activities in 2018-19 was thus estimated at **£4 million** in economic output (i.e. turnover), supporting **65 FTE staff**, and contributing **£3 million** of gross value added.

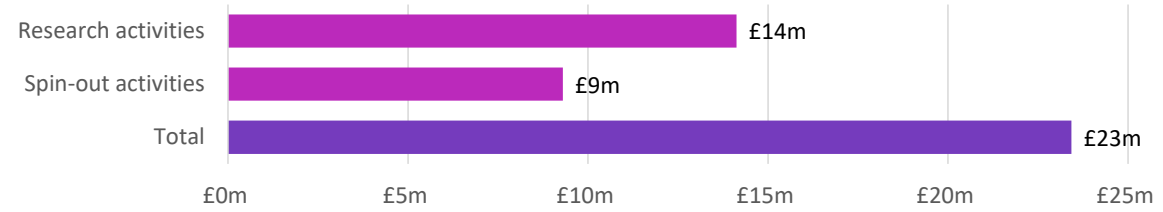
We then applied relevant economic multipliers (derived from our Input-Output analysis) to estimate the total direct, indirect, and induced economic impacts associated with Leeds Beckett University's spin-out company. Applying these multipliers to the above direct impacts, the total economic impact associated with the activities of Leeds Beckett University's spin-out company in the 2018-19 academic year was estimated to be **£9 million** across the UK economy, all of which was generated in Yorkshire and the Humber. The estimated total number of FTE jobs supported stood at **125** (all of which were located in Yorkshire and the Humber). The corresponding estimate in terms of GVA stood at **£6 million** (again, all of which was located in Yorkshire and the Humber).

3.4 Total impact of Leeds Beckett University's research activities

Finally, as presented in Figure 11, the total economic impact associated with Leeds Beckett University's research and knowledge transfer activities in 2018-19 was estimated at **£23 million**. Approximately **£14 million** was associated with Leeds Beckett University's research and productivity spillovers to the rest of the UK economy, while **£9 million** was associated with the activities of Leeds Beckett University's spin-out company.

The impact of Leeds Beckett University's research and knowledge transfer activities in 2018-19 stood at £23 million.

Figure 11 Total impact of Leeds Beckett University's research and knowledge transfer activities in 2018-19, £m



Note: All values are presented in economic output in 2018-19 prices, rounded to the nearest £1 million, and may not add up precisely to the totals indicated. ***Source: London Economics' analysis***

Comparing the **£8 million** of research income received by Leeds Beckett University in 2018-19 to the **£23 million** impact from research and knowledge transfer activities, this suggests that **for each £1 million of its research income, Leeds Beckett University's research and knowledge transfer activities generated a total of £2.8 million in economic impact across the UK.**

Box 5 Tackling obesity in the UK and internationally: LBU and MoreLife

More than 72,000 children and adults have directly benefited from improved obesity treatment provided by Leeds Beckett University's subsidiary company, **MoreLife.**

Primarily via the NHS and local authorities, MoreLife has delivered clinically significant weight loss to participants: the programme has produced reductions in weight and associated clinical, social and emotional benefits continue to accrue with more than 14,000 children and adults benefitting in 2020.

MoreLife has also successfully transferred this impact to the treatment of Qatari children and underpinned the development of the UK's national NHS Diabetes Prevention Programme. LBU's co-created research with Public Health England (PHE) on a Whole Systems Approach to obesity has impacted obesity in local authorities across England and beyond, as well as framing the submission of evidence that has changed UK Government policy on childhood obesity.

While the World Health Organisation acknowledges the growing obesity epidemic is one of the world's most visible, yet most neglected public health problems, LBU and MoreLife are having a significant impact both nationally and internationally through: improved obesity treatment; addressing the challenges of obesity in local authorities across England and beyond; and changing UK childhood obesity policy.

MoreLife produces a range of programmes for the NHS and Local Authorities in the UK and internationally, covering five Clinical Commissioning Groups in Greater Manchester, Essex and Suffolk. The company is expanding rapidly, with annual turnover increasing tenfold to over £6 million. LBU and MoreLife are also enhancing professional practice through delivery of training to up to 2,000 professionals each year.

4 The impact of Leeds Beckett University'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 Leeds Beckett University. 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) students in the 2018-19 cohort of Leeds Beckett University students, over the entire course of their studies[42]. 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 Leeds Beckett University itself) and non-fee income (accrued by other organisations providing goods and services to international students) associated with non-UK students in the 2018-19 cohort.
- **Indirect effect ('supply chain impacts'):** Leeds Beckett University 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 Leeds Beckett University (supported by its tuition fee income) and of companies providing goods and services to Leeds Beckett University'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[43].

The total of the direct, indirect, and induced effects constitutes the *gross* economic impact of Leeds Beckett University'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[44].

[42] Note that other types of export income accrued directly by Leeds Beckett University (such as research income from international sources, or any other income received from non-UK sources) are taken account of in our analysis of the impact of Leeds Beckett University's research activity (Section 3) and the impact of the expenditures of Leeds Beckett University (Section 5), and are thus excluded from the analysis of exports to avoid double-counting.

[43] 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 Leeds Beckett University). The economic impact associated with UK students' tuition fee expenditures is instead (implicitly) included in the estimated direct, indirect, and induced impacts associated with Leeds Beckett University's own expenditures (see Section 5).

[44] 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*

The direct, indirect, and induced impacts are measured in terms of monetary economic output[45], gross value added (GVA)[46], 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[47]. 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[48]) with a range of regional-level data[49] to achieve a granular breakdown by sector[50] *and* region[51].

In addition to the impacts associated with Leeds Beckett University'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 Leeds Beckett University (see Section 5).

4.1 The 2018-19 cohort of international Leeds Beckett University's students

Figure 12, Figure 13, and Figure 14 present information on the number of non-UK domiciled students included in the 2018-19 cohort of Leeds Beckett University students (by domicile, mode of study, and level of study, respectively).

In terms of domicile (Figure 12), of the total of **710** international students starting higher education qualifications at Leeds Beckett University in 2018-19, **185** (**26%**) were domiciled within the European Union, while **525** (**74%**) were from non-EU countries. In terms of study mode (Figure 13), the

adjusted for *displacement* or additionality (e.g. the extent to which the tuition fee and non-tuition fee income associated with Leeds Beckett University's international students might otherwise have been used for other purposes). Hence, our analysis effectively estimates the direct, indirect, and induced impacts associated with Leeds Beckett University's educational exports in *gross* terms.

[45] 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 Leeds Beckett University).

[46] 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).

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

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

[49] 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).

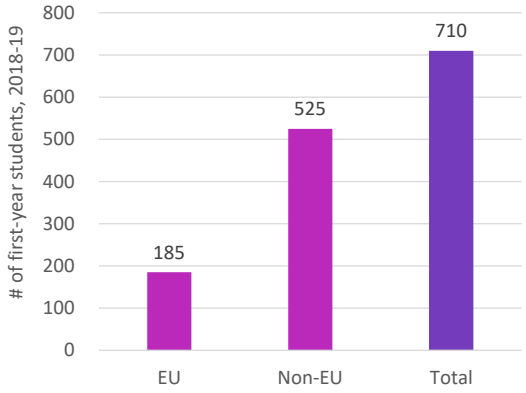
[50] In terms of sector breakdown, the original UK Input-Output tables are broken down into 64 (relatively granular) sectors. However, the (wide range of) regional-level data required to generate the multi-regional Input-Output model is not available for such a granular sector breakdown. Instead, the multi-regional Input-Output model is broken down into 10 more high-level sector groups (see Table 18 in A2.2.1 for more information).

[51] 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.

majority of international students in the cohort (**605, 85%**) were undertaking their qualifications on a full-time basis, with the remaining **105** (**15%**) studying on a part-time basis.

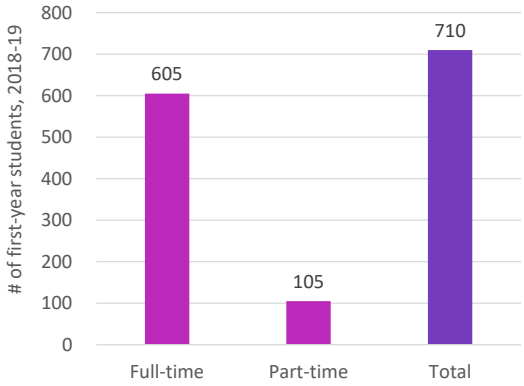
In terms of study level (Figure 14), in contrast to UK domiciled students (see Section 2.1), the majority of non-UK domiciled students in the cohort were undertaking postgraduate qualifications (**415**, **58%**), including **325** (**46%**) enrolled in postgraduate taught degrees, **15** students (**2%**) undertaking postgraduate research degrees, and **75** (**11%**) undertaking other postgraduate learning. At undergraduate level, there were **255** (**36%**) students undertaking first degrees, while the remaining **40** (**6%**) students were enrolled in other undergraduate learning[52].

Figure 12 Non-UK domiciled students in the 2018-19 cohort of Leeds Beckett University, by domicile



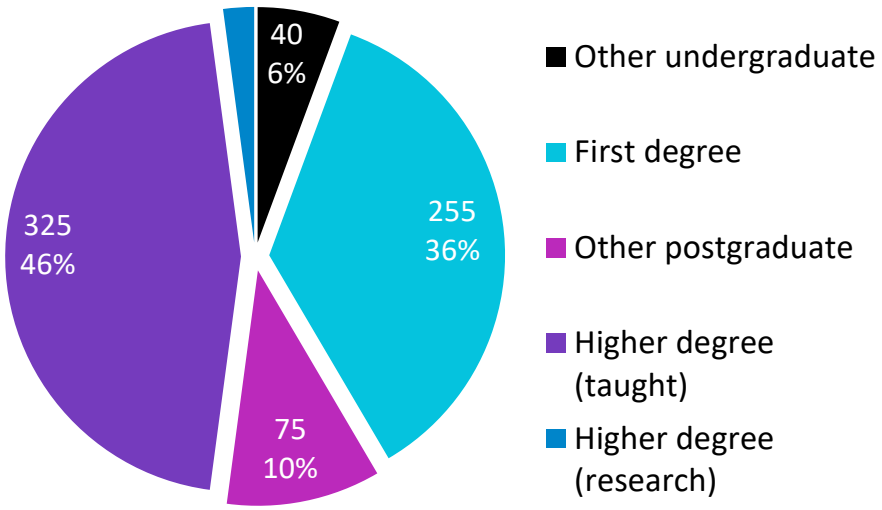
Note: All numbers are rounded to the nearest 5, and the total values may not add up precisely due to this rounding.
Source: London Economics' analysis based on Leeds Beckett University's HESA data

Figure 13 Non-UK domiciled students in the 2018-19 cohort of Leeds Beckett University 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 Leeds Beckett University's HESA data

Figure 14 Non-UK domiciled students in the 2018-19 cohort of Leeds Beckett University 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.
Source: London Economics' analysis based on Leeds Beckett University's HESA data

[52] For more detailed information on Leeds Beckett University's 2018-19 cohort of non-UK domiciled students, please refer to Annex A2.2.2.

Box 6 Battle Back – research to improve the health of military personnel

Leeds Beckett University's research has driven the design and delivery of a **residential recovery course** for wounded, injured and sick (WIS) serving military personnel. The course has produced significant and sustained improvements in positive mental health and well-being, with over 4,000 armed forces serving personnel benefitting from attendance since August 2013.

Research evidence provided by LBU underpinned the decision of The Royal British Legion to invest **£27 million** to fund this recovery course for ten years and elicited policy changes in the British Army and Royal Air Force to mandate attendance of the Battle Back course for their WIS populations. Impacts are now evident beyond serving personnel, for example in military veterans, junior soldiers and spinal cord and brain injured rugby union players, their families and carers.

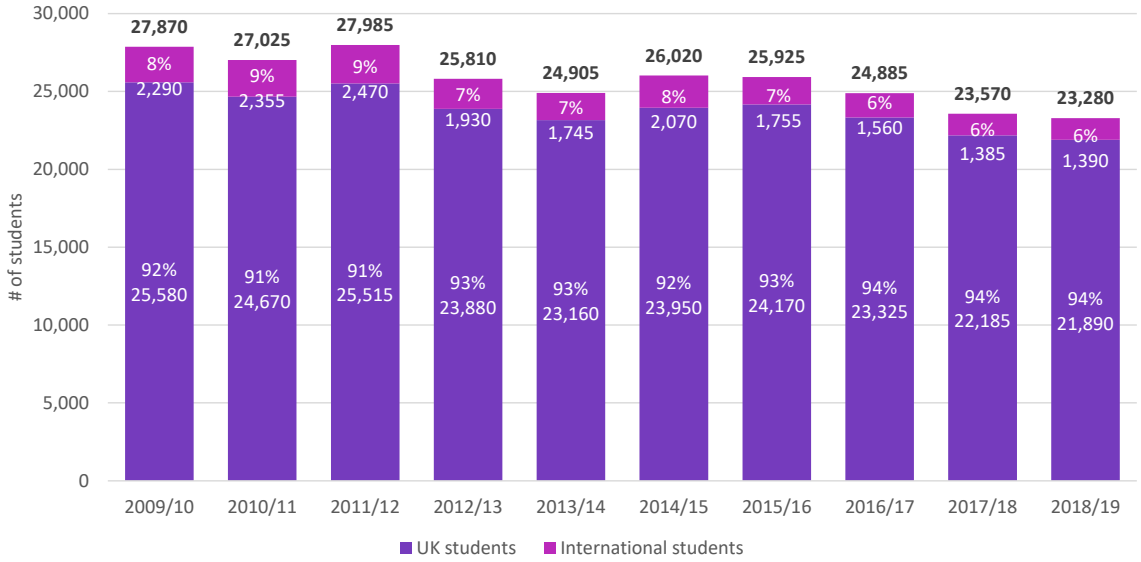
Between 2012 and 2015, 971 participants showed an **average significant increase of 15.9%** in positive mental wellbeing over the duration of the course. More individualised, qualitative research showed the courses stimulated a balance of present- and future-oriented psychosocial outcomes for the participants. They rediscovered aspects of themselves that had been lost through their injury or illness and helped them move forward with their lives, adopting new, future-oriented activities. Findings suggested that, in the short-term, involvement in the course had numerous individual positive outcomes which improved the psychological well-being and development of the participants.

