

The economic impact of Russell Group universities

Final Report for the Russell Group



RUSSELL GROUP



LE

London Economics

October 2017



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Acknowledgements

We would like to acknowledge the useful guidance and feedback provided by the Russell Group throughout this research. The Russell Group also provided us with much of the data that was employed in our analysis. In particular, we would like to thank Martin Furner, Stephanie Smith and Jessica Cole for the valuable information and advice they have provided. Responsibility for the contents of this report remains with London Economics.

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Executive Summary

London Economics were commissioned to estimate the economic impact of Russell Group universities across the United Kingdom, focusing on the 2015-16 academic year. In addition to assessing the **direct, indirect and induced** impact associated with Russell Group universities' physical and digital footprint, we generated estimates of the economic benefits associated with the universities' teaching and learning activity (related to the 2015-16 cohort of students), their research activities and the impact of educational exports generated by their overseas students.

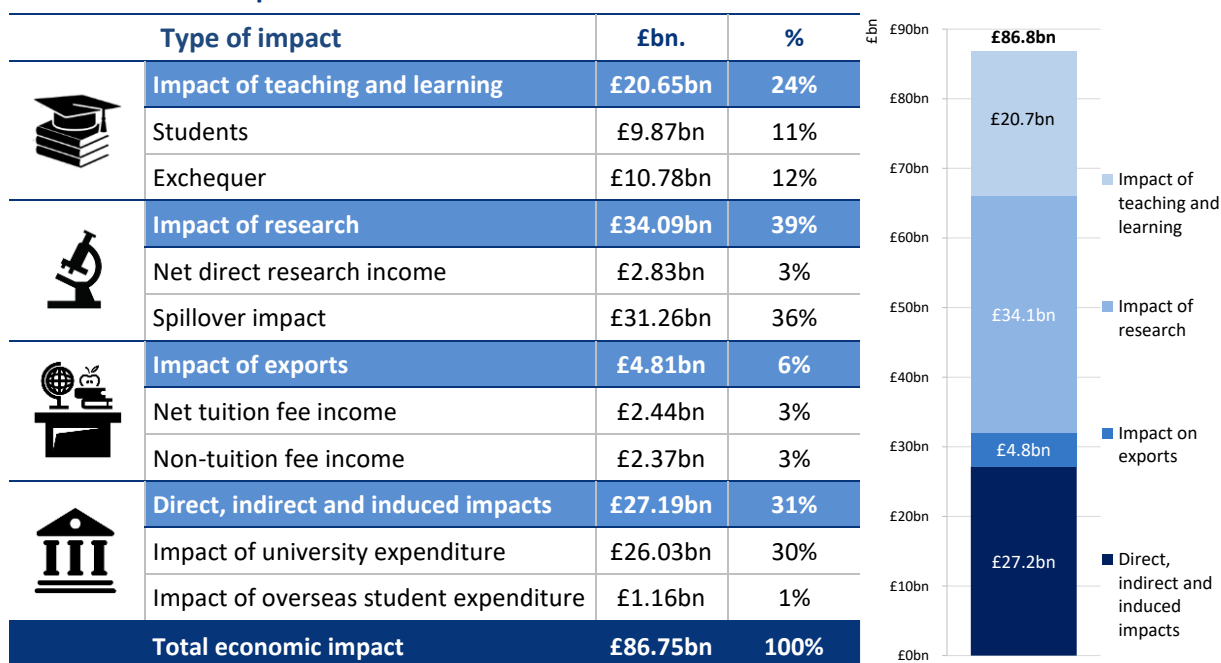
The aggregate economic impact of Russell Group universities

In 2015-16, the 24 Russell Group universities taught **609,285** students, including **265,765** first-year students, and employed **153,015** FTE staff. **The total economic impact associated with the Russell Group universities' activities across the UK was estimated to be £86.75 billion in 2015-16.**

In terms of the components of economic impact, the value of Russell Group universities' **teaching and learning** activities stood at approximately **£20.65 billion (24%** of the total), while **research** activity contributed a further **£34.09 billion (39%)**. The economic contribution associated with the **direct, indirect and induced impact** associated with Russell Group universities' operational and staff expenditure, as well as the expenditure of its overseas students was estimated to be **£27.19 billion (31%)**. The remaining **6%** (or **£4.81 billion**) was associated with the universities' contribution to **educational exports**.

Compared to these Russell Group universities' total operational costs of approximately **£15.69 billion** in 2015-16, the total economic contribution to the UK in 2015-16 was estimated to be approximately **£86.75 billion**, which corresponds to a benefit to cost ratio of **5½:1**.

Figure 1 Aggregate economic impact of Russell Group universities in the UK (£bn.) and % of total impact in 2015-16





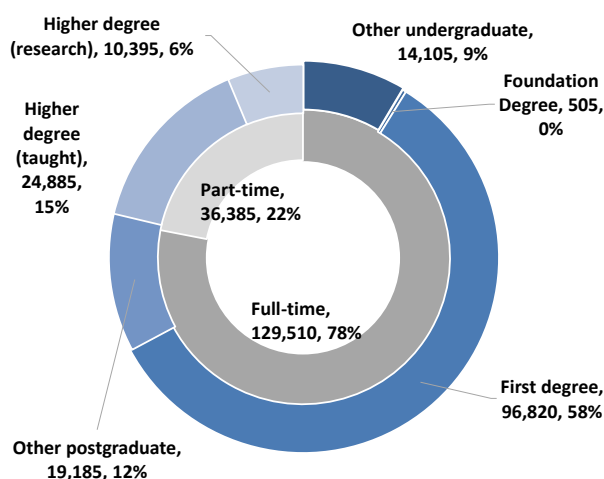
The impact of Russell Group universities' teaching and learning activities

The analysis estimates the **enhanced employment** and **earnings benefits** to students, and the **additional taxation receipts** to the Exchequer associated with higher education qualification attainment, adjusted for the characteristics of the **165,895** UK domiciled students who **started** a qualification or credit-bearing module in the 2015-16 academic year.

Incorporating both the costs and benefits to students, the analysis suggests that, for a representative UK domiciled student, the **net graduate premium** associated with a full-time undergraduate degree from a Russell Group university (with GCE 'A' Levels and equivalent as their highest level of prior attainment) stands at approximately **£88,000** (in 2015-16 money terms). Taking account of the costs and benefits to the public purse, the **net Exchequer benefit** associated with a representative UK domiciled full-time undergraduate degree undertaken at a Russell Group university was estimated at **£89,000**.

The net graduate premiums and net Exchequer benefits (by institutions, students' gender, study mode, domicile, prior level of attainment and qualification level) were combined with information on the number of UK domiciled students starting qualifications at the each of the 24 Russell Group universities in 2015-16. The analysis estimates that the aggregate economic impact generated by the universities' teaching and learning activities stands at approximately **£20.65 billion**. Of this total, **£9.87 billion (48%)** is accrued by students, while **£10.78 billion (52%)** of this benefit is accrued by the Exchequer.

Figure 2 Profile of domestic students in the 2015-16 cohort of Russell Group university students, by qualification level and mode of study



Note: All student numbers are rounded to the nearest 5.

Source: London Economics' analysis of HESA data

Table 1 Aggregate impact of Russell Group universities' teaching and learning by domicile and mode of student and beneficiary of impact (£ bn.) in 2015-16

Type of impact	Domicile				
	England	Wales	Scotland	N. Ireland	Total
Students	£8.26bn	£0.47bn	£0.65bn	£0.49bn	£9.87bn
Undergraduate	£6.36bn	£0.36bn	£0.44bn	£0.37bn	£7.52bn
Postgraduate	£1.91bn	£0.11bn	£0.21bn	£0.12bn	£2.35bn
Exchequer	£9.23bn	£0.43bn	£0.62bn	£0.51bn	£10.78bn
Undergraduate	£6.60bn	£0.29bn	£0.35bn	£0.35bn	£7.60bn
Postgraduate	£2.63bn	£0.14bn	£0.27bn	£0.15bn	£3.18bn
Total	£17.49bn	£0.90bn	£1.27bn	£1.00bn	£20.65bn
Undergraduate	£12.95bn	£0.65bn	£0.79bn	£0.72bn	£15.12bn
Postgraduate	£4.54bn	£0.24bn	£0.48bn	£0.28bn	£5.54bn

Note: All estimates are presented in 2015-16 prices, and rounded to the nearest £0.1bn. Source: London Economics' analysis



The economic impact of Russell Group universities' research activities

Russell Group universities are committed to maintaining world class research with impact. The 24 members submitted **28,521** members of academic staff to the 2014 Research Excellence Framework¹. An overwhelming **84%** of the Russell Group universities' research activity is classified as world-leading [4* (**37%**)] or 'internationally excellent' [3* (**47%**)]².