4.2 Changes in the number of international students at Leeds Beckett University over time

Alongside the analysis of the 2018-19 cohort of non-UK domiciled *first-year* students, we have also examined the trends in Leeds Beckett University's *entire* non-UK student body over the past decade (i.e. academic years 2009-10 to 2018-19).

There has been a reduction in the number of non-UK domiciled students enrolled at Leeds Beckett University over the last decade, decreasing from **2,290** students in 2009-10 to **1,390** students in 2018-19. With the number of UK domiciled students having fallen at a slightly slower rate, this has resulted in a reduction in the proportion of Leeds Beckett University's students that are from non-UK domiciles over the period, from **8%** in 2009-10 to **6%** in 2018-19 (see Figure 15).

Figure 15 Total students at Leeds Beckett University, 2009-10 to 2018-19, by domicile

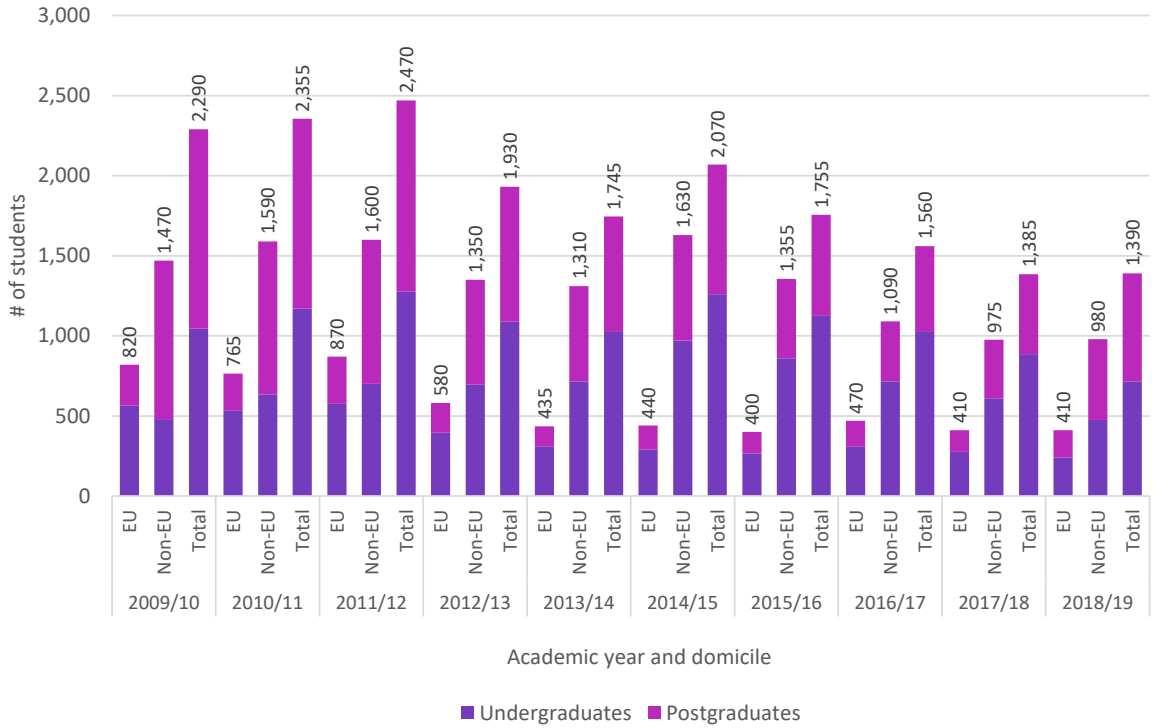


Source: London Economics' analysis based on HESA (2011, 2012, 2013, 2014, 2015 and 2021)

In terms of the breakdown of these non-UK students by domicile (Figure 16), the overall decrease in international students was evenly split between non-EU and EU domiciled students (**820** and **1,470** in 2009-10, to **410** and **980** in 2018-19 respectively).

The fall in the total number of international students studying at Leeds Beckett University occurred across both undergraduate and postgraduate students (Figure 16), with the total number of non-UK undergraduate students falling from **1,045** in 2009-10 to **715** in 2018-19, and the total number of non-UK postgraduate students decreasing from **1,245** in 2009-10 to **675** in 2018-19. With a relatively stronger decline in numbers at undergraduate level, this has resulted in a slight increase in the proportion of non-UK domiciled students undertaking postgraduate as compared to undergraduate qualifications, increasing from **49%** in 2009-10 to **54%** in 2018-19.

Figure 16 Non-UK domiciled students at Leeds Beckett University, 2009-10 to 2018-19, by level of study and domicile



Source: London Economics' analysis based on HESA (2011, 2012,2013, 2014, 2015 and 2021)

4.3 Direct impact

4.3.1 Net tuition fee income

To assess the level of ***gross* tuition fee income** associated with international students in the 2018-19 cohort, we made use of data on average tuition fees charged by Leeds Beckett University in 2018-19 (by study level, mode, and domicile[53]). Assuming the same average study durations as in the analysis of the impact of Leeds Beckett University'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 2018-19 prices and using the HM Treasury Green Book real discount rate of 3.5% (see HM Treasury, 2018), 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[54]. These

[53] As in the analysis of Leeds Beckett University's teaching and learning activities (see Section 2), we used information provided by Leeds Beckett University on average tuition fees per *full-time* student charged by Leeds Beckett University in 2018-19, separately by domicile (i.e. UK, EU, and non-EU students), study mode, and study level. To arrive at the fees per *part-time* student (ensuring that the estimated fees for part-time students accurately reflect the average study intensity amongst part-time students in the 2018-19 cohort), we multiplied the respective full-time rates by the average study intensity amongst part-time students in the cohort. The average study intensity was estimated separately by qualification level and calculated by dividing the number of part-time students in the cohort in full-time equivalents by the number of students in terms of headcount (again based on HESA data provided by Leeds Beckett University).

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

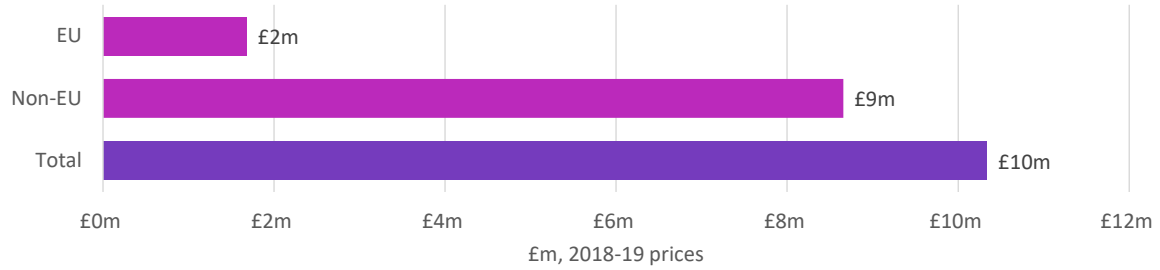
Exchequer costs include the subsidies associated with the tuition fee support provided by the Student Loans Company, in terms of:

- The RAB charge on **tuition fee loans provided to eligible EU domiciled full-time and part-time undergraduate students**;
- The RAB charge on **Master's and Doctorate loans provided to eligible EU full-time and part-time postgraduate students**; and
- The **recurrent teaching grant funding** paid to Leeds Beckett University in relation to the provision of teaching to EU domiciled students (by the Office for Students)[55].

In addition to these public purse costs, we also deducted any **fee waivers and bursaries** paid to international students by Leeds Beckett University itself[56]. Again, all of these costs were calculated over students' total study duration and estimated in present value terms[57].

Combining the estimates per student with information on the number of non-UK students in the 2018-19 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 2018-19 cohort of Leeds Beckett University students. As presented in Figure 17, the **total net tuition fee income** generated by international students in the cohort was estimated at **£10 million**, of which **£2 million** was generated by **EU students**, and **£9 million** was generated by **non-EU students**.

Figure 17 Aggregate net tuition fee income associated with international students in the 2018-19 cohort, by domicile (£m)



Note: All estimates are presented in 2018-19 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

4.3.2 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 Leeds Beckett University. 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.);

[55] For more information on our assumptions in relation to public student support and recurrent teaching grants, please refer to Section 2.
[56] We received data on net tuition fees, excluding fee waivers and bursaries and hence did not need to deduct these separately.
[57] For information on the estimated levels of net fee income per student, please refer to Annex A1.1.1.

- **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[58], 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 2018-19 cohort of international students studying at Leeds Beckett University, we used estimates from the **2014-15 Student Income and Expenditure Survey** (SIES)[59]. 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 4.3.1).
- We deducted any **on-campus expenditure** that students might incur (to avoid double-counting with the analysis of the impacts of the expenditure of Leeds Beckett University itself (see Section 5))[60].
- 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[61].
- 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 2018-19 cohort returned home during the third (i.e. final) term of the 2019-20 academic year, and that 50% of full-time students in the cohort returned home during the second and third terms of the 2020-21 academic year[62, 63]. 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).

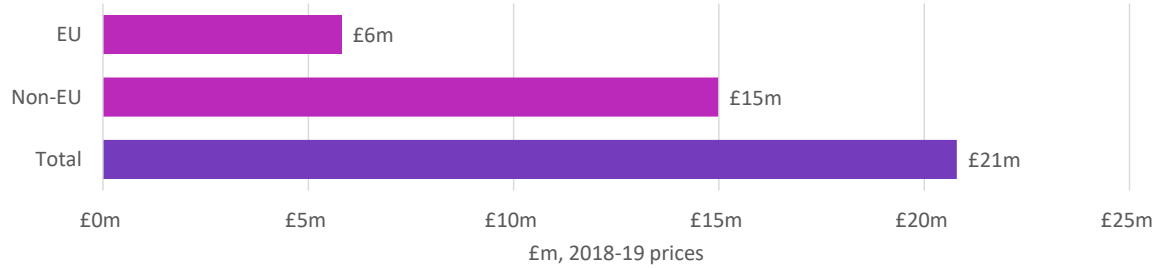
[58] See (former) Department for Business, Innovation and Skills (2011b).
[59] See Institute for Employment Studies & National Centre for Social Research (2018). At the time of writing, estimates for a more recent academic year were not available.
[60] Specifically, following the approach undertaken 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 Leeds Beckett University itself).
[61] These adjustments are based on the approach outlined by the (former) 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 A2.2.4.
[62] In other words, we assume that due to the Covid-19 pandemic, the subsistence expenditures of full-time international students in the 2018-19 cohort were 17% lower in 2019-20 (i.e. 50% x 33%), and 33% lower in 2020-21 (i.e. 50% x 67%) than would otherwise have been the case.
[63] 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. In addition, any full-time students with an assumed one-year study duration (including postgraduate taught degrees, 'other postgraduate' qualifications, and 'other undergraduate' qualifications) are not affected by these assumptions (since they are assumed to have completed their studies in the 2018-19 academic year). As a result, the majority of students in the 2018-19 cohort of Leeds Beckett University students are not impacted by these Covid-19 adjustments.

- Finally, we **inflated** the estimates to 2018-19 prices[64].

Similar to tuition fees, we then calculated the non-tuition fee expenditure over the entire duration 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 2018-19 prices, by level of study, mode, and domicile[65].

Again combining the estimated non-tuition fee income per student with the number of international students in the 2018-19 cohort expected to complete qualifications (or credits/modules) at Leeds Beckett University, the **total (off-campus) non-tuition fee expenditure** associated with international students in the 2018-19 cohort was estimated at **£21 million** (Figure 18). Of this total, **£6 million** was associated with **EU students**, whereas **£15 million** was generated by **non-EU students** in the cohort.

Figure 18 Aggregate non-tuition fee income associated with international students in the 2018-19 cohort, by domicile (£m)



Note: All estimates are presented in 2018-19 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

4.3.3 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 2018-19 Leeds Beckett University cohort (in economic output terms) was estimated at **£31 million** (Figure 19). Around two thirds of this total (**£21 million**) was generated from international students' non-tuition fee spending, while the other third (**£10 million**) was generated from international students' tuition fees accrued by Leeds Beckett University (net of any public costs of provision or fee waivers/bursaries provided by Leeds Beckett University). In terms of student domicile, the majority of this impact (**£24 million**, **76%**) was generated by non-EU domiciled students, while **£7 million** (**24%**) was associated with 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[66]. We thus estimate

[64] Inflation estimates are based on Consumer Price Index inflation estimates provided by the Office for National Statistics (2021).
[65] For information on the estimated levels of non-tuition fee income per student, please refer to Annex A2.2.5.
[66] To estimate the direct GVA and employment associated with the (net) tuition fee income generated by Leeds Beckett University's international students, we multiplied this income by the average ratio of GVA to output and FTE employees to output within Yorkshire and the Humber's 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 Leeds Beckett University'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 Yorkshire and the Humber (again based on the multi-regional Input-Output model). In other words, we assume that the non-tuition fee expenditures of Leeds Beckett University's international students support the same

that the export income generated by international students in the 2018-19 Leeds Beckett University cohort directly generates **£20 million** in GVA (**£7 million** from international (net) fee income and **£13 million** from non-fee income), and supports **325 full-time equivalent jobs** (**150** from (net) tuition fee income and **175** from non-tuition fee income[67]).

Figure 19 Total direct impact associated with non-UK students in the 2018-19 Leeds Beckett University cohort, by type of impact

Note: All monetary estimates are presented in 2018-19 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

levels of GVA and employment (in relative/proportionate terms) as the expenditure of households located in Yorkshire and the Humber more generally.

[67] The reduced difference in direct employment (as compared to output & GVA) 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 Yorkshire and the Humber's government, health, and education sector is considerably larger than the corresponding ratio for sectors producing consumer goods and services purchased by households located in Yorkshire and the Humber (e.g. including the real estate or production sectors).

Box 7 Improving gender equity within sport coaching workforces

Despite the increase in participation of women in sport, women remain acutely underrepresented as sport coaches at all levels of the profession. Research undertaken at Leeds Beckett University's Carnegie School of Sport has been used to **reform sport organisational thinking and strategic approaches** towards improving gender equity within the UK sport coaching workforce and European policy.

European organisations have used the research to: **promote gender equity** as a strategic priority; underpin national interventions towards creating a more equitable coaching workforce; and, specifically, to shape the strategic approaches of The English Football Association (The FA) in its support of women coaches. This led directly to a change in organisational thinking towards supporting underrepresented coaches and subsequently, a greater number of qualified women.

Based on LBU's research, the FA has created a new team of 16 coach developers whose sole remit it is to recruit and develop female coaches and/or Black, Asian, and Minority Ethnic coaches (men and women). Since the beginning of 2017, **over 5,000 more females have qualified as football coaches**. The FA has also increased the number, and subsequent uptake, of individual coach bursaries by women coaches. Since this change, 204 female coaches have received financial assistance to complete their UEFA A, B and Pro qualifications. This led to a **doubling in numbers of women qualified** at A Licence (the second highest coaching award).

The evidence from the programme of research at LBU has also been used by other national governing bodies. LBU research has directly informed a change in organisational practices of national governing bodies including the Rugby Football League, British Cycling and the Lawn Tennis Association.

British Cycling cited LBU's research as part of its Women's Strategy to combat the problem of a lack of clear developmental pathways for, and retention of, women coaches. The increase in women mentor coaches through the programme has contributed to a **rise to 23% of the UK cycling coaching workforce being women** (compared to 17% national average in other sports).

4.4 Total economic impact associated with Leeds Beckett University's educational exports

To estimate the total (direct, indirect, and induced) economic impact associated with the export income generated by international students studying at Leeds Beckett University, we used economic multipliers derived from the 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 2018-19 cohort, including:

- **Multipliers relating to international tuition fee income (accrued by Leeds Beckett University itself)**: The multipliers used to estimate the impact of Leeds Beckett University's international tuition fee income were calculated based on the inter- and intra-industry flows of goods and services for Yorkshire and the Humber's government, health, and education sector as a whole[68].
- **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 Yorkshire and the Humber[69], and subsequently applied to the estimated off-campus non-tuition fee expenditures of overseas students in the 2018-19 cohort of Leeds Beckett University 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 7 presents the economic multipliers applied to the income generated by international students at Leeds Beckett University (in terms of the impact on Yorkshire and the Humber and the UK economy as a whole)[70]. In terms of economic output, the analysis assumes that every £1 million of **tuition fee expenditure** incurred by international students generates an *additional* **£1.40 million** of impact throughout the UK economy, of which **£0.54 million** is generated in Yorkshire and the Humber. In addition, we assume that every £1 million of **non-fee expenditure** incurred by international students generates an *additional* **£1.56 million** of impact throughout the UK, of which **£0.62 million** is located in Yorkshire and the Humber.

[68] This approach is based on the fact that the tuition fee income from international students is accrued by Leeds Beckett University itself. In other words, we assume that the expenditure patterns of Leeds Beckett University are the same as for other institutions operating in Yorkshire and the Humber's government, health, and education sector. Specifically, we apply these multipliers to the *gross* tuition fee income generated by international students in the 2018-19 Leeds Beckett University cohort, and then deduct the Exchequer/University cost of provision (i.e. public teaching grants, public student support, and Leeds Beckett University fee waivers and bursaries) to arrive at the *net* direct, indirect and induced impact associated with this income.

[69] In other words, for the purpose of applying relevant economic multipliers, we assume that international students studying at Leeds Beckett University have similar expenditure patterns as households in Yorkshire and the Humber 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.

[70] While the table presents the multipliers for the impacts on Yorkshire and the Humber 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 20.

Table 7 Economic multipliers associated with the income from international students in the 2018-19 cohort of Leeds Beckett University students

Location of impact and type of income	Output	GVA	FTE employment
Tuition fee income			
Yorkshire and the Humber	1.54	1.48	1.35
Total UK	2.40	2.21	1.84
Non-fee income			
Yorkshire and the Humber	1.62	1.60	1.66
Total UK	2.56	2.44	2.55

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[71], 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 2018-19 Leeds Beckett University cohort amounts to **£80 million** of **economic output** (see top panel of Figure 20):

The impact of the export income generated by the 2018-19 Leeds Beckett University cohort stood at £80 million.

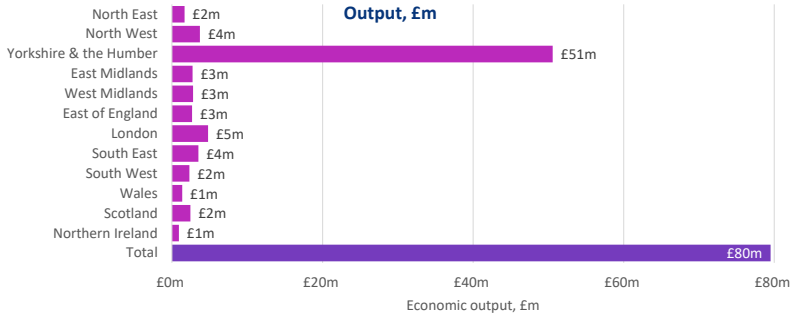
- In terms of the breakdown by type of income from international sources, **£26 million** of this impact was associated with international students' (net) **tuition fees**, and **£53 million** was associated with these students' **non-tuition fee expenditures** over the duration of their studies at Leeds Beckett University.
- In terms of the breakdown by region, the majority of this impact (**£51 million**, **64%**) was generated in the **Yorkshire and the Humber region**, with the remaining **£29 million** (**36%**) occurring in **other regions** across the UK.
- In terms of sector, the tuition fee and non-tuition fee income generated from Leeds Beckett University's international students generated particularly large impacts within the **government, health, and education sector** (**£17 million**, **21%**), given that the cohort's tuition fee income is accrued as income by Leeds Beckett University itself. In addition, there are relatively large impacts felt within the **distribution, transport, hotel, and restaurant sector** (**£16 million**, **20%**), the **real estate industry** (**£13 million**, **16%**), and the **production sector** (**£13 million**, **16%**)[72].

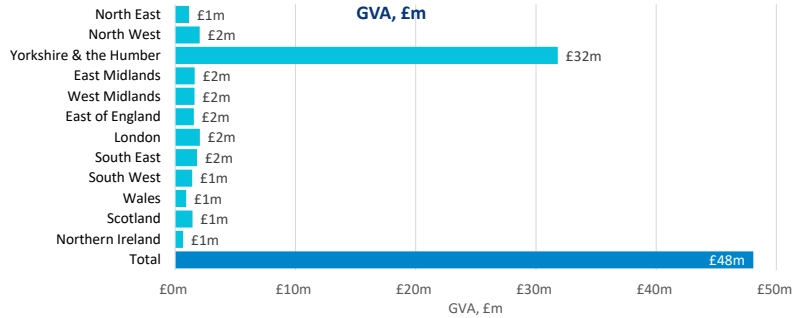
The impact in terms of gross value added was estimated at **£48 million** across the UK economy as a whole (with **£32 million** generated within Yorkshire and the Humber), while the corresponding estimates in terms of employment stood at **725 full-time equivalent jobs** across the UK as a whole, with **505 jobs** supported across Yorkshire and the Humber.

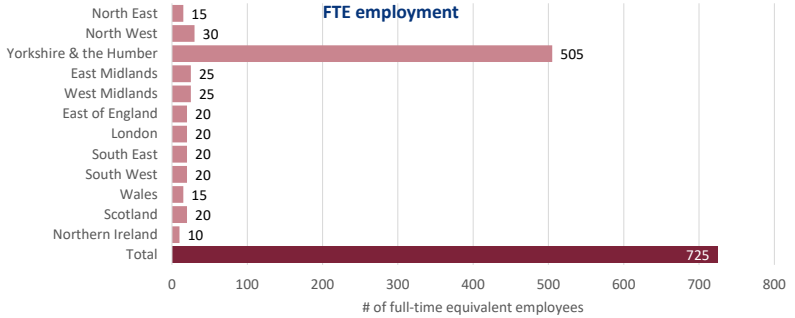
[71] Again, in terms of tuition fee income, note that we apply the relevant multipliers to the *gross* tuition fee income generated by international students in the 2018-19 Leeds Beckett University cohort, and then deduct the Exchequer/University cost of provision (i.e. public teaching grants, public student support, and Leeds Beckett University fee waivers and bursaries) to arrive at the *net* direct, indirect and induced impact associated with this income.
[72] Again, for more detail on what industries are included in this high-level sector classification, please refer to Table 18 in Annex A2.2.1.

Figure 20 Total economic impact associated with international students in the 2018-19 Leeds Beckett University cohort, by region and sector

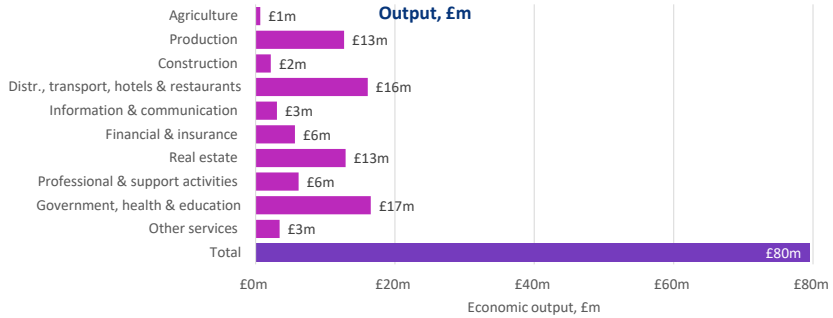
By region

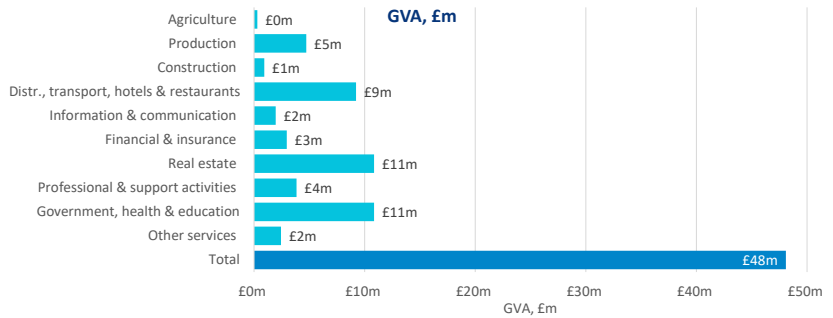


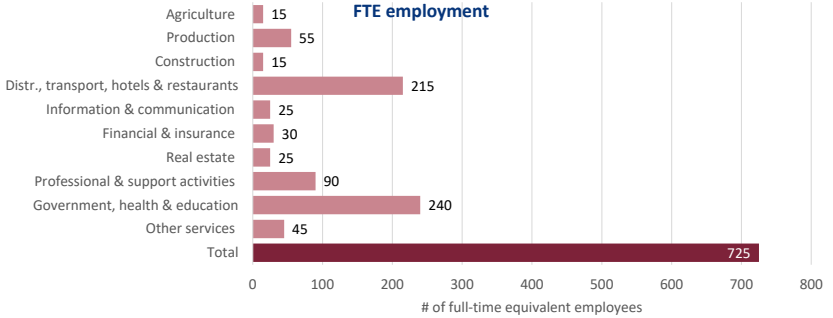




By sector







Note: Monetary estimates are presented in 2018-19 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***

5 The impact of Leeds Beckett University'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 Leeds Beckett University's educational exports (see Section 4), 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 Leeds Beckett University itself, by purchasing goods and services (including labour) from the economy in which it operates.
- **Indirect effect:** Leeds Beckett University purchases generate income for the supplying industries, which they in turn spend on their own purchases from suppliers to meet Leeds Beckett 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 Leeds Beckett University and of businesses operating in Leeds Beckett University'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 Leeds Beckett University. In line with the other strands of impact, the analysis focuses on the 2018-19 academic year. As with the impact of Leeds Beckett University's educational exports, these impacts can be measured in terms of economic output, gross value added, and (full-time equivalent) employment.