To estimate the **direct** economic impact associated with Russell Group universities' research activities, we used information on the total research-related income accrued by each of the universities in the 2015-16 academic year, including:

- **Research grants and contracts** provided by the Department for Business Enterprise and Industrial Strategy Research Councils; UK and overseas based charities; UK Central Government, Health and Hospital Authorities and EU government bodies; UK and overseas industry, commerce and public corporations; and other UK and overseas sources; and
- Research-related funding body grants, including **Quality Research (QR) Funding and Postgraduate Research Funding** provided by the Higher Education Funding Councils.

Aggregating income streams from these sources, the total research-related income accrued by Russell Group universities in 2015-16 stood at **£5.69 billion** (74% of all UK higher education institution research income). The funding granted by the UK Research Councils and UK charities constituted the largest funding component, contributing approximately **£2.49 billion** (44%), followed by **£1.33 billion** in Funding Councils' research grants and contracts (23%), and almost **£1bn** in research grants and contracts from other UK sources (17%). EU research grants and contracts accounted for **11%** of total research-related funding (**£0.60 billion**), with the remaining **5%** generated from non-EU sources (**£0.31 billion**).

To arrive at the net impact of Russell Group universities' research activities, we deducted the public costs of funding research through direct block grants allocated by the Funding Councils, as well as RCUK funding. Together, these public costs amount to approximately **£2.86 billion**, implying a **total (net) direct research impact** of **£2.83 billion** generated by the universities in 2015-16. Econometric research³ suggests that there is strong evidence of the existence of **spillovers** from public investment in R&D expenditure by RCUK and charities. Our analysis implies a spillover multiplier of approximately **5.5** associated with the universities' total research income (in 2015-16).

Combining the **direct economic value** of Russell Group universities' research activities (**£2.83 billion**) with the **productivity spillovers** estimated for private organisations in the UK (**£31.26 billion**), the total economic impact of research conducted by the universities in 2015-16 was estimated to be approximately **£34.09 billion**.

Table 2 Total economic impact of Russell Group universities' research activities

Type of impact	£bn.
Direct research impact	£2.83bn
Productivity spillovers	£31.26bn
Total	£34.09bn

Note: All estimates are presented in 2015-16 prices. *Source: London Economics' analysis*

¹ This compares to a total of **23,540** members of staff and an average of **19** staff per unit and institution across all other HEIs.

² This compares to **67%** of research in other non-Russell Group universities (**21%** at 4* and **46%** at 3*).

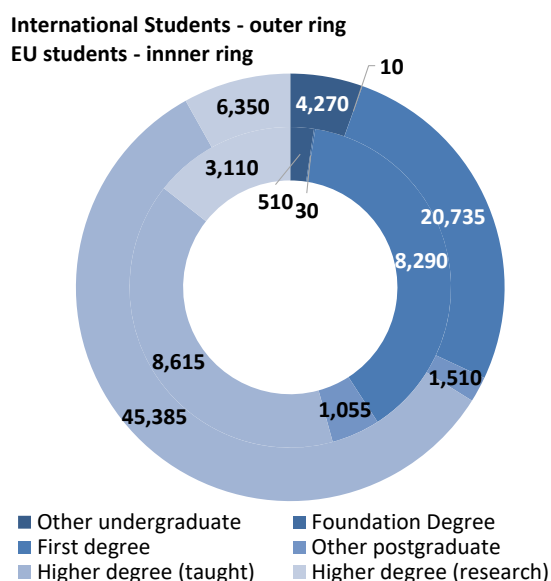
³ Haskel and Wallis (2010).



The impact of Russell Group universities' activity on educational exports

In the 2015-16 academic year, there were a total of **99,870** non-UK domiciled students starting courses or standalone modules at Russell Group universities. This represents approximately **38%** of all students in the 2015-16 cohort of starters. Of these, **21,610 (22%)** were domiciled within the European Union and **78,260 (78%)** were international students coming from outside the European Union. Illustrating the Russell Group universities' focus on developing research capacity, approximately **66,025** new entrants were postgraduate students (**66%**), with the remaining **33,845** undertaking undergraduate studies (**34%**).

Figure 3 Profile of non-UK domiciled students in the 2015-16 cohort of Russell Group university students



Note: All student numbers are rounded to the nearest 5.
 London Economics' analysis of HESA data

After deducting the costs to the UK Exchequer associated with EU domiciled students entering the UK to study at Russell Group universities, the analysis indicates that the total **net tuition fee income** generated by all EU and non-EU international students in 2015-16 stood at **£2.44 billion**. Of this total, approximately **£0.18 billion** was associated with students from the EU, while **£2.26 billion** was generated by non-EU international students. The total **non-tuition fee income** generated by overseas students in 2015-16 stood at **£2.37 billion** (with **£0.60bn** generated by EU students and **£1.77 billion** associated with international students). The total value of educational exports generated by Russell Group universities from these non-UK students was estimated to be **£4.81 billion** in 2015-16.

Table 3 Aggregate economic impact of Russell Group universities on exports, by domicile and type of impact, £ bn. in 2015-16

Type of impact	Domicile		
	EU (outside UK)	Non-EU	Total
Net tuition fee income	£0.18bn	£2.26bn	£2.44bn
Non-tuition fee income	£0.60bn	£1.77bn	£2.37bn
Total	£0.78bn	£4.03bn	£4.81bn

Note: All estimates are presented in 2015-16 prices.
 Source: London Economics' analysis



The direct, indirect and induced impact of Russell Group universities' physical and digital footprint

Russell Group universities' physical and digital footprint supports jobs and promotes economic growth throughout the entire United Kingdom. With **153,015** FTE employees, the universities spent a total of **£8.38 billion** in 2015-16 on staff related costs, as well as a further **£6.32 billion** on non-staff related costs (net of depreciation). The total expenditure of Russell Group universities amounted to approximately **47%** of all UK higher education institution expenditure in 2015-16. In addition to this **£14.70 billion** in direct economic impact, through a far-reaching supply chain, the 24 universities generated a further **£11.33 billion** of indirect and induced impacts – supporting a further **98,635** jobs across the United Kingdom.

With an additional **£1.16 billion** in impact associated with overseas student expenditure (supporting **9,815** jobs), the **total direct, indirect and induced impact** generated by Russell Group universities' institutional-level and overseas student expenditure stood at **£27.19 billion** across the UK, with **261,465** jobs supported. Of this total, **153,015** full-time equivalent staff were directly employed by Russell Group universities, and a further **108,450** full-time equivalent jobs were supported by the expenditure of the 24 universities, their staff and international students across the United Kingdom.

Table 4 Direct, indirect and induced impact associated with Russell Group universities' expenditure and overseas student expenditure (£bn.) and number of FTE jobs supported in 2015-16

Type of impact	£bn	# of FTE jobs
Impact of Russell Group universities' expenditure	£26.03bn	251,650
Impact of overseas student expenditure	£1.16bn	9,815
Total	£27.19bn	261,465

Note: Monetary estimates are presented in 2015-16 prices. Job numbers are presented in full-time equivalent employees, and have been rounded to the nearest 5.

Source: London Economics' analysis

1 Introduction

The Russell Group represents 24 leading UK universities⁴ which are committed to maintaining the very best research quality, an outstanding teaching and learning experience and unrivalled links with business and the public sector. Russell Group universities make a significant contribution to the UK economy through their **teaching and learning activities**; their **research**; their **spending** on goods and services from within the UK economy; and by creating **export revenues** by attracting EU and non-EU students to the UK.

London Economics were commissioned to estimate the economic impact of Russell Group universities on the UK economy, focusing on the 2015-16 academic year.

1.1 Structure of the report

Our approach to addressing these many impacts is as follows. In the first section of this report (**Section 2**), we assess the enhanced labour market earnings and employment outcomes associated with higher education attainment, using a detailed analysis of the Labour Force Survey. Through an assessment of the lifetime benefits and costs associated with higher education qualification attainment, we estimate the economic impact of Russell Group universities' **teaching and learning** activity for its **165,895** UK domiciled students *starting* qualifications or standalone credit bearing modules in 2015-16. We estimate both the impact on these students, as well as the impact on the public purse (through enhanced taxation receipts).

In **Section 3** of the report, we combine information on the research-related income accrued by Russell Group universities in 2015-16 (by income source), and combine this with estimates from the wider economic literature on the extent to which public investment in university research activity results in additional or subsequent private sector productivity (i.e. positive 'productivity spillovers'). This results in an estimate of the impact of Russell Group universities' **research activities**.

The United Kingdom is a world leader in higher education and an attractive destination for many overseas students undertaking higher education. Many will choose to study at Russell Group universities and in addition to the **165,895** UK domiciled students starting qualifications or credit bearing modules at Russell Group universities in 2015-16, a further **99,870** EU and non-EU international students enrolled with the universities. As such, Russell Group universities contribute to the value of UK educational exports through the receipt of income from overseas. **Section 4** of this report assesses the monetary value of the tuition fee and non-tuition fee income associated with non-UK domiciled students, and estimates the contribution of these activities to the UK economy.