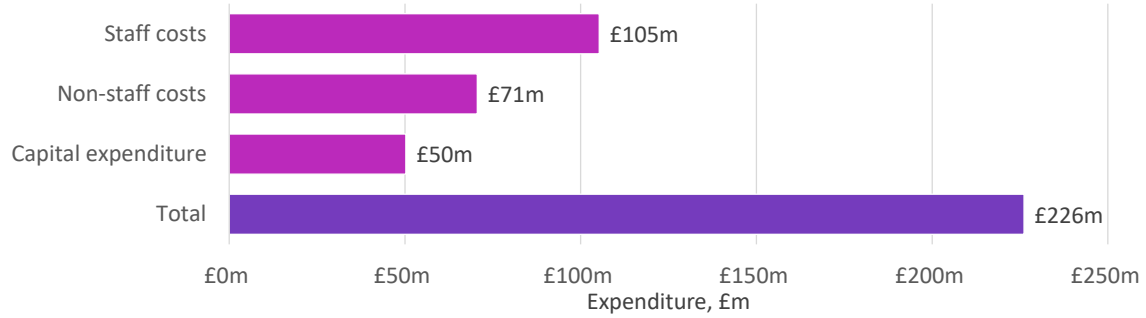
5.1 Direct impact of Leeds Beckett University's expenditures

To measure the direct economic impact of the purchases of goods, services, and labour by Leeds Beckett University, we used information on the University'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 2018-19 academic year[73].

Based on this, in terms of monetary economic **output** (measured in terms of expenditure), **the direct economic impact** associated with Leeds Beckett University's expenditures stood at approximately **£226 million** in 2018-19 (see Figure 21). This includes **£105 million** current expenditure on staff related costs, **£71 million** current expenditure on other (non-staff) operating expenses[74], as well as **£50 million** of capital expenditure incurred in that academic year.

[73] Based on staff and financial data published by the Higher Education Statistics Agency (see HESA (2020a) and HESA (2020c)).
[74] The total operational expenditure (excluding capital expenditure) of Leeds Beckett university in 2018-19 stood at **£233 million**. From this, for the purpose of the analysis, we excluded **£32 million** in depreciation costs (from non-staff expenditure) and **£25 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). Including **£50 million** of capital expenditure, this results in total expenditure of **£226 million** in 2018-19.

Figure 21 Direct economic impact (in terms of output) of Leeds Beckett University's expenditure in 2018-19, by type of expenditure



Note: We exclude a total of **£32 million** of non-staff costs associated with depreciation, and **£25 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 2018-19 prices, and rounded to the nearest £1m.
Source: London Economics' analysis based on HESA (2020a) and data provided by Leeds Beckett University

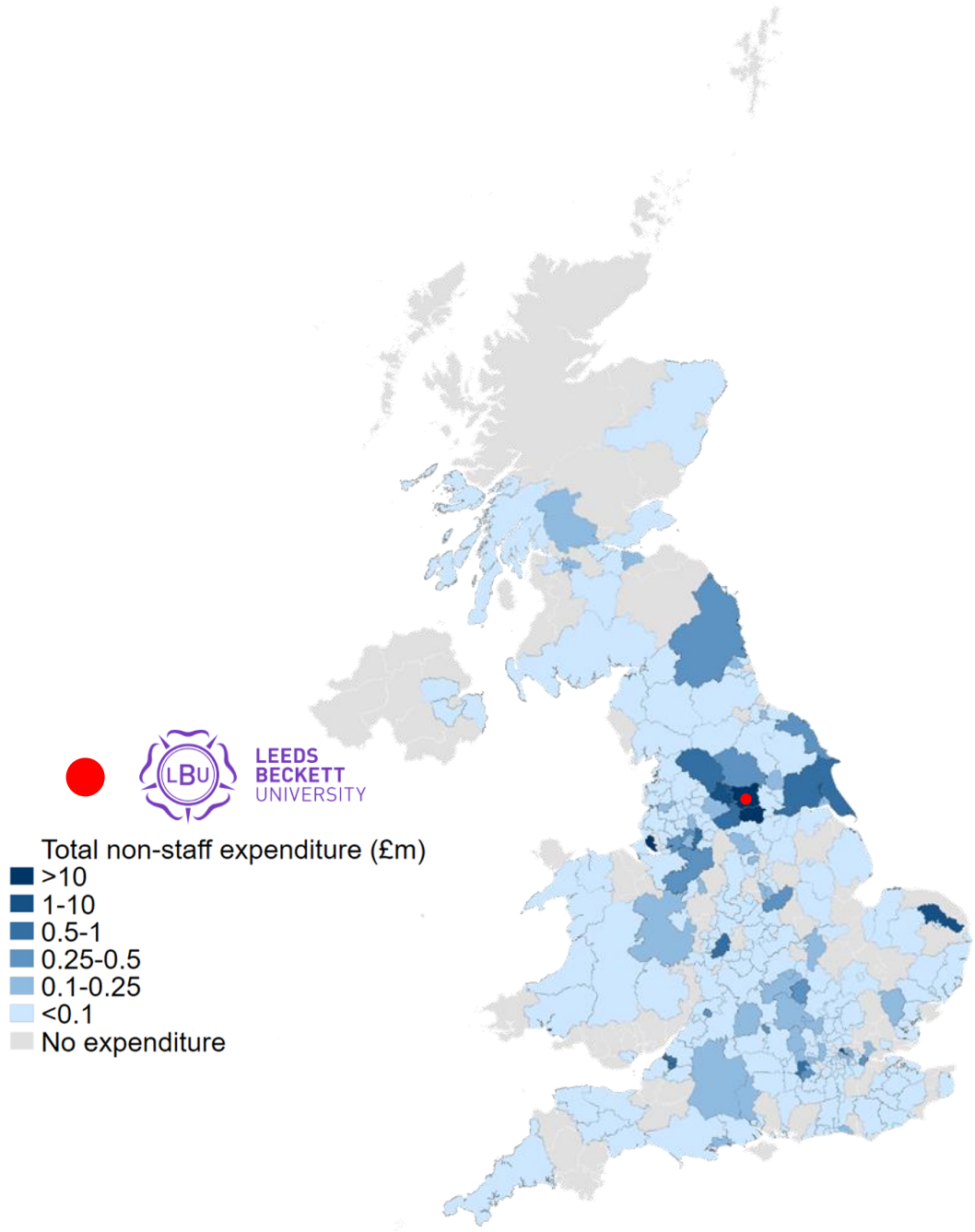
In addition to these total expenditures, we investigated the **geographical breakdown** of Leeds Beckett University's procurement expenditures, residential addresses of staff and staff expenditure, to demonstrate the breadth of Leeds Beckett University's impact across Yorkshire and the Humber and the rest of the UK.

Figure 22 presents the distribution of Leeds Beckett University's procurement expenditures (based on invoice data for 2018-19) by Local Authority. The map illustrates a clear concentration of procurement expenditure in **Yorkshire and the Humber** (approximately **41%** of expenditure, with **Leeds** accounting for approximately **19%** of the overall total), **London** (approximately **22%**)[75] and the **North West** (approximately **21%** of expenditure).

In addition to the analysis of Leeds Beckett University's procurement expenditure, Figure 23 and Figure 24 illustrate the distribution of Leeds Beckett University's staff by number and expenditure on staffing (respectively) based on the Local Authority district of employees' home address. The maps again show a large concentration of staff and staff expenditure around Leeds Beckett University (with **88%** of staff based in **Yorkshire and the Humber** with approximately **12%** of staff based in each of **Harrogate, Leeds, Selby, Craven and Bradford**, respectively). Around **5%** of staff are based in the North West.

[75] It is likely that the data overestimates the level of procurement expenditure occurring in London as compared to other regions, since the invoice data would reflect suppliers' head office locations, rather than reflecting the location where these activities took place.

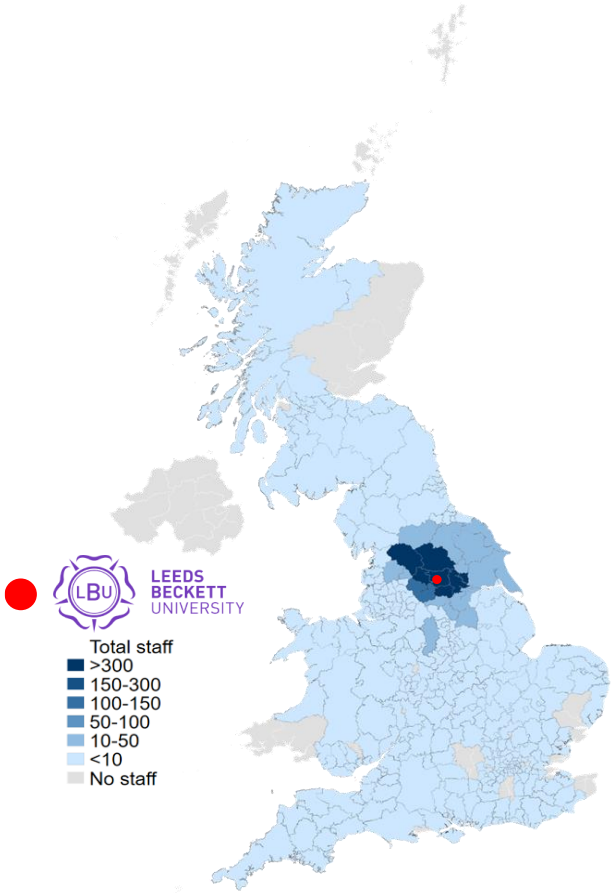
Figure 22 Distribution of Leeds Beckett University's procurement expenditure in 2018-19, by Local Authority (of invoice address)



Note: We received data on the invoice postcodes associated with £93 million of procurement expenditure by Leeds Beckett University in 2018-19. This constitutes a subset of the University's total non-staff spend, as it excludes a range of expenditure on different activities and suppliers. Of this total, we excluded expenditure records with missing postcodes (108 records) and non-UK postcodes (100 records). As a result of these exclusions, the figure is based on a total of £91 million of procurement expenditure. We used the August 2019 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 April 2019 to generate the map.

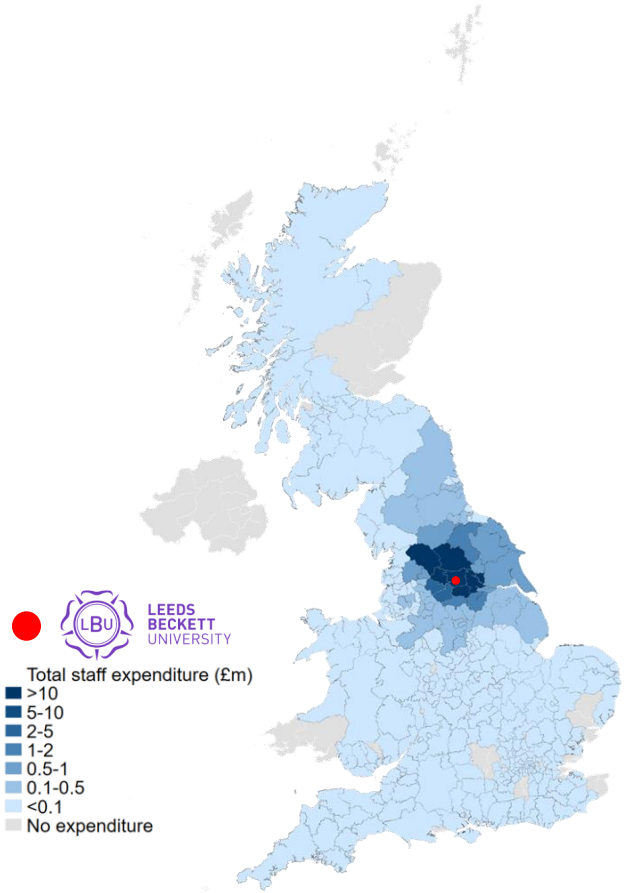
Source: London Economics' analysis based on Leeds Beckett University data and Office for National Statistics data. Contains National Statistics data, OS data, Royal Mail, Gridlink, LPS (Northern Ireland), ONS, NISRA data, NRS data and Ordnance Survey data © Crown copyright and database right 2021.