With **153,015** full-time equivalent staff employed in 2015-16, and a total expenditure of **£15.7 billion**, the **direct economic impact** of the Russell Group is substantial. In addition to these direct impacts, the universities also **indirectly** support the employment and earnings outcomes of many individuals that provide services throughout the universities' extensive supply chains and the wages paid to their staff. Similarly, the spending of students undertaking their learning at the universities within the local economy results in economic benefits to local businesses and throughout their supply chains. In **Section 5**, we estimate both the direct impact of Russell Group universities' expenditure and the spending of its overseas students, as well as the indirect and induced impact across the United Kingdom.

Section 6 of this report summarises our main findings.

⁴ A list of all 24 Russell Group universities can be found in Annex 2.

2 The impact of teaching and learning activities at Russell Group universities

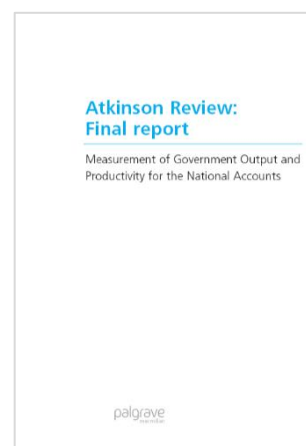
2.1 Introduction and rationale

Undertaking an economic impact analysis is never a straightforward task. However, assessing the economic impact of higher education institutions such as Russell Group universities is even more challenging.

Traditional economic impact analyses of higher education institutions typically consider the direct economic effect of universities' physical and digital footprints on their local and regional economies, as well as the indirect and induced impacts across the region through the institutions' extensive supply chains and the expenditures on their staff. Further, these analyses often also consider the direct, indirect and induced effects associated with the off-campus expenditure by domestic and international students. However, given that Russell Group universities' primary 'products' include undertaking world-class research, and the delivery of high-quality teaching and learning, a traditional study of this nature would significantly underestimate the economic and social impact of these higher education institutions on the UK economy.

2.2 Valuing the economic contribution of a higher education institution

Atkinson's (2005) report to the Office for National Statistics was tasked with determining the appropriate methodology to be used when assessing the economic impact of a range of public sector activities. Traditionally, to estimate the value associated with **education outcomes**, straightforward *input-output* analysis has been used. This approach simply asserts that the value of inputs into the education system essentially equals the value of outputs associated with educational attainment. However, this approach in no way captures the productivity or growth impacts associated with having a more highly educated workforce, and as such undervalues the productivity benefits associated with higher education. Although there are many non-economic benefits associated with higher education (and positive spillovers to the wider economy), Atkinson stated that **the economic value of education and training is essentially the value placed on that qualification as determined by the labour market**.



In this section of the report, we detail the methodological approach we used to place a value on the **teaching and learning activities** undertaken at the 24 Russell Group universities. This was achieved by analysing the labour market benefits associated with enhanced qualification attainment and skills acquisition – to **both the individual and the public purse**.

2.3 Cohort of students considered for the analysis

The analysis of the economic impact of Russell Group universities' teaching and learning activities is based on the **2015-16 cohort** of students. In other words, instead of considering the 24 universities' entire student body of **609,285** students in that academic year (irrespective of when these individuals may have commenced their studies), we focus on determining the economic impact

generated by those **165,895** UK domiciled students *starting a formally recognised qualification or new stand-alone credit bearing module in the 2015-16 academic year.*

In terms of the domicile of these students, approximately **134,630** starters were from England, with **8,605** from Wales, **12,190** from Scotland and **10,470** from Northern Ireland. In terms of the location of study, Scotland and Wales were net importers of students, with **14,565** and **9,645** studying in Russell Group universities in these countries, respectively. In contrast, England and Northern Ireland were net exporters for students, with **132,480** and **9,295** studying in universities in these countries respectively.

Figure 4 Profile of domestic students in the 2015-15 cohort of Russell Group university students, by domicile

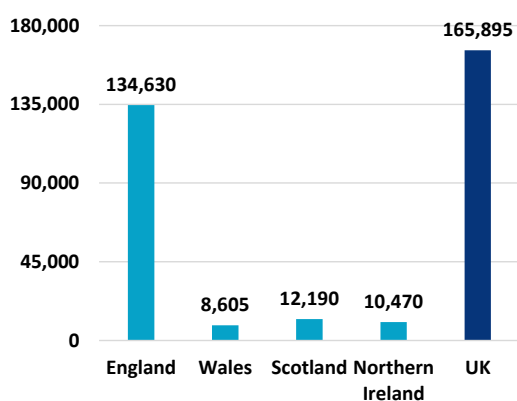
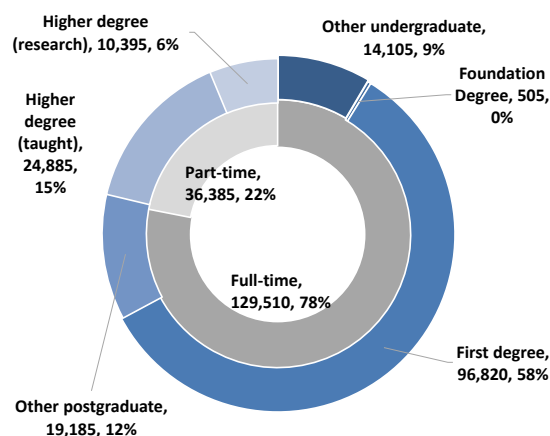


Figure 5 Profile of domestic students in the 2015-16 cohort of Russell Group university students, by qualification level and mode of study



Note: All student numbers are rounded to the nearest 5. We received HESA data on a total of **266,445** students from the Russell Group. From those, we excluded a total of **545** with an unknown domicile within the UK and **90** students with an unknown gender. Out of the remaining **265,765** students, we excluded **99,870** non-UK domiciled students.

Source: London Economics' analysis of HESA data

Considering the level of study, approximately **58%** of UK first year students were enrolled in undergraduate degrees (corresponding to **96,820** students), with a further **9%** (**14,610**) undertaking other undergraduate qualifications or Foundation Degrees. In addition, approximately **33%** of UK students in the 2015-16 cohort were undertaking postgraduate qualifications, with **24,885** (**15%**) undertaking postgraduate taught degrees, and **10,395** (**6%**) undertaking postgraduate research degrees. The remaining **19,185** (**12%**) were undertaking other postgraduate qualifications. More detailed information on the composition of the student body under consideration in this analysis is provided in Table 5.

Note that the analysis of the impact of teaching and learning in this section focuses only on those students included in the 2015-16 Russell Group universities' cohort that are **UK domiciled** (i.e. with a known domicile in any of the UK's Home Nations). However, it is likely that a proportion of EU and non-EU domiciled students undertaking their studies at Russell Group universities 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 non-UK students (e.g. when considering the earnings which these students forego during their studies at university), this analysis of teaching and learning focuses on UK domiciled students only. In other words, we implicitly assert that all UK students studying at a Russell Group university will enter the UK labour market upon graduation, and that all non-UK students will leave the UK upon qualification

completion. Non-UK domiciled students in the 2015-16 cohort are instead considered as part of the analysis of Russell Group universities' impacts on **exports**, based on the tuition fee and non-tuition fee income associated with these students (**Section 4**).

Table 5 UK domiciled students (headcount) in the 2015-16 cohort of Russell Group university students, by domicile, study mode and level of study

Level and mode of study at Russell Group universities	Domicile				
	England	Wales	Scotland	Northern Ireland	Total UK
Full-time	108,980	5,595	8,635	6,300	129,510
Other undergraduate	740	90	0	5	835
Foundation Degree	100	0	0	35	135
Undergraduate degree	81,075	4,230	5,620	4,865	95,790
Other postgraduate	6,410	305	1,045	435	8,195
Higher degree (taught)	13,380	650	1,255	675	15,960
Higher degree (research)	7,275	320	715	285	8,595
Part-time	25,650	3,010	3,555	4,170	36,385
Other undergraduate	6,345	1,915	1,740	3,270	13,270
Foundation Degree	310	15	30	15	370
Undergraduate degree	790	40	150	50	1,030
Other postgraduate	8,855	620	955	560	10,990
Higher degree (taught)	7,810	365	520	230	8,925
Higher degree (research)	1,540	55	160	45	1,800
Total	134,630	8,605	12,190	10,470	165,895
Other undergraduate	7,085	2,005	1,740	3,275	14,105
Foundation Degree	410	15	30	50	505
Undergraduate degree	81,865	4,270	5,770	4,915	96,820
Other postgraduate	15,265	925	2,000	995	19,185
Higher degree (taught)	21,190	1,015	1,775	905	24,885
Higher degree (research)	8,815	375	875	330	10,395

Note: All student numbers are rounded to the nearest 5.

We received HESA data on a total of **266,445** students from the Russell Group. From those, we excluded a total of **545** with an unknown domicile within the UK and; **90** students with an unknown gender. Out of the remaining **265,765** students, we excluded **99,870** non-UK domiciled students (as the economic impact associated with these students is considered in Section 4).

Source: London Economics' analysis based on HESA data

2.4 Completion rates

The above information provides an overview of the number of students *starting* qualifications or modules at Russell Group universities in the 2015-16 academic year. However, to aggregate individual-level impacts of the universities' teaching and learning activities, it is necessary to adjust the number of 'starters' to account for **completion rates**.

Table 6 presents the completion rates assumed throughout the analysis, based on information on progression outcomes for previous years' cohorts provided by the Russell Group⁵. More specifically, completion rates were estimated by comparing the number of first-year students in a given academic year with the number of qualifiers in subsequent academic years, separately by qualification level, gender and study mode, and based on HESA data for the 24 Russell Group universities⁶.

⁵ The same completion rates are applied to estimate the impact of Russell Group universities on exports (**Section 4**) and the direct, indirect and induced impact of the universities' activities (**Section 5**).

⁶ Note that, while completion rates for full-time students were estimated separately for each of the 24 institutions, estimates for part-time students were estimated as an average across all institutions (given a lack of required detail in the original HESA information).

Note that, in instances where a resulting completion rate was lower than 100%, we assume that the remaining proportion of students would at least complete one or more modules associated with their intended qualification. Hence, we assume that a first degree student who does not complete their intended degree instead at least completes learning at ‘other undergraduate’ level. Similarly, we assume that a student undertaking a higher taught degree who does not complete the intended qualification instead completes learning at ‘other postgraduate’ level. Though relatively small, this ensures that the analysis comprehensively captures the associated wage and employment returns associated with any and all higher education learning undertaken at Russell Group universities.

The resulting information suggests that of those individuals starting a full-time undergraduate degree at a Russell Group university in 2015-16, approximately **92%** are expected to complete the qualification as intended, while the remaining **8%** complete another qualification or instead only undertake one or more of the modules associated with their degree at ‘other undergraduate’ level before discontinuing their studies. The respective estimates for part-time undergraduate degrees stand at **76%** and **24%**. In all of these cases, the analysis calculates the estimated returns associated with the *completed* qualification or standalone credit-bearing module(s).

Table 6 Completion rates by intended qualification (by study mode)

Completion outcome	Qualification intention					
	Other undergraduate	Foundation Degree	UG degree	Other postgraduate	Higher degree (taught)	Higher degree (research)
Full-time						
Complete as intended	100%	89%	92%	100%	91%	91%
Other outcome	0%	11%	8%	0%	9%	9%
Total	100%	100%	100%	100%	100%	100%
Part-time						
Complete as intended	100%	69%	76%	100%	76%	77%
Other outcome	0%	31%	24%	0%	24%	23%
Total	100%	100%	100%	100%	100%	100%

Source: London Economics' analysis based on HESA data

2.5 Defining the returns to higher education qualifications

The fundamental objective of this element of the analysis is to generate the **net graduate premium** to the individual associated with higher education qualification attainment and the **net public purse benefit**. These are defined in Box 1. The specific components of the analysis are presented in Figure 6, and discussed in greater detail in subsequent sections.

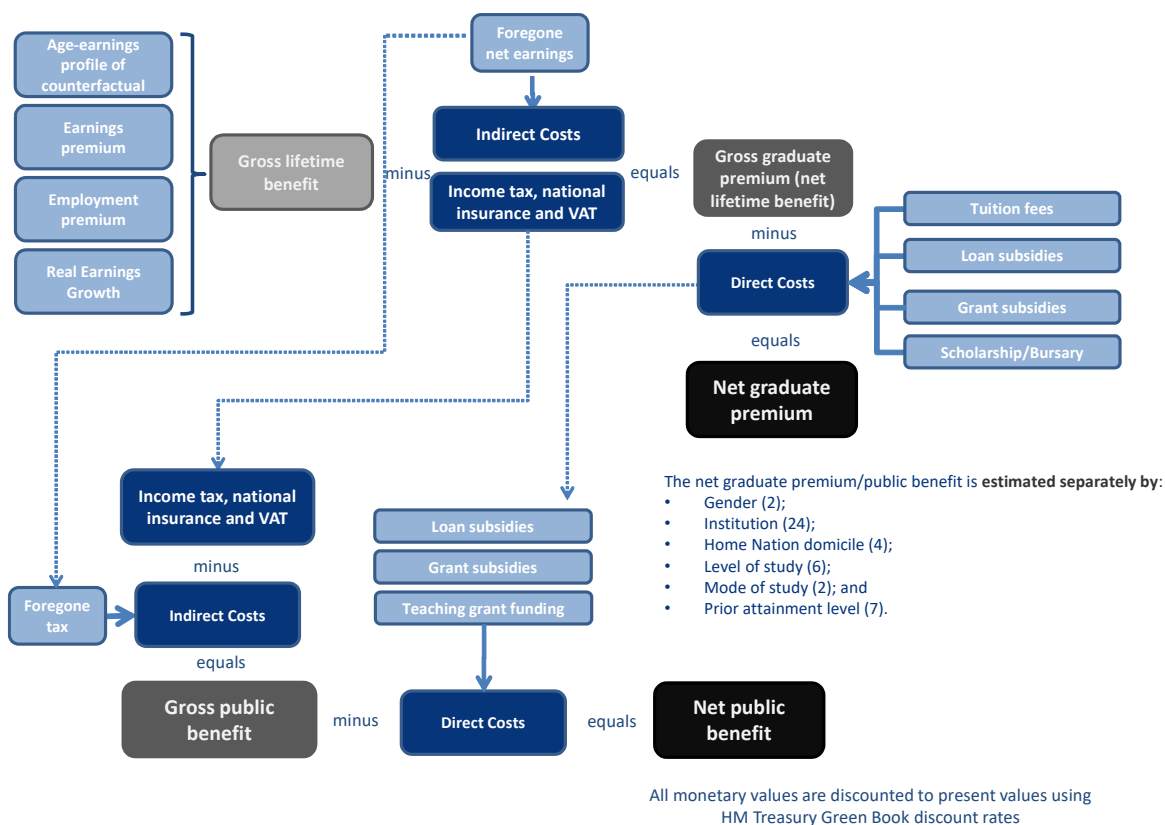
Box 1 Definition of gross and net graduate premiums and benefits to the public purse

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) relative to an individual in possession of the counterfactual qualification.

The **gross benefit to the public purse** associated with qualification attainment 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) 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. Similarly, the **net benefit to the public purse** is defined as the gross benefit *minus* the direct costs of provision during the period of attainment.

Figure 6 Overview of gross and net graduate premium and net Exchequer benefit



Source: London Economics’ analysis of Department for Business, Innovation and Skills (2011a)

2.6 Estimating the returns to higher education qualifications

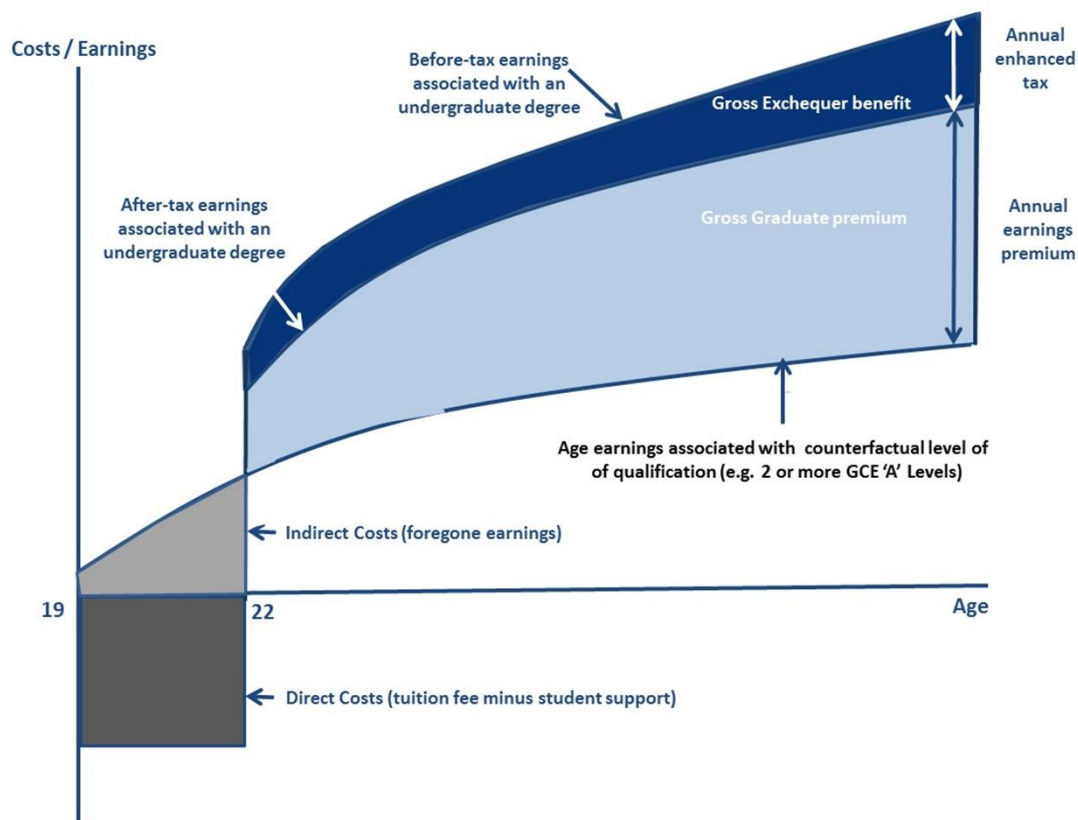
2.6.1 Assessing the gross graduate premium

To measure the **economic benefits to higher education qualifications**, we estimate the labour market value associated with particular higher education qualifications, rather than simply assessing the labour market outcomes achieved by individuals *in possession* of a higher education

qualification. To achieve this, the standard approach is to undertake a standard **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. Full details of the econometric approach are presented in A3.1.2, while information on the treatment and counterfactual groups is presented in A3.1.1.