Figure 23 Distribution of Leeds Beckett University's staff, by Local Authority (of home address)



Note: We received data on home address postcode districts for a total of 3,150 staff (in headcount) from Leeds Beckett University. Of this total, we excluded staff records where the postcode is listed as outside the UK (14 staff). The figure is thus based on the home addresses of 3,136 staff. Staff data was provided with the first one or two digits of postcode only, which covers multiple Local Authorities in most cases. Therefore the data was apportioned equally over the relevant Local Authorities. We used the August 2019 ONS Postcode Directory to determine the Local Authority for each postcode district included in the dataset. The data by Local Authority was then matched with the ONS digital vector boundaries for Local Authority Districts as of April 2019 to generate the map. ***Source: London Economics' analysis based on Leeds Beckett University 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 2021.***

Figure 24 Distribution of Leeds Beckett University's expenditure on staff, by Local Authority (of home address)



Note: We received data on home address postcode districts for a total of £94 million in staff expenditure from Leeds Beckett University. Of this total, we excluded staff records where the postcode is listed as outside the UK (14 records). The figure is thus based on £93 million of staff expenditure. Staff data was provided with the first one or two digits of postcode only, which covers multiple Local Authorities in most cases. Therefore the data was apportioned equally over the relevant Local Authorities. We used the August 2019 ONS Postcode Directory to determine the Local Authority for each postcode district included in the dataset. The data by Local Authority was then matched with the ONS digital vector boundaries for Local Authority Districts as of April 2019 to generate the map. ***Source: London Economics' analysis based on Leeds Beckett University 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 2021.***

5.2 Indirect and induced impacts of Leeds Beckett University's expenditures

As with the economic impact of Leeds Beckett University's educational exports (see Section 4), the assessment of the indirect and induced economic impacts associated with the expenditures of Leeds Beckett University is based on economic multipliers derived from the above-discussed multi-regional Input-Output model[76]. In particular, we applied the estimated average economic multipliers associated with organisations in Yorkshire and the Humber's government, health, and education sector. This mirrors the approach used to assess the impact of Leeds Beckett University's international tuition fee income, since this income was accrued (and subsequently spent) by Leeds Beckett University itself. Again, this approach asserts that the spending patterns of Leeds Beckett University reflect the average spending patterns across organisations operating in Yorkshire and the Humber's government, health, and education sector.

These multipliers (for Yorkshire and the Humber and the UK as a whole[77]) are presented in Table 8, indicating that every £1 million of operational or capital expenditure incurred by Leeds Beckett University generates an *additional* **£1.4 million** of impact throughout the UK economy, of which **£0.54 million** is generated in Yorkshire and the Humber[78]. In terms of employment, we assume that, for every **1,000** (FTE) staff employed directly by Leeds Beckett University, an additional **840** staff are supported throughout the UK, of which **350** are located in Yorkshire and the Humber.

Table 8 Economic multipliers associated with the expenditures of Leeds Beckett University

Location of impact	Output	GVA	FTE employment
Yorkshire and the Humber	1.54	1.48	1.35
Total UK	2.40	2.21	1.84

Note: All multipliers constitute Type II multipliers, defined as [Direct + indirect + induced impact]/[Direct impact]. The figures match the assumed multipliers associated with Leeds Beckett University's international tuition fee income (see Table 7 in Section 4.4).
Source: London Economics' analysis

5.3 Adjustments for double-counting and transfers

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

- The total research income received by Leeds Beckett University in 2018-19 (**£8 million**), to avoid double-counting with the estimated impact of Leeds Beckett University's research activities (Section 3); and,
- The direct, indirect, and induced impacts generated by Leeds Beckett University's (gross) international fee income associated with the 2018-19 cohort of non-UK students (**£27**

[76] See Section 4 for more information.
[77] In addition to the impacts on Yorkshire and the Humber 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 5.4.
[78] This exactly matches the assumed multipliers associated with Yorkshire and the Humber international tuition fee income (see Table 7 in Section 4.3).

million[79]), to avoid double-counting with the impact of Leeds Beckett University's educational exports (Section 4).

5.4 Aggregate impact of Leeds Beckett University's spending

Figure 25 presents the estimated total direct, indirect, and induced impacts associated with expenditures incurred by Leeds Beckett University in 2018-19 (after the above-described adjustments have been made). The aggregate impact of these expenditures was estimated at approximately **£508 million** in economic output terms (see top panel of Figure 25):

The impact of Leeds Beckett University's expenditure on the UK economy in 2018-19 stood at £508 million.

- In terms of region, as with the impact of exports (Section 4), the majority of this impact (**£325 million**, **64%**) was generated in **Yorkshire and the Humber**, with **£183 million** (**36%**) 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 (**£241 million**, **47%**[80]), there are also large impacts felt within other sectors, e.g. including the **distribution, transport, hotel, and restaurant sector** (**£65 million**, **13%**), the **production sector** (**£64 million**, **13%**)[81], and the **real estate sector** (**£44 million**, **9%**).

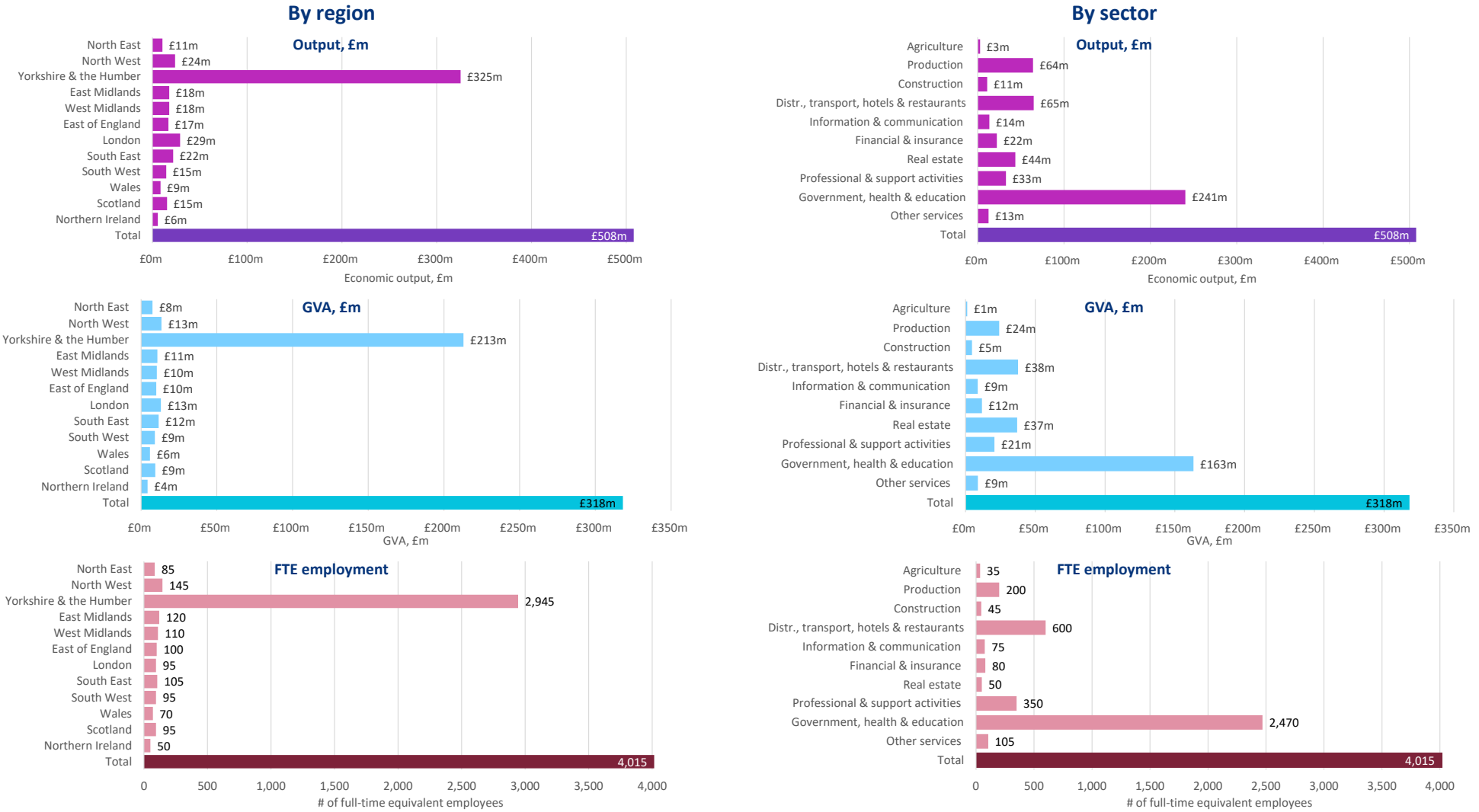
In terms of the number of jobs supported (in FTE), the results indicate that Leeds Beckett University's spending supported a total of **4,015** FTE jobs across the UK economy in 2018-19 (of which **2,945** are located in Yorkshire and the Humber). In addition, the impact in terms of gross value added was estimated at **£318 million** across the UK economy as a whole (with **£213 million** generated within Yorkshire and the Humber).

[79] This is slightly larger than the above impact of the *net* tuition fee income associated with international students in the 2018-19 cohort (**£10 million**; see Section 4), as the value deducted here relates to the impact of Leeds Beckett University's *gross* international fee income *before* the deduction of the Exchequer (since these costs are already deducted when estimating the impact of Leeds Beckett University's educational exports).

[80] 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 Leeds Beckett University (net of the above adjustments to avoid any double-counting).

[81] Again, for more detail on what industries are included in this high-level sector classification, please refer to Table 18 in Annex A2.2.1.

Figure 25 Total economic impact associated with Leeds Beckett University's expenditure in 2018-19, by region and sector



Note: Monetary estimates are presented in 2018-19 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***

Box 8 Improving the energy efficiency of homes

Research by Leeds Beckett University's **Leeds Sustainability Institute (LSI)** suggested that all **27 million homes** in the UK had **higher fuel bills** and **greater carbon emissions** than was previously thought. Since 2003, LSI has characterised, measured, and investigated the causes and implications of this domestic energy performance gap through various building performance evaluation research projects.

Insights from this research led directly to changes to **UK Building Regulations** to improve the **energy efficiency of homes**. These changes are estimated to have prevented up to **120,000 tonnes of CO_2** entering the atmosphere due to the reduction in energy used to heat homes and resulted in lower fuel bills for hundreds of thousands of homes worth over **£66 million** during the most recent Research Excellence Framework audit period. The "co-heating" research method developed by the LSI has been adopted as the de-facto approach to understand the true energy efficiency of buildings by the **International Energy Agency (IEA)** and the **UK Government**.

LSI's research discovered a party wall bypass phenomenon, in both new and existing dwellings. It was consequently identified that a cavity party wall full-fill retrofit could **reduce whole house heat loss by eight per cent** in some instances. The Government's fuel poverty policy has funded 1,724 party cavity wall insulation retrofits. People in fuel poverty are more at risk of health problems resulting from cold homes. Party wall retrofits can improve thermal comfort and make homes easier to heat. The discovery of the bypass by LSI has therefore contributed to the **health and wellbeing** of thousands of occupants in these retrofitted homes.

6 Total economic impact of Leeds Beckett University

The total economic impact on the UK economy associated with Leeds Beckett University's activities in 2018-19 was estimated to be approximately **£1.43 billion** (Table 9). In terms of the components of this impact:

- The value of the University's teaching and learning activities stood at **£820 million** (**57%**);
- Leeds Beckett University's **research activities** accounted for **£23 million** (**2%**) of this impact;
- The impact of the University's **educational exports** was estimated at **£80 million** (**6%**); and
- The impact generated by the **operating and capital spending** stood at **£508 million** (**35%**).

Table 9 Total economic impact of Leeds Beckett University's activities in the UK in 2018-19 (£m and % of total)

Type of impact		£m	%
	Impact of teaching and learning	**£820m**	**57%**
	Students	£421m	29%
	Exchequer	£399m	28%
	Impact of research	**£23m**	**2%**
	Research activities	£14m	1%
	Knowledge transfer activities (spinouts)	£9m	1%
	Impact of exports	**£80m**	**6%**
	Tuition fee income	£26m	2%
	Non-tuition fee income	£53m	4%
	Impact of the University's expenditure	**£508m**	**35%**
	Direct impact	£226m	16%
	Indirect and induced impacts	£282m	20%
	Total economic impact	**£1,431m**	**100%**

Note: All estimates are presented in 2018-19 prices, and rounded to the nearest £1m. Totals may not add up precisely due to rounding.
Source: London Economics' analysis

Compared to Leeds Beckett University's total operational costs of approximately **£233 million** in 2018-19[82], the total impact of the University's activities on the UK economy was estimated at **£1.43 billion**[83], which corresponds to a **benefit to cost ratio of 6.1:1**.

[82] Compared to the **£226 million** of direct impact of Leeds Beckett University's expenditures included in Section 5 and in Table 9 in this section, the **£233 million** of operating expenditure here *excludes* capital expenditure (**£50 million**) but *includes* depreciation costs (**£32 million**) and movements in pension provisions (**£25 million**).

[83] In addition to this total impact on the UK economy as a whole, *some* of the strands of impact considered in the analysis can be disaggregated by sector and region (and can be measured in economic output as well as GVA and (FTE) employment). In aggregate, approximately **£587 million** (**41%**) of Leeds Beckett University's total impact can be disaggregated in this way. For more information, see Annex 1.

Index of Tables and Figures

Tables

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ANNEXES

Annex 1 References

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Annex 2 Technical Annex

A2.1 Impact of Leeds Beckett University's teaching and learning activities

A2.1.1 Qualifications and counterfactuals considered in the econometric analysis

Our econometric analysis of the earnings and employment returns to higher education qualifications (described in more detail in Annex A2.1.2) considered **five different higher education qualification groups** (i.e. five **'treatment' groups**) within the National Qualifications Framework: three at postgraduate level (higher degree (research), higher degree (taught) and 'other' postgraduate qualifications[84]) and two at undergraduate level (first degrees and 'other' undergraduate qualifications[85]).

Table 10 presents these different postgraduate and undergraduate level qualifications (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 higher education qualification 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 for the removal of other personal, regional, or socioeconomic characteristics that might influence *both* the determinants of qualification attainment as well as earnings/employment.

For the analysis of marginal returns, postgraduate degree 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 2 or more GCE 'A' Levels as their highest qualification. For the purposes of estimating the returns to all higher education qualifications, the highest level of professional or vocational qualification that an individual may be in possession of is Level 3 (for both those in possession of higher education qualifications (the treatment group) and those individuals not in possession of higher education qualifications (the control group)).

[84] This relates to Labour Force Survey variables a) HIQUAL11 and HIQUAL15 value labels 'Level 7 Diploma' and 'Level 7 Certificate' and b) HIQUAL4, HIQUAL5, HIQUAL8, HIQUAL11 and HIQUAL15 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).

[85] This relates to Labour Force Survey variables HIQUAL4, HIQUAL5, HIQUAL8, HIQUAL11 and HIQUAL15 value label 'other higher education below degree'. Additionally, Diplomas of Higher Education, Other Degrees, Level 4 Certificates, and Level 6 Diplomas are included. Interviewers are instructed to use 'other higher education below degree' only if the respondent states that they have 'something 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.

Table 10 Treatment and comparison groups used to assess the marginal earnings and employment returns to higher education qualifications

Treatment group – highest academic qualification	Comparison group - highest academic qualification	Treatment and comparison groups – highest possible vocational/professional qualification
Higher degree (research)	First degree	Level 3 vocational
Higher degree (taught)	First degree	Level 3 vocational
Other postgraduate	First degree	Level 3 vocational
First degree	2 or more GCE 'A' Levels	Level 3 vocational
Other undergraduate	2 or more GCE 'A' Levels	Level 3 vocational
2 or more GCE 'A' Levels	5 or more GCSEs at A*-C	Level 3 vocational

Source: London Economics

In addition to the analysis of higher education qualifications, 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 provide an indication of the fact that the academic 'distance travelled' by a (small) proportion of students in the 2018-19 Leeds Beckett University cohort is **greater** than might be the case compared to those in possession of levels of prior attainment 'traditionally' associated with higher education entry. Similarly, for other students within the cohort, the academic 'distance travelled' is **lower** than the traditional prior attainment level (e.g. a small proportion of students intending to undertake a first degree had previously already completed a sub-degree level (i.e. 'other undergraduate') qualification).

In instances where the level of prior attainment for students at Leeds Beckett University was higher or lower than the 'traditional' counterfactual qualifications outlined in Table 10, 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 Leeds Beckett University**, we *deducted* the returns to undertaking an 'other undergraduate' qualification (relative to the possession of 2 or more GCE 'A' Levels) from the returns to undertaking a first degree (again relative to the possession of 2 or more GCE 'A' Levels). Similarly, to calculate the returns for a student **in possession of 5 or more GCSEs at grades A*-C undertaking a first degree at Leeds Beckett University**, we *added* the returns to achieving 2 or more GCE 'A' Levels (relative to the possession of 5 or more GCSEs at grades A*-C) to the returns to undertaking a first degree (relative to the possession of 2 or more GCE 'A' Levels)[86].

A2.1.2 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

[86] 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 attainment, irrespective of the level of prior education attainment).

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:

$ln\ (\omega_i) = \alpha + \beta X_i + \epsilon_i$ for *i* = 1 to n, where i is an individual LFS respondent

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

- Gender;
- Age;
- Age squared;
- Ethnic origin;
- Region of usual residence;
- Qualifications held;
- 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;
- Interaction terms; 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 students domiciled in the different Home Nations.

To estimate the impact of higher education qualifications on labour market outcomes using this methodology, we used information from **pooled Quarterly UK Labour Force Surveys between 2004 and 2020**. The selection of information over this period is the longest time for which information on education and earnings is available on a relatively consistent basis.

The resulting estimates of the marginal wage returns to higher education qualifications are presented in Table 11. In the earnings regressions, the coefficients relating to the different higher education qualifications provide an indication of the additional effect on hourly earnings associated with possession of the respective higher education 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 **22.5%** hourly earnings premium compared to comparable men holding only 2 or more GCE 'A' levels as their highest level of attainment. The comparable estimate for women aged between 31 and 35 stands at **27.0%**.

In addition to estimating marginal earnings returns on average across *all subjects* of study, we repeated the econometric analysis to estimate these returns *separately by subject*[87]. Combining these subject-level returns with the number of students in the 2018-19 cohort of Leeds Beckett University students by subject, we then calculated **subject mix adjustment factors** (separately by gender and qualification level). These adjustment factors were then applied to the above average marginal wage returns (across all subjects) to **adjust for the specific subject composition of the University's student cohort**.

Table 11 Marginal earnings returns to higher education qualifications (in all subjects), in % (following exponentiation), 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[1]	8.8%	5.0%	9.9%	18.4%	24.6%	17.2%	26.1%	16.9%	18.9%	10.6%
Other undergraduate[2]				5.8%	13.9%	20.2%	17.8%	20.1%	23.9%	28.8%
First degree[2]		10.1%	16.1%	22.5%	21.0%	27.6%	18.1%	24.9%	23.7%	27.4%
Other postgraduate[3]		9.7%	12.4%	9.2%	4.9%	5.4%				
Higher degree (taught)[3]		10.3%	11.5%	7.9%	10.1%	12.5%	12.4%	13.4%	12.3%	13.4%
Higher degree (research)[3]			18.3%	19.0%	20.4%	19.7%	25.1%	27.0%	27.4%	47.4%
Women										
2 or more GCE A-levels[1]	8.4%	5.3%	9.9%	11.6%	17.6%	18.9%	13.7%	14.5%	13.2%	10.4%
Other undergraduate[2]		3.5%	8.4%	12.0%	18.9%	19.8%	22.3%	27.0%	27.5%	24.4%
First degree[2]		10.5%	17.6%	27.0%	34.0%	31.8%	32.7%	34.2%	28.3%	26.1%
Other postgraduate[3]		8.4%	8.7%	12.1%	9.4%	9.1%	11.2%	14.3%	11.1%	14.3%
Higher degree (taught)[3]		7.8%	6.3%	9.6%	12.5%	17.4%	22.1%	15.3%	27.8%	20.8%
Higher degree (research)[3]		16.9%	20.0%	21.4%	31.1%	28.1%	38.4%	40.2%	34.0%	39.5%

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.

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

[2] Returns to first degrees and 'other' undergraduate qualifications are estimated relative to individuals holding 2 or more GCE 'A' levels as their highest qualification.

[3] Returns to higher degree (taught), higher degree (research), and 'other' postgraduate qualifications are estimated relative to undergraduate degrees.

Source: London Economics' analysis of pooled Quarterly Labour Force Survey data for 2004-2020Q3

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:

[87] The HESA Joint Academic Coding System (JACS) was used to classify subject areas. The following subject groups were distinguished: (1) Medicine & dentistry, (2) Subjects allied to medicine, (3) Biological sciences, (4) Veterinary science, (5) Agriculture & related subjects, (6) Physical sciences, (7) Mathematical sciences, (8) Computer science, (9) Engineering & technology, (A) Architecture, building & planning, (B) Social studies, (C) Law, (D) Business & administrative studies, (E) Mass communications & documentation, (F) Languages, (G) Historical & philosophical studies, (H) Creative arts & design, (I) Education, and (J) Combined.

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

The dependent variable adopted represents the binary variable $EMPNOT_i$, which is coded 1 if the individual is in employment and 0 otherwise[88]. 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:

- Gender;
- Age;
- Age squared;
- Ethnic origin;
- 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 2018-19 cohort of UK domiciled students attending Leeds Beckett University. 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 the University's specific subject mix)) are presented in Table 12. In the employment regressions, the relevant coefficients provide estimates of the impact of the qualification on the probability of being in employment (expressed in percentage points). Again, to take an example, the analysis estimates that a man aged between 31 and 35 in possession of a first degree is **2.5 percentage points** more likely to be in employment than a man of similar age holding only 2 or more GCE 'A' levels as his highest level of education. The corresponding estimate for women stands at **4.5 percentage points**.

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

Table 12 Marginal employment returns to higher education qualifications (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[1]	-2.2		2.9	1.4	2.0	1.3	1.4			
Other undergraduate[2]		-2.8	-2.0			2.0				
First degree[2]		-1.5	1.4	2.5	2.0	2.0	1.8	3.8	2.4	
Other postgraduate[3]		5.5		1.8		1.7	1.7	2.5		-5.0
Higher degree (taught)[3]			-1.0						2.4	3.2
Higher degree (research)[3]						1.9		3.8	7.4	9.7
Women										
2 or more GCE A-levels[1]		3.7	3.2	2.1		1.8	3.3	3.5		
Other undergraduate[2]			-2.0	2.2						
First degree[2]		2.6	3.9	4.5	6.3	4.9	4.3	3.0	2.7	
Other postgraduate[3]		4.6	1.3	3.2	2.3	5.5	5.1	3.9		
Higher degree (taught)[3]			-1.8			3.6	2.6	2.9	5.5	
Higher degree (research)[3]			-3.2	3.6		5.7	6.7	5.4	11.0	16.7

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.

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

[2] Returns to first degrees and 'other' undergraduate qualifications are estimated relative to individuals holding 2 or more GCE 'A' levels as their highest qualification.

[3] Returns to higher degree (taught), higher degree (research) and 'other' postgraduate qualifications are estimated relative to undergraduate degrees.

Source: London Economics' analysis of pooled Quarterly Labour Force Survey data for 2004-2020Q3

A2.1.3 '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 whilst 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 amongst students in the 2018-19 cohort commencing postgraduate taught degrees with Leeds Beckett University on a part-time basis is **32**, compared to **26** 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 13 presents the assumed average age at enrolment, study duration, and age at completion for students in the 2018-19 Leeds Beckett University cohort[89].

Table 13 Average age at enrolment, study duration, and age at completion for students in the 2018-19 Leeds Beckett University 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	20	2	22	37	5	42
First degree	19	3	22	29	7	36
Other postgraduate	27	2	29	37	4	41
Higher degree (taught)	26	1	27	32	2	34
Higher degree (research)	33	4	37	42	9	51

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

Given these characteristics, we adjust the methodology when estimating the returns to part-time (and later full-time) education attainment at the University, namely through the use of an **'age-decay' function**. This approach assumes that possession of a particular higher 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) 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[90]. 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 amongst 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).

Table 14 presents the assumed age-decay adjustment factors which we apply to the marginal earnings and employment returns to full-time and part-time students undertaking qualifications at Leeds Beckett University in the 2018-19 cohort. To take an example, we have assumed that a student undertaking a postgraduate taught degree on a full-time basis achieves 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 34 (on average)), these students recoup only **83%** of the corresponding full-time earnings and employment premiums from that age (of attainment).