The rationale for adopting this approach is that the comparison of the earnings and employment outcomes of the treatment group and the counterfactual groups ‘strips away’ those other personal and socioeconomic characteristics that might affect labour market earnings and employment (such as gender, sector or region of employment), leaving just the labour market gains attributable to the qualification itself (i.e. the contribution of the higher education institution). An illustration of this is presented in Figure 7.

Figure 7 Estimating the gross graduate premium



Note: The analysis assumes that the opportunity costs of foregone earnings associated with further 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 the cohort data for the 2015-16 cohort where the mean age of starting a full-time undergraduate degree stands at 19 and requires three years to complete⁷.

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.

⁷ Note that, while the three-year study duration is a weighted average, there is variation in the average study duration across the different institutions. For example, the expected study duration of students undertaking full-time undergraduate degrees at Russell Group universities in Scotland is four years.

The econometric analysis is also undertaken **by subject of degree** to illustrate the fact that there is significant variation in post-graduation labour market outcomes depending on the subject of study, as well as the fact that the composition of the subjects offered by Russell Group universities is different from many other universities (for instance, in relation to the provision of medicine and dentistry).

In addition, given the fact that part-time students undertake and complete higher education qualifications later in life than full-time students, the analysis of 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 (see A3.1.3).

2.6.2 Assessing the gross benefits to the public purse

The potential benefits accruing to the Exchequer from the provision of higher education learning 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 Russell Group university (based on the above-discussed adjustment for subject mix), gender, level of study, mode of study, and prior attainment).

2.6.3 Assessing the net graduate premium

The differences between the gross and net graduate premium essentially relate to the **direct costs** of acquisition⁸. These direct costs refer to the **proportion of the tuition fee paid by the student**⁹ net of any **fee support** or **maintenance support** provided by the Student Loans Company (SLC) or the Student Awards Agency for Scotland (SAAS)¹⁰, and minus any **fee bursaries** provided by Russell Group universities¹¹. In this respect, the student benefit associated with tuition fee loan or

⁸ 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 taken account of in the gross graduate premium.

⁹ To calculate an average fee per student, we made use of HESA information on aggregate fee income for new and continuing full-time students in 2015-16 provided by the Russell Group, separately by institution, domicile (i.e. Home/EU vs non-EU students) and qualification group (broken down by undergraduate, postgraduate taught and postgraduate research). To derive fee levels per *full-time* student per year across these qualification groups, we divided the total levels of fee income by the underlying number of students attending Russell Group universities in 2015-16. To derive fee levels per *part-time* student, we then multiplied the respective full-time rates by information on the average study intensity amongst part-time students (again by institution, domicile and qualification level).

Note that, for students undertaking other postgraduate qualifications, we assumed the same average fee levels as for students undertaking postgraduate taught degrees. Further note that the original HESA data provide information on fee income *net of any fee bursaries* paid to students by the universities. As a result, we added average fee bursaries (calculated as discussed in footnote 11) to these original net values, to arrive at a *gross* fee per student.

¹⁰ The analysis makes use of *average* levels of support paid per student, separately by study mode, study level (i.e. undergraduate or postgraduate taught), domicile and location of study, based on publications by the SLC on student support for higher education in England, Wales and Northern Ireland (see Student Loans Company 2016a, 2016b and 2016c) and publications by the SAAS on student support for higher education in Scotland (see Student Awards Agency for Scotland, 2016). 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). 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) and location of study (i.e. 'Home' vs. the rest of the UK). Further, and again wherever possible, we adjusted the average levels of fee and maintenance loans for average loan take-up rates.

¹¹ Average fee waivers and other bursaries per student (by university and study mode) were calculated based on information on total bursary spending in 2015-16 by English institutions from the Office for Fair Access (see OFFA, 2017) and separate information from the University of Cardiff, the University of Glasgow, the University of Edinburgh and Queen's University Belfast. Wherever possible, total bursary spending was split into fee waivers and other (non-fee) types of scholarships and bursaries. To arrive at averages per student (by institution and bursary type), we then divided the total values by the total number of (first-year and continuing) students in 2015-16 (using HESA information), *excluding* any non-EU students (i.e. we assume that bursary support is only available to UK or EU domiciled

maintenance loan support equals the **Resource Accounting and Budgeting Charge** (RAB charge, or interest rate and write-off subsidy), capturing the proportion of the loan that is not repaid¹². Given the differing approach to student support funding in each of the UK Home Nations, the total direct costs incurred by students were assessed separately for students from England, Wales, Scotland and Northern Ireland and studying in each of the different Home Nations (as well as by qualification level and study mode).

2.6.4 Assessing the net public purse benefit

The direct costs¹³ to the Exchequer include the **teaching grants paid directly to universities** (by the Higher Education Funding Council for England, the Higher Education Funding Council for Wales, the Scottish Funding Council and the Department for Employment and Learning Northern Ireland)¹⁴, and the above-described **student support** in the form of maintenance/fee grants, as well as interest rate or write-off **subsidies** that are associated with maintenance and tuition fee loans (i.e. the RAB charge). Again, the analysis tailors the cost of student support to the student's specific Home Nation of domicile. For instance, in relation to fees, for the **4,230** Welsh-domiciled undergraduate degree students attending Russell Group universities (anywhere in the United Kingdom) on a full-time basis, we include the **£5,190** annual (maximum) tuition fee grant available to first-year students in 2015-16 by the Welsh Government, as well as the additional Exchequer cost associated with the remaining **£3,810** in tuition fees (using the relevant Welsh Government RAB charge). In contrast, for English domiciled students, we estimate the costs of public provision based on a full **£9,000** fee loan in 2015-16 and the associated (higher) RAB charge.

The above-described direct costs associated with qualification attainment to both students and the Exchequer (by institution, qualification level, prior educational attainment, 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 values of the economic benefits and costs are computed in **present value** terms (i.e. in 2015-16 money terms), all benefits and costs occurring at points in the future were discounted using standard HM Treasury Green Book discount rates¹⁵.

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

students). For part-time students, we again multiplied the respective full-time rates by the average study intensity amongst part-time students.

¹² We have assumed a RAB charge of 25% associated with tuition fee loans for English students studying anywhere in the UK; Scottish students studying in England, Wales or Northern Ireland; and Northern Irish students studying in England, Wales or Scotland. In addition, we have assumed a RAB charge of 10% for Welsh students studying anywhere in the UK and Northern Irish students studying in Northern Ireland (reflecting the relatively lower level of fee loans taken out by these students), as well as for Scottish students studying in Scotland (reflecting the fact that these students do not take out any tuition fee loan, but instead receive a full fee grant to cover their tuition fee costs). The 25% RAB charge was based on the most recent official estimates of the RAB charge provided by the (former) Department for Business, Innovation and Skills (see UK Parliament, 2016); while the 10% estimate (for lower levels of loan) is based on estimates by the Diamond Review of Higher Education in Wales (Welsh Government, 2016).

¹³ Again, the 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.

¹⁴ To estimate the level of teaching grant per student (by study mode and institution), we divided HESA information on the total amount of teaching grant paid by the Funding Councils to each of the 24 Russell Group universities by the total number of first year and continuing students enrolled with the universities in 2015-16 (excluding any non-EU domiciled students and postgraduate research students; i.e. it is assumed that there is no teaching funding associated with these students). Teaching grants per part-time student were again adjusted for the average assumed study intensity amongst part-time students).

¹⁵ We use a standard discount rate of **3.5%** for the first 30 years and **3.0%** thereafter (see HM Treasury (2011)).

2.7 Estimates of the net benefits to students and the Exchequer associated with undergraduate degrees

The net graduate premiums achieved by students undertaking undergraduate degrees in 2015-16 (depending on the student domicile, study mode and gender) are presented in Table 7. The analysis indicates that the **net graduate premium** achieved by a representative¹⁶ student in the 2015-16 cohort completing a full-time undergraduate degree at a Russell Group university with GCE 'A' Level or equivalent as their highest level of prior attainment is **£88,000** in today's money terms, with the premium achieved by men standing at **£108,000** compared to a premium of **£73,000** generated by women¹⁷.

In relation to part-time students, the corresponding estimates are **£40,000**, **£66,000** and **£24,000** on average, for the cohort in total, for men and for women respectively.

Table 7 Estimated net graduate premiums to Russell Group undergraduate degrees (relative to GCE 'A' Levels), by domicile, gender and study mode

Study mode and gender	Domicile				
	England	Wales	Scotland	Northern Ireland	All
Full-time students					
Men	£107,000	£116,000	£112,000	£114,000	£108,000
Women	£71,000	£84,000	£78,000	£80,000	£73,000
Weighted Average	£87,000	£97,000	£92,000	£95,000	£88,000
Part-time students					
Men	£70,000	£46,000	£47,000	£62,000	£66,000
Women	£23,000	£10,000	£27,000	£14,000	£24,000
Weighted Average	£49,000	£27,000	£29,000	£23,000	£40,000

Note: All estimates are presented in 2015-16 prices, discounted to reflect net present values, and rounded to the nearest £1,000. The estimates present weighted averages across all 24 Russell Group universities (weighted by the number of students with the given characteristics expected to complete their qualification). The estimates are based on an average age at graduation of 22 for students undertaking undergraduate degrees at a Russell Group university on a full-time basis, and an average age of 39 and 44 for male and female part-time students, respectively.

Source: London Economics' analysis

Reflecting the different tuition fee and student support arrangements across the Home Nations, the respective net graduate premium for undergraduate students from **Wales** is noticeably *higher* than in England, standing at approximately **£116,000** for male and **£84,000** for female undergraduate degree students. In contrast, the net graduate premium for a full-time undergraduate male student from **England** stands at **£107,000** (and **£71,000** for a female).

Table 8 presents the corresponding **net Exchequer benefits** associated with students undertaking undergraduate degrees in the 2015-16 Russell Group cohort (again by domicile, study mode and gender). The results indicate that the net Exchequer benefit associated with a representative student in the 2015-16 cohort completing a full-time undergraduate degree at a Russell Group

¹⁶ The analysis is based on an average age at graduation of 22 for full-time students undertaking undergraduate degrees at Russell Group universities.

¹⁷ It is important to note that the economic benefits associated with higher education qualification - 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, it is often the case that the *returns* associated with higher education qualification attainment - expressed as either the percentage increase in hourly earnings or enhanced probability of employment - are greater for women than for men.

university (with GCE 'A' Levels as their highest level of prior attainment) is **£89,000** in today's money terms, with the net benefit accrued by the Exchequer associated with male students standing at **£118,000** compared to **£66,000** achieved by women.

Part-time undergraduate degrees also provide an economic benefit to the Exchequer. The corresponding estimates are **£43,000**, **£81,000** and **£19,000** on average, for the cohort of part-time undergraduate students in total, and for men and for women respectively.

Also presented in Table 8, in terms of differences by student domicile, the net Exchequer benefit for a representative full-time undergraduate student from **England** with GCE 'A' levels as their highest level of prior attainment stands at approximately **£118,000** for men **£66,000** for women in 2015-16 money terms. In comparison, reflecting the higher levels of public student support provided to students from **Wales** and **Scotland**, the net Exchequer benefits were estimated to be **£109,000** and **£107,000** for men respectively, and approximately **£61,000** and **£57,000** for women, respectively.

Table 8 Estimated net Exchequer benefit associated with Russell Group undergraduate degrees (relative to GCE 'A' Levels), by domicile, gender and study mode

Study mode and gender	Domicile				
	England	Wales	Scotland	Northern Ireland	All
Full-time students					
Men	£118,000	£109,000	£107,000	£127,000	£118,000
Women	£66,000	£61,000	£57,000	£75,000	£66,000
Weighted Average	£90,000	£81,000	£78,000	£98,000	£89,000
Part-time students					
Men	£88,000	£58,000	£42,000	£61,000	£81,000
Women	£29,000	£14,000	£12,000	£4,000	£19,000
Weighted Average	£61,000	£35,000	£16,000	£15,000	£43,000

Note: All estimates are presented in 2015-16 prices, discounted to reflect net present values, and rounded to the nearest £1,000.

The estimates present weighted averages across all 24 Russell Group universities (weighted by the number of students expected of the given characteristics expected to complete their qualification). The estimates are based on an average age at graduation of 22 for students undertaking undergraduate degrees at a Russell Group university on a full-time basis, and an average age of 39 and 44 for male and female part-time students, respectively.

Source: London Economics' analysis

2.8 Estimates of the net benefits to students and the Exchequer associated with postgraduate degrees

Turning to the second major source of impact associated with Russell Group universities' teaching and learning (accounting for **21%** of all students in the 2015-16 UK cohort), Table 9 and Table 10 present estimates of the net graduate premium and net Exchequer benefits associated with postgraduate (taught (PGT) and research (PGR)) degrees, relative to a comparable individual in possession of an **undergraduate degree as their highest level of qualification**.

The findings indicate that, on average, full-time **postgraduate taught students** (across all Home Nations and genders) achieve a **net graduate premium** of approximately **£62,000**, with the corresponding estimate for part-time students standing at **£60,000** (reflecting the later average age of attainment and less time in the labour market). In relation to **postgraduate research degrees**, the analysis indicates that the average net graduate premium (again, across all Home Nations and genders) per full-time student stands at **£97,000**, with the comparable estimate for part-time postgraduate research degrees standing at **£67,000**.

Table 9 Estimated net graduate premiums to Russell Group postgraduate taught and research degrees (relative to undergraduate degrees), by domicile, gender and study mode

Study mode and gender	Level	Domicile				
		England	Wales	Scotland	Northern Ireland	All
Full-time students						
Men	PGT	£49,000	£59,000	£49,000	£50,000	£50,000
	PGR	£103,000	£99,000	£94,000	£106,000	£102,000
Women	PGT	£73,000	£80,000	£74,000	£62,000	£73,000
	PGR	£92,000	£79,000	£82,000	£88,000	£90,000
Weighted Average	PGT	£62,000	£70,000	£62,000	£56,000	£62,000
	PGR	£98,000	£92,000	£88,000	£96,000	£97,000
Part-time students						
Men	PGT	£48,000	£48,000	£45,000	£48,000	£48,000
	PGR	£70,000	£39,000	£64,000	£65,000	£68,000
Women	PGT	£69,000	£68,000	£62,000	£59,000	£68,000
	PGR	£70,000	£27,000	£56,000	£56,000	£67,000
Weighted Average	PGT	£60,000	£60,000	£55,000	£54,000	£60,000
	PGR	£70,000	£32,000	£60,000	£59,000	£67,000

Note: All estimates are presented in 2015-16 prices, discounted to reflect net present values, and rounded to the nearest £1,000. The estimates present weighted averages across all 24 Russell Group universities (weighted by the number of students expected of the given characteristics expected to complete their qualification). The estimates for postgraduate taught degrees are based on an average age at graduation of 26 for both men and women undertaking these qualifications at Russell Group universities on a full-time basis, and 37 and 36 for male and female part-time students, respectively. The estimates for postgraduate research degrees are based on an average age at graduation of 28 and 29 for men and women undertaking these qualifications at Russell Group universities on a full-time basis, and 44 and 43 for male and female part-time students, respectively.

Source: London Economics' analysis

From the perspective of the Exchequer, given the relatively limited public funding associated with these qualifications, postgraduate qualifications generate a substantial return. On average, full-time **postgraduate taught students** (across all Home Nations and genders) generate a **net Exchequer benefit** of approximately **£78,000**, with the corresponding estimate for part-time students standing at **£67,000**.

For **postgraduate research** qualifications, the analysis illustrates that the average net graduate premium (again across all Home Nations and genders, and compared to undergraduate degrees) for full-time students stands at **£135,000**, with the comparable estimate for postgraduate research degrees attained on a part-time basis standing at **£76,000¹⁸**.

¹⁸ Estimates of the net graduate premium and net Exchequer benefit associated with other undergraduate and postgraduate qualifications are presented in A3.1.5.