[89] The assumed average age at enrolment is based on the number of individuals in the cohort assumed to *complete* a given qualification at Leeds Beckett University (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 for more information)). In particular, the age at enrolment per qualification (based on the HESA data provided by Leeds Beckett University) is calculated as the weighted average age at enrolment across students in the 2018-19 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).
The assumed average duration of study for both full-time and part-time students (by qualification level) is based on separate information provided by Leeds Beckett University.
[90] 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 14 Assumed age decay adjustment factors for students in the 2018-19 Leeds Beckett University cohort

Age	Other undergraduate	First degree	Other postgraduate	Higher degree (taught)	Higher degree (research)
18	100%	100%	100%	100%	100%
19	100%	100%	100%	100%	100%
20	100%	100%	100%	100%	100%
21	100%	100%	100%	100%	100%
22	100%	100%	100%	100%	100%
23	100%	100%	100%	100%	100%
24	98%	98%	100%	100%	100%
25	95%	95%	100%	100%	100%
26	93%	93%	100%	100%	100%
27	90%	90%	100%	100%	100%
28	88%	88%	100%	100%	100%
29	85%	85%	97%	97%	97%
30	83%	83%	94%	94%	94%
31	80%	80%	91%	91%	91%
32	78%	78%	89%	89%	89%
33	75%	75%	86%	86%	86%
34	73%	73%	83%	83%	83%
35	70%	70%	80%	80%	80%
36	68%	68%	77%	77%	77%
37	65%	65%	74%	74%	74%
38	63%	63%	71%	71%	71%
39	60%	60%	69%	69%	69%
40	58%	58%	66%	66%	66%
41	55%	55%	63%	63%	63%
42	53%	53%	60%	60%	60%
43	50%	50%	57%	57%	57%
44	48%	48%	54%	54%	54%
45	45%	45%	51%	51%	51%
46	42%	42%	49%	49%	49%
47	40%	40%	46%	46%	46%
48	37%	37%	43%	43%	43%
49	35%	35%	40%	40%	40%
50	32%	32%	37%	37%	37%
51	30%	30%	34%	34%	34%
52	27%	27%	31%	31%	31%
53	25%	25%	29%	29%	29%
54	22%	22%	26%	26%	26%
55	20%	20%	23%	23%	23%
56	17%	17%	20%	20%	20%
57	15%	15%	17%	17%	17%
58	12%	12%	14%	14%	14%
59	10%	10%	11%	11%	11%
60	7%	7%	9%	9%	9%
61	5%	5%	6%	6%	6%
62	2%	2%	3%	3%	3%
63	0%	0%	0%	0%	0%
64	0%	0%	0%	0%	0%
65	0%	0%	0%	0%	0%

Note: Shaded areas indicate relevant average graduation age per full-time / part-time student at each level of study at Leeds Beckett University:

Full-time students Part-time students

Source: London Economics' analysis based on Leeds Beckett University HESA data

Note that the application of the 'age-decay' function implies that, for *all* qualification levels at the University, 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[91].

A2.1.4 Estimating the gross graduate premium and gross public purse benefit

The gross graduate premium 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 A2.1.2) 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 (i.e. 2 or more GCE 'A' Levels or a first degree).
2. We inflated these baseline or counterfactual earnings using the marginal earnings premiums and employment premiums (presented in Table 11 and Table 12 in Annex A2.1.2), adjusted to reflect late attainment (as outlined in Annex A2.1.3), 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 **0.8%** per annum (based on average earnings growth rate forecasts estimated by the Office for Budget Responsibility (2020 and 2021)[92]).
4. Based on the earnings profiles generated by qualification holders, and income tax and National Insurance rates and allowances for the relevant academic year[93], we computed the future stream of net earnings (i.e. post-tax)[94]. Using similar assumptions, we further calculated the stream of (employment-adjusted) foregone earnings (based on earnings in the relevant counterfactual group[95]) during the period of study, again net of tax, for full-time students only.

[91] 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.

[92] Specifically, we make use of the Office for Budget Responsibility's most recent short-term forecasts (for 2019 to 2025; see Office for Budget Responsibility (2021)) as well as their most recent long-term forecasts (for 2026 to 2069; see Office for Budget Responsibility (2020)) of nominal average earnings growth. The assumed **0.8%** rate captures the average annual real earnings growth rate over the total period (adjusted from nominal to real terms based on projected (Retail Price Index) inflation over the same period (and based on the same sources).

[93] i.e. 2018-19. 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 earnings growth of **0.8%**.

[94] The tax adjustment also takes account of increased VAT revenues for HMG, by assuming that individuals consume **91.5%** 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 forecasts of the household savings rate published by the Office for Budget Responsibility (2021), while the proportion of consumption subject to VAT is based on VAT estimates provided by the Office for Budget Responsibility (no date).

[95] The foregone earnings calculations are based on the baseline or counterfactual earnings associated with either 2 or more GCE 'A' Levels or first degrees. Specifically, as outlined in Annex A2.1.1, some students in the 2018-19 Leeds Beckett University cohort were in possession of other levels of 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 2 or

5. We calculated the **discounted** stream of additional (employment-adjusted) future earnings compared to the relevant counterfactual group (using a standard discount rate of **3.5%** as presented in HM Treasury Green Book (HM Treasury, 2018)), and the discounted 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 higher education qualification attainment.

Note that the gross graduate premium 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 taught postgraduate degree undertaking an additional postgraduate qualification at Leeds Beckett University will not accrue any wage or employment benefits from this additional qualification attainment (while still incurring 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 the Home Nations, 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 and gross public purse benefits per student (by study mode, level of study, gender, and prior attainment) are presented in Table 15.

A2.1.5 Net graduate premium and net public benefit

Table 16 and Table 17 provide detailed information on the net graduate premiums and net public benefits for students associated with all higher education qualifications offered by Leeds Beckett University (respectively), based on the 2018-19 cohort. Each table provides detailed information on the net graduate premiums/net Exchequer benefits by student domicile, study mode, study level, prior attainment, and gender[96].

more GCE 'A' Levels as the highest qualification (adjusted for the age at enrolment and completion associated with the relevant qualification obtained). In addition, the estimated foregone earnings for students previously in possession of postgraduate qualifications are based on the level of earnings associated with first degrees.

[96] In terms of gender, it is important to note that the economic benefits associated with higher education qualifications - expressed in *monetary terms* - are generally lower for women than men, predominantly as a result of the increased likelihood of spending time out of the active labour force. However, as with the majority of the wider economic literature, the *marginal benefits* associated with higher education qualifications - expressed as either the *percentage increase* in hourly earnings or enhanced probability of employment - are often greater for women than for men (see Annex A2.1.2).

Table 15 Gross graduate premiums and Exchequer benefits per student associated with HE qualification attainment at Leeds Beckett University, by study mode, level, gender, and prior attainment

Level of study	Previous qualification and gender													
	GCSE		A-level		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	£167,000	£64,000	£91,000	£30,000	-£21,000	-£19,000	-£19,000	-£17,000	-£19,000	-£17,000		-£17,000		
First degree	£149,000	£100,000	£77,000	£67,000	-£28,000	£19,000	-£30,000	-£25,000	-£30,000	-£25,000	-£30,000	-£25,000		
Other postgraduate			£118,000	£109,000	£9,000	£62,000	£11,000	£13,000	-£44,000	-£38,000	-£44,000	-£38,000	-£44,000	-£38,000
Higher degree (taught)			£148,000	£164,000	£34,000	£115,000	£37,000	£68,000	-£20,000	£15,000	-£20,000	-£18,000		-£18,000
Higher degree (research)							-£14,000	-£0,000	-£41,000	-£32,000	-£52,000	-£60,000		
Part-time students														
Other undergraduate	£88,000	£37,000	£57,000	£24,000	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
First degree	£113,000	£73,000	£65,000	£54,000	£0	£22,000	£0	£0		£0	£0	£0	£0	
Other postgraduate	£104,000	£80,000	£70,000	£65,000	£6,000	£39,000	£19,000	£25,000	£0	£0	£0	£0	£0	£0
Higher degree (taught)	£189,000	£164,000	£128,000	£141,000	£32,000	£101,000	£45,000	£72,000	£8,000	£32,000	£0	£0		£0
Higher degree (research)							£31,000	£21,000	£28,000	£14,000	£21,000	£7,000		
Gross Exchequer benefits														
Full-time students														
Other undergraduate	£168,000	£65,000	£103,000	£37,000	-£4,000	-£3,000	-£3,000	-£2,000	-£3,000	-£2,000		-£2,000		
First degree	£156,000	£100,000	£93,000	£72,000	-£5,000	£34,000	-£6,000	-£3,000	-£6,000	-£3,000	-£6,000	-£3,000		
Other postgraduate			£135,000	£103,000	£31,000	£65,000	£37,000	£24,000	-£24,000	-£18,000	-£24,000	-£18,000	-£24,000	-£18,000
Higher degree (taught)			£153,000	£142,000	£43,000	£102,000	£50,000	£63,000	-£10,000	£19,000	-£10,000	-£8,000		-£8,000
Higher degree (research)							£40,000	£24,000	£9,000	-£2,000	-£1,000	-£25,000		
Part-time students														
Other undergraduate	£80,000	£29,000	£54,000	£18,000	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
First degree	£101,000	£59,000	£61,000	£44,000	£0	£19,000	£0	£0		£0	£0	£0	£0	
Other postgraduate	£98,000	£64,000	£69,000	£53,000	£9,000	£32,000	£22,000	£20,000	£0	£0	£0	£0	£0	£0
Higher degree (taught)	£178,000	£135,000	£127,000	£116,000	£35,000	£84,000	£50,000	£59,000	£6,000	£26,000	£0	£0		£0
Higher degree (research)							£30,000	£16,000	£27,000	£11,000	£21,000	£5,000		

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2018-19 Leeds Beckett University cohort expected to complete the given qualification (with the given characteristics). Grey shading indicates instances where the level of study at Leeds Beckett University 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 16 Net graduate premiums per student associated with HE qualification attainment at Leeds Beckett University, by study mode, level, gender, prior attainment, and domicile

Level of study	Previous qualification and gender													
	GCSE		A-level		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
Students from England														
Full-time students														
Other undergraduate	£165,000	£62,000	£88,000	£27,000	-£24,000	-£22,000	-£22,000	-£20,000	-£22,000	-£20,000		-£20,000		
First degree	£145,000	£96,000	£73,000	£63,000	-£32,000	£15,000	-£34,000	-£29,000	-£34,000	-£29,000	-£34,000	-£29,000		
Other postgraduate			£106,000	£97,000	-£2,000	£51,000	-£0,000	£1,000	-£56,000	-£49,000	-£56,000	-£49,000	-£56,000	-£49,000
Higher degree (taught)			£142,000	£158,000	£28,000	£109,000	£31,000	£62,000	-£26,000	£9,000	-£26,000	-£24,000		-£24,000
Higher degree (research)							-£24,000	-£10,000	-£51,000	-£42,000	-£62,000	-£70,000		
Part-time students														
Other undergraduate	£87,000	£36,000	£56,000	£23,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000
First degree	£112,000	£72,000	£64,000	£53,000	-£1,000	£21,000	-£1,000	-£1,000		-£1,000	-£1,000	-£1,000	-£1,000	
Other postgraduate	£94,000	£69,000	£60,000	£55,000	-£4,000	£29,000	£9,000	£15,000	-£10,000	-£10,000	-£10,000	-£10,000	-£10,000	-£10,000
Higher degree (taught)	£183,000	£159,000	£122,000	£135,000	£26,000	£95,000	£40,000	£66,000	£2,000	£26,000	-£6,000	-£6,000		-£6,000
Higher degree (research)							£22,000	£11,000	£18,000	£5,000	£12,000	-£2,000		
Students from Wales														
Full-time students														
Other undergraduate			£93,000	£32,000										
First degree			£80,000	£70,000	-£25,000	£22,000								
Other postgraduate							-£0,000	£1,000						
Higher degree (taught)							£32,000	£64,000						
Higher degree (research)														
Part-time students														
Other undergraduate	£87,000	£35,000	£56,000				-£1,000	-£1,000						
First degree		£72,000	£63,000											
Other postgraduate							£9,000	£15,000		-£10,000	-£10,000			
Higher degree (taught)					£28,000		£41,000	£68,000		£28,000				
Higher degree (research)														

Level of study	Previous qualification and gender													
	GCSE		A-level		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
Students from Scotland														
Full-time students														
Other undergraduate			£84,000	£24,000										
First degree			£68,000	£58,000	-£37,000	£10,000								
Other postgraduate														
Higher degree (taught)							£31,000	£62,000						
Higher degree (research)														
Part-time students														
Other undergraduate	£72,000	£21,000			-£16,000	-£16,000		-£16,000						
First degree					-£21,000	£1,000								
Other postgraduate						£29,000	£9,000	£15,000	-£10,000	-£10,000		-£10,000		
Higher degree (taught)								£66,000		£26,000				
Higher degree (research)														
Students from Northern Ireland														
Full-time students														
Other undergraduate			£83,000	£23,000	-£28,000	-£26,000								
First degree	£139,000		£66,000	£56,000	-£39,000	£9,000								
Other postgraduate							-£0,000	£1,000						
Higher degree (taught)						£109,000	£31,000	£62,000	-£26,000					
Higher degree (research)												-£73,000		
Part-time students														
Other undergraduate														
First degree														
Other postgraduate							£9,000	£15,000		-£10,000	-£10,000	-£10,000		
Higher degree (taught)	£183,000					£95,000	£40,000							
Higher degree (research)														

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2018-19 Leeds Beckett University cohort expected to complete the given qualification (with the given characteristics). Grey shading indicates instances where the level of study at Leeds Beckett University 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. ***Source: London Economics' analysis***

Table 17 Net Exchequer benefits per student associated with HE qualification attainment at LBU, by study mode, level, gender, prior attainment, and domicile