Table 10 Estimated net Exchequer benefit associated with Russell Group postgraduate taught and research degrees (relative to undergraduate degrees), by domicile, gender and study mode

Study mode and gender	Level	Domicile				
		England	Wales	Scotland	Northern Ireland	All
Full-time students						
Men	PGT	£77,000	£87,000	£71,000	£72,000	£76,000
	PGR	£159,000	£156,000	£153,000	£161,000	£159,000
Women	PGT	£79,000	£85,000	£76,000	£65,000	£79,000
	PGR	£107,000	£98,000	£100,000	£102,000	£106,000
Weighted Average	PGT	£78,000	£86,000	£74,000	£69,000	£78,000
	PGR	£137,000	£135,000	£126,000	£129,000	£135,000
Part-time students						
Men	PGT	£67,000	£65,000	£58,000	£61,000	£66,000
	PGR	£89,000	£53,000	£83,000	£80,000	£87,000
Women	PGT	£69,000	£67,000	£59,000	£56,000	£68,000
	PGR	£70,000	£31,000	£56,000	£52,000	£66,000
Weighted Average	PGT	£68,000	£66,000	£58,000	£58,000	£67,000
	PGR	£79,000	£41,000	£69,000	£62,000	£76,000

Note: All estimates are presented in 2015-16 prices, discounted to reflect net present values, and rounded to the nearest £1,000. The estimates present weighted averages across all 24 Russell Group universities (weighted by the number of students expected of the given characteristics expected to complete their qualification). The estimates are based on an average age at graduation of 26 and 29 for students undertaking postgraduate taught and research degrees at a Russell Group university on a full-time basis (and average age of commencement of 33 and 36 for a part-time student). *Source: London Economics' analysis*

2.9 Aggregate impact of teaching and learning

Combining the information on completion rates with the number of students in the 2015-16 Russell Group universities' cohort of UK domiciled students, and the net graduate and net Exchequer benefits associated with the different qualification levels (relative to students' relevant prior attainment), the analysis estimates the aggregate economic impact of Russell Group universities' teaching and learning activities.

As presented in Table 11, the analysis indicates that the **aggregate economic benefit of teaching and learning** associated with Russell Group universities' 2015-16 cohort in the UK stands at approximately **£20.65 billion**.

Of the total impact, **48% (£9.87 billion)** is accrued by students undertaking qualifications at Russell Group universities, while the remaining **52% (£10.78 billion)** is accrued by the Exchequer.

Further, considering the breakdown by qualification level, the analysis suggests that approximately **73% (£15.12 billion)** of the total impact is associated with undergraduate level students attending Russell Group universities, with the remaining **27% (£5.54 billion)** generated by students undertaking postgraduate qualifications. Reflecting the profile of the student cohort, **93% (£19.18 billion)** of the economic impact is associated with Russell Group universities' full-time students, with the remaining **7% (£1.47 billion)** generated by part-time students.

It is important to emphasise that these impacts are associated with the 2015-16 cohort of students only. Depending on the size and composition of subsequent cohorts of Russell Group universities'

students, a comparable assessment of the economic impact associated with these institutions' teaching and learning activities would occur for each successive cohort of starters.

Table 11 Aggregate impact of Russell Group universities' teaching and learning by study level and type of impact by domicile of student

Type of impact	Domicile				
	England	Wales	Scotland	Northern Ireland	Total
Students	£8.26bn	£0.47bn	£0.65bn	£0.49bn	£9.87bn
Undergraduate	£6.36bn	£0.36bn	£0.44bn	£0.37bn	£7.52bn
Postgraduate	£1.91bn	£0.11bn	£0.21bn	£0.12bn	£2.35bn
Exchequer	£9.23bn	£0.43bn	£0.62bn	£0.51bn	£10.78bn
Undergraduate	£6.60bn	£0.29bn	£0.35bn	£0.35bn	£7.60bn
Postgraduate	£2.63bn	£0.14bn	£0.27bn	£0.15bn	£3.18bn
Total	£17.49bn	£0.90bn	£1.27bn	£1.00bn	£20.65bn
Undergraduate	£12.95bn	£0.65bn	£0.79bn	£0.72bn	£15.12bn
Postgraduate	£4.54bn	£0.24bn	£0.48bn	£0.28bn	£5.54bn

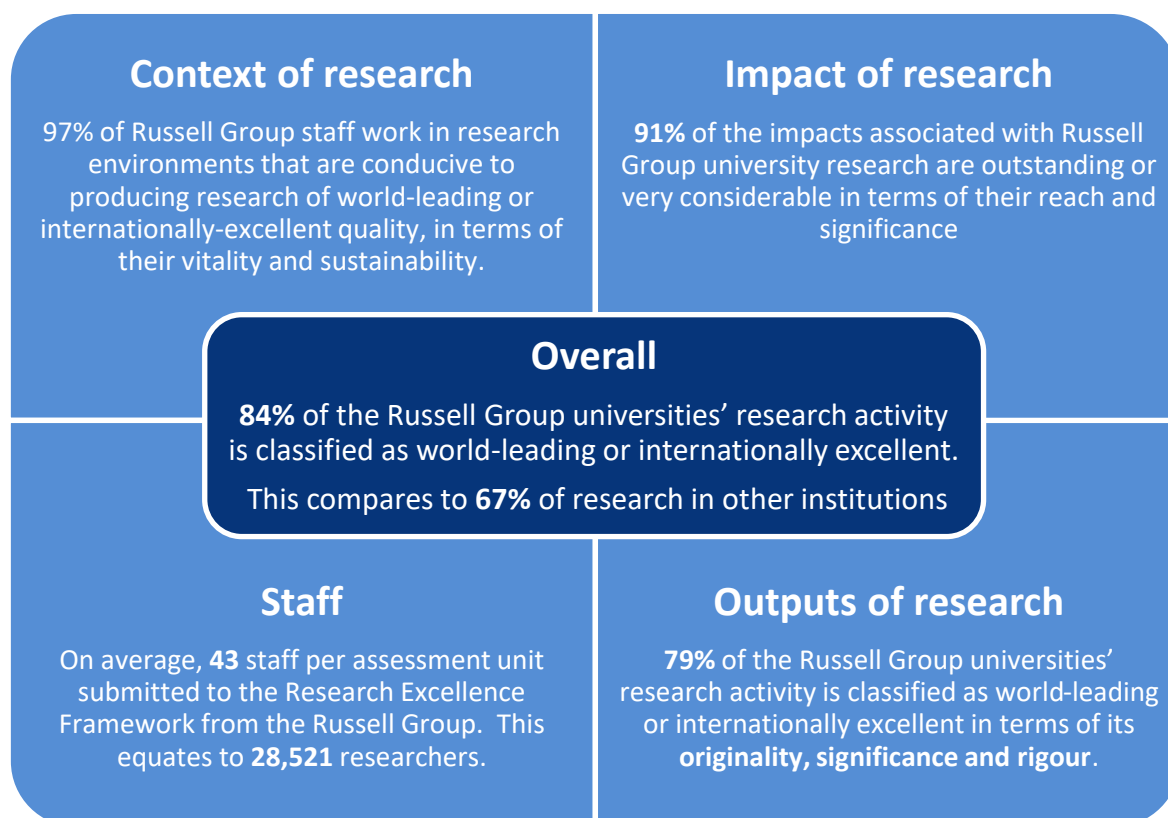
Note: All estimates are presented in 2015-16 prices. *Source: London Economics' analysis*

3 The impact of research and knowledge transfer activities at Russell Group universities

3.1 Methodological approach

With **28,521** members of Russell Group universities’ staff submitted to the 2014 Research Excellence Framework – equating to an average of **43** staff per assessment unit¹⁹ - Russell Group universities are committed to generating world-class research with impact. Overall, **84%** of the research undertaken by academic staff at Russell Group universities is classified as world-leading (4* (**37%**)) or ‘internationally excellent’ (3* (**47%**))²⁰.

Box 2 The Russell Group in context: results from the Research Excellence Framework



Notes: **61%** and **36%** of Russell Group universities’ research was given a research environment score of ‘world-leading’ (4*) or ‘internationally excellent’ (3*) respectively. This compares to **70%** of research in other institutions (**25%** at 4* and **45%** at 3*). **54%** and **37%** of Russell Group universities’ research was given an *impact* score of ‘world-leading’ or ‘internationally excellent’ respectively. This compares to **74%** of research in other institutions (**31%** at 4* and **43%** at 3*). **27%** and **52%** of Russell Group universities’ research was given an *output* score of ‘world-leading’ or ‘internationally excellent’ respectively. This compares to **64%** of research in other institutions (**17%** at 4* and **47%** at 3*). Russell Group universities’ research was given an *overall* score of ‘world-leading’ (**37%**) or ‘internationally excellent’ (**47%**). This compares to only **67%** of research in other institutions (**21%** at 4* and **46%** at 3*). **Source: 2014 Research Excellence Framework**

The **economic impact** of Russell Group universities’ research activities is estimated by combining information on the research-related income accrued by Russell Group universities in 2015-16 (by income source) with estimates from the wider economic literature on the extent to which public

¹⁹ This compares to a total of **23,540** members of staff and an average of **19** staff per unit across all other higher education institutions.

²⁰ This compares to **67%** of research in all other higher education institutions (**21%** at 4* and **46%** at 3*).

investment in research activity results in additional or subsequent private sector productivity (i.e. positive 'productivity spillovers').