Level of study	Previous qualification and gender													
	GCSE		A-level		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
Students from England														
Full-time students														
Other undergraduate	£153,000	£50,000	£88,000	£22,000	-£19,000	-£18,000	-£18,000	-£17,000	-£18,000	-£17,000		-£17,000		
First degree	£134,000	£78,000	£72,000	£51,000	-£27,000	£12,000	-£28,000	-£25,000	-£28,000	-£25,000	-£28,000	-£25,000		
Other postgraduate			£135,000	£102,000	£31,000	£64,000	£36,000	£23,000	-£25,000	-£19,000	-£25,000	-£19,000	-£25,000	-£19,000
Higher degree (taught)			£153,000	£142,000	£43,000	£102,000	£49,000	£63,000	-£11,000	£18,000	-£11,000	-£9,000		-£9,000
Higher degree (research)							£38,000	£22,000	£6,000	-£4,000	-£4,000	-£28,000		
Part-time students														
Other undergraduate	£64,000	£13,000	£38,000	£3,000	-£16,000	-£16,000	-£16,000	-£16,000	-£16,000	-£16,000	-£16,000	-£16,000	-£16,000	-£16,000
First degree	£80,000	£39,000	£40,000	£23,000	-£21,000	-£2,000	-£21,000	-£21,000		-£21,000	-£21,000	-£21,000	-£21,000	
Other postgraduate	£97,000	£64,000	£69,000	£52,000	£9,000	£32,000	£21,000	£20,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000	-£1,000
Higher degree (taught)	£178,000	£135,000	£126,000	£116,000	£35,000	£83,000	£49,000	£59,000	£6,000	£26,000	-£0,000	-£0,000		-£0,000
Higher degree (research)							£28,000	£13,000	£24,000	£8,000	£18,000	£3,000		
Students from Wales														
Full-time students														
Other undergraduate			£83,000	£17,000										
First degree			£64,000	£44,000	-£34,000	£5,000								
Other postgraduate							£36,000	£23,000						
Higher degree (taught)							£48,000	£61,000						
Higher degree (research)														
Part-time students														
Other undergraduate	£64,000	£13,000	£39,000				-£15,000	-£15,000						
First degree		£39,000	£40,000											
Other postgraduate							£21,000	£20,000		-£1,000	-£1,000			
Higher degree (taught)					£33,000		£48,000	£58,000		£25,000				
Higher degree (research)														

Level of study	Previous qualification and gender													
	GCSE		A-level		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
Students from Scotland														
Full-time students														
Other undergraduate			£92,000	£25,000										
First degree			£77,000	£56,000	-£22,000	£17,000								
Other postgraduate														
Higher degree (taught)							£49,000	£63,000						
Higher degree (research)														
Part-time students														
Other undergraduate	£79,000	£28,000			-£1,000	-£1,000		-£1,000						
First degree					-£1,000	£18,000								
Other postgraduate						£32,000	£21,000	£20,000	-£1,000	-£1,000		-£1,000		
Higher degree (taught)								£59,000		£26,000				
Higher degree (research)														
Students from Northern Ireland														
Full-time students														
Other undergraduate			£93,000	£26,000	-£15,000	-£14,000								
First degree	£140,000		£78,000	£57,000	-£20,000	£18,000								
Other postgraduate							£36,000	£23,000						
Higher degree (taught)						£102,000	£49,000	£63,000	-£11,000					
Higher degree (research)												-£25,000		
Part-time students														
Other undergraduate														
First degree														
Other postgraduate							£21,000	£20,000		-£1,000	-£1,000	-£1,000		
Higher degree (taught)	£178,000					£83,000	£49,000							
Higher degree (research)														

Note: All values are rounded to the nearest £1,000. Gaps may arise where there are no students in the 2018-19 Leeds Beckett University cohort expected to complete the given qualification (with the given characteristics). Grey shading indicates instances where the level of study at Leeds Beckett University 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. ***Source: London Economics' analysis***

A2.2 Impact on educational exports

A2.2.1 Industry breakdown

Table 18 provides an overview of the high-level industry classifications used throughout the multi-regional Input-Output analysis (described in greater detail in Section 4).

Table 18 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)

A2.2.2 Additional information on the 2018-19 cohort of non-UK domiciled students studying at Leeds Beckett University

Table 19 presents a detailed breakdown of the 2018-19 non-UK domiciled Leeds Beckett University cohort, by domicile, level, and mode of study.

Table 19 Non-UK domiciled students in the 2018-19 cohort of Leeds Beckett University students, by level of study, mode of study and domicile

Level and mode of study	Domicile		
	EU	Non-EU	Total
Full-time			
Other undergraduate	-	25	**25**
First degree	85	170	**255**
Other postgraduate	5	20	**25**
Higher degree (taught)	55	230	**285**
Higher degree (research)	5	10	**15**
Total	**150**	**455**	**605**
Part-time			
Other undergraduate	10	5	**15**
First degree	-	-	**-**
Other postgraduate	10	40	**45**
Higher degree (taught)	15	25	**45**
Higher degree (research)	-	-	**5**
Total	**35**	**70**	**105**
Total			
Other undergraduate	10	25	**40**
First degree	85	170	**255**
Other postgraduate	15	55	**70**
Higher degree (taught)	70	255	**330**
Higher degree (research)	5	10	**15**
Total	**185**	**525**	**710**

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 Certificates of Higher Education, Foundation Degree, other undergraduate-level diplomas and certificates, and undergraduate-level credits. 'Other postgraduate learning' includes Postgraduate Certificates or Professional Graduate Diplomas in Education, taught work for credit at postgraduate level, and other certificates, diplomas, and qualifications at postgraduate level.

Source: London Economics' analysis based on Leeds Beckett University's HESA data

A2.2.3 Net tuition fee income per international student

Table 20 presents estimates of the net tuition fee income per international student in the 2018-19 Leeds Beckett University cohort (over the entire study duration), by domicile, level of study, and mode of study.

Table 20 Net tuition fee income per international student in the 2018-19 cohort of Leeds Beckett University 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	£9,000	£18,000	£16,000
First degree	£13,000		£26,000	
Other postgraduate	£9,000	£8,000	£19,000	£17,000
Higher degree (taught)	£5,000	£5,000	£10,000	£9,000
Higher degree (research)	£3,000		£32,000	

Note: Gaps may arise where there are no students in the 2018-19 Leeds Beckett University cohort expected to complete the given qualification (of the given characteristics). All estimates are presented in 2018-19, discounted to reflect net present values, and rounded to the nearest £1,000. Although the annual tuition fee charged to an EU domiciled first degree student stands at £9,250 (annually for 3 years), the £13,000 presented in the table represents the net contribution made by the individual, net of public subsidy, i.e. after accounting for the proportion of the tuition fee loan written off by the Exchequer and bursaries that are distributed by Leeds Beckett University and any teaching grants distributed by the Office for Students. These Exchequer contributions only apply to EU domiciled students which results in significant difference in net tuition fee income by student group.
Source: London Economics' analysis

A2.2.4 Assumed average stay durations among international students

As outlined in Section 4.3.2, to estimate the non-tuition fee income associated with non-UK students in the 2018-19 Leeds Beckett University 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.

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[97]. 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 21.

[97] 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 2019-20 and 2020-21 academic years to account for the increased likelihood of students returning to their home countries during the Covid-19 pandemic (see Section 4.3.2).

Table 21 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)

A2.2.5 Non-fee income per international student

Table 22 presents estimates of the non-tuition fee income per international student in the 2018-19 Leeds Beckett University cohort (over the entire study duration), by domicile, level of study, and mode of study.

Table 22 Non-fee income per international student in the 2018-19 cohort of Leeds Beckett University 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	£22,000	£66,000	£23,000	£71,000
First degree	£30,000		£33,000	
Other postgraduate	£29,000	£72,000	£29,000	£72,000
Higher degree (taught)	£15,000	£37,000	£15,000	£37,000
Higher degree (research)	£55,000		£55,000	

Note: Gaps may arise where there are no students in the 2018-19 Leeds Beckett University cohort expected to complete the given qualification (of the given characteristics). All estimates are presented in 2018-19, discounted to reflect net present values, and rounded to the nearest £1,000.

Source: London Economics' analysis

Annex 3 Total impact by region and sector (where available)

In addition to the total impact on the UK economy as a whole (presented in Section 6) it was possible to disaggregate *some* strands of Leeds Beckett University'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 Leeds Beckett University's **educational exports** (**£80 million**, see Section 4); and
- The impact associated with the **operating and capital expenditure of Leeds Beckett University** (**£508 million**, see Section 5).

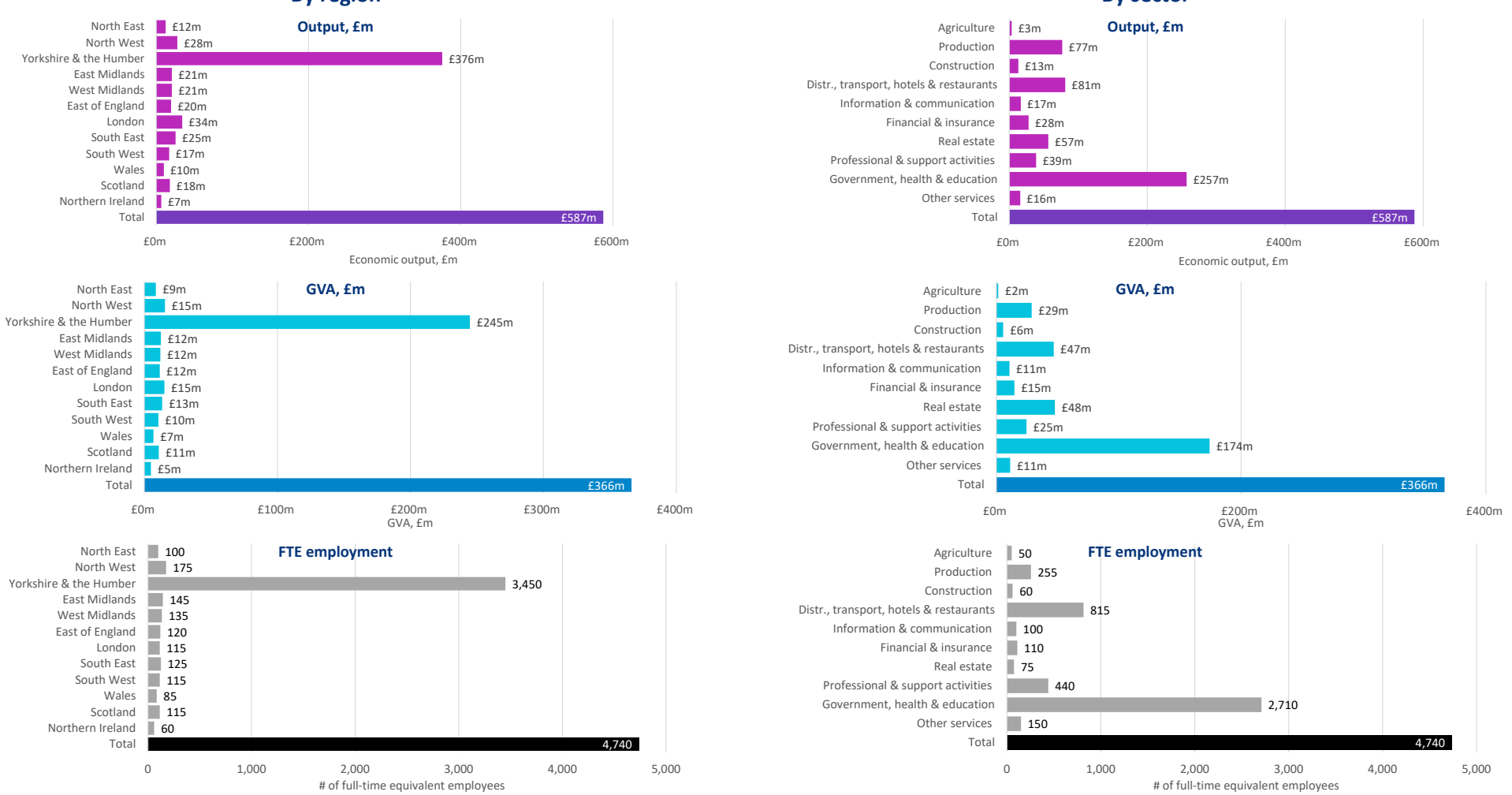
Hence, approximately **£587 million** (**41%**) of Leeds Beckett University's total impact of **£1,431 million** can be disaggregated in this way[98] (see Figure 26).

In terms of the breakdown by region, the analysis indicates that of this total of **£587 million**, **£376 million** (**64%**) was generated in **Yorkshire and the Humber**, with **£212 million** (**36%**) occurring in **other regions** across the UK.

In terms of sector, Leeds Beckett University's activities resulted in particularly large impacts within the **government, health, and education sector** (**£257 million**, **44%**), the **distribution, transport, hotel, and restaurant sector (£81 million**, **14%**), the **production sector** (**£77 million**, **13%**), and the **real estate sector** (**£57 million**, **10%**).

[98] The remaining **£844 million** of impact includes the impact of Leeds Beckett University's **research activities** (**£23 million**, where a breakdown by region or sector is not available as it was not possible to assign the geographic location or sectors of businesses benefiting from productivity spillovers generated by Leeds Beckett University's research); and the impact of **teaching and learning activities** (**£820 million**, 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 26 Total economic impact of Leeds Beckett University's activities in 2018-19, by region and sector (where possible)



Note: Monetary estimates are presented in 2018-19 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***

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