3.1.1 Direct research impact

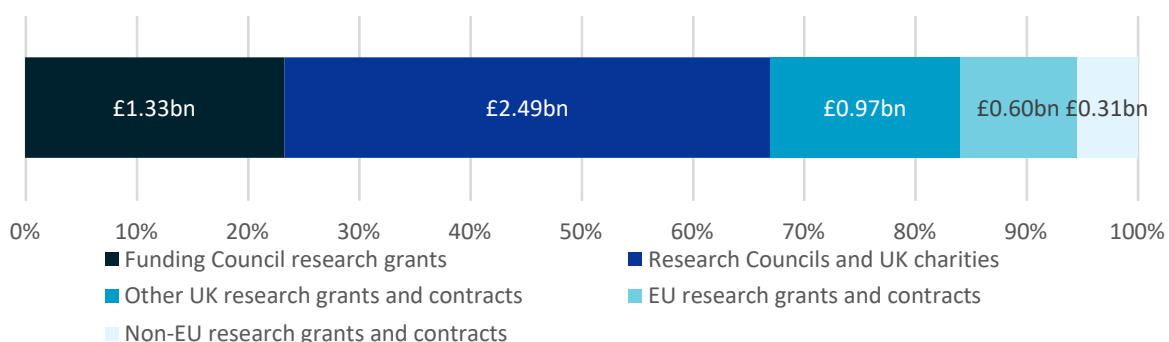
Assuming that the **direct economic impact** of research generated by Russell Group universities is equal to the resources the institutions contribute to research-related activities each year, the **direct effect** of their research activities can be derived from the universities' income and expenditure accounts submitted to HESA for the 2015-16 academic year.

Russell Group universities secured a total of **£5.69 billion²¹** in research-related funding in 2015-16 (see Figure 8), from a wide range of different sources, in particular:

- Research grants and contracts provided by:
 - The **Department for Business Enterprise and Industrial Strategy Research Councils** (as well as The Royal Society, British Academy and The Royal Society of Edinburgh);
 - **UK and overseas based charities**;
 - **UK Central Government, Health and Hospital Authorities** and **EU government bodies**;
 - **UK and overseas industry, commerce** and **public corporations**;
 - **Other UK and overseas sources**; and
- Research-related funding body grants, including **Quality-Related (QR) Research Funding and Postgraduate Research Funding**, provided by the Higher Education Funding Council for England (HEFCE), the Higher Education Funding Council for Wales (HEFCW), the Scottish Funding Council (SFC) and the Department for Employment and Learning in Northern Ireland (DELNI).

Of the total research-related funding, **Research Council and UK-based charities** accounted for nearly half of all funding received (approximately **£2.49 billion**, which equates to **44% of total research income**). The various **HEFCE/HEFCW/SFC/DELNI Funding Council** research grants accounted for a further **23%** (equating to **£1.33 billion**), with other UK research grants and contracts accounting for **17%** of research income (approximately **£0.97 billion**). EU and non-EU research grants and contracts accounted for a further **16%** of total research-related funding (**£0.91 billion**).

Figure 8 Russell Group universities' research-related income, £ billion in 2015-16



Note: All estimates are presented in 2015-16 prices. *Source: London Economics' analysis of HESA data*

In order to calculate the **net direct impact** of universities' research activities on the UK economy, it is necessary to deduct the costs to the government of funding Russell Group universities' research

²¹ Note that we have excluded a total of £0.08 billion of income in 2015-16 associated with Research and Development Expenditure Credits, as this was provided to the universities as part of a UK tax incentive scheme, and was received as a one-off source of income.

from the above total research-related income. This relates to the research grants received by Russell Group universities from the UK Research Councils and the Higher Education Funding Councils (i.e. HEFCE, HEFCW, SFC and DELNI), which jointly amount to **£2.86 billion**. Deducting these costs to the public purse from Russell Group universities' total research-related income, the analysis suggests that the Russell Group universities generated a **total net direct research impact of £2.83 billion** in the 2015-16 academic year.

3.1.2 Productivity spillovers²²

In addition to the direct impact of research activities in terms of the income derived by universities, the wider academic literature indicates that investments in intangible assets such as R&D may induce positive **externalities**. Economists refer to the term 'externality' to describe situations in which the activities of one 'agent' in the market induces external effects on other agents in that market (where these external effects can be either positive or negative and are not reflected in the price mechanism). In other words, *'an externality is present whenever the well-being of a consumer or the production possibilities of a firm are directly affected by the actions of another agent in the economy'* (Mas-Collell et al., 1995). In the context of the economic impact of research activities, the literature assesses the existence and size of the **positive productivity and knowledge spillovers**, where knowledge generated through the research activities of one agent increases the productivity of other organisations.

There are many ways in which research generated at Russell Group universities can induce such positive spillover effects. The spillovers from the universities to the private sector are enabled through direct R&D collaborations between the universities and firms, the publication and dissemination of research findings, or through Russell Group universities' graduates who enter into the labour market.

Literature estimates of productivity spillovers from Higher Education research

Of particular interest in the context of research conducted by universities, a study by Haskel and Wallis (2010)²³ investigates evidence of **spillovers from public funding of Research & Development** through a number of channels. 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&D²⁴. They also investigate the relative effectiveness of these channels of public spending in terms of their impact on the market sector.

Haskel and Wallis find strong evidence of the existence of market sector productivity spillovers from public R&D expenditure originating from UK Research Councils^{25 26}. Based on their estimates, the findings imply that although there is no spillover effect associated with public funding of civil and defence Research & Development, the marginal spillover effect of public spending on research

²² Note that there are 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.

²³ For a summary of Haskel and Wallis' (2010) findings, please refer to Imperial College London (2010).

²⁴ The authors use data on government expenditure published by the Department for Business, Innovation and Skills for the financial years between 1986-87 and 2005-06.

²⁵ This is undertaken by regressing total factor productivity growth in the UK on various measures of public sector R&D spending

²⁶ Note that the authors' regressions only test for correlation, so that 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 receive similar estimates. These time 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.

through the **Research Councils** stands at **12.7** (i.e. for every £1 spent on university research through the Research Councils results in an additional annual output of £12.70 in UK companies). The analysis also suggests that the spillover benefits of public spending on research in higher education are greater than those from other R&D areas supported by government.

Another recent 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 economy as a whole, the authors analyse the size of spillover effects from **public research** across different UK industries²⁷. 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)²⁸, interacted with measures of industry research activity, and total factor productivity within the different market sectors²⁹. 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).

Estimating productivity spillovers

In order to produce estimates of the productivity spillovers associated with Russell Group universities' research activities, we follow the established literature and apply the pertinent productivity spillover multipliers to the different items of research-related income presented in Figure 8. Assigning the multiplier of **12.7** to the research funding that the Russell Group received from UK Research Councils and UK based charities (where there was an open competitive process) in 2015-16 (amounting to **£2.41 billion**), and using the multiplier of **0.2** for all other research funding received by Russell Group universities in that academic year (amounting to **£3.28 billion**)³⁰, we infer a weighted average spillover multiplier of approximately **5.5** associated with Russell Group universities' research activities. This means that for **every £1 invested in Russell Group universities' research activities, an additional annual economic output of £5.50 is generated across the UK economy.**

Applying the average productivity spillover multiplier to the total research-related income the universities accrued in 2015-16, we estimate that the research conducted Russell Group universities results in **total market sector productivity spillovers of approximately £31.26 billion.**

²⁷ Haskel et al. (2014) use data on 7 industries in the United Kingdom for the years 1995 to 2007.

²⁸ A key difference to the multiplier estimate 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 estimated the impact of research *funding* by the Research Councils on private sector productivity, Haskel et al. 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).

²⁹ 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.

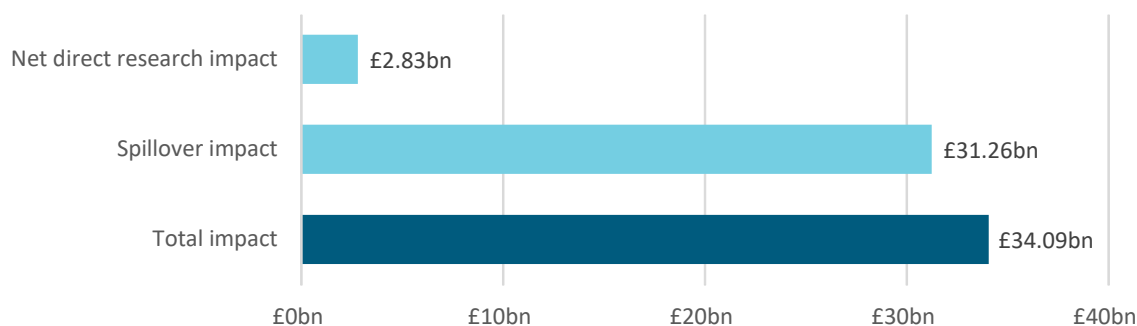
³⁰ In terms of the large difference in magnitude between these multipliers, explaining the size of the 12.7 multiplier in particular, Haskel and Wallis (2010) argue that they would expect the productivity spillovers from Research Council funding to be large, 'given that the support provided by Research 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.

3.2 Total economic impact of Russell Group universities' research activities

The total economic impact of research conducted by Russell Group universities in the 2015-16 academic year was estimated at **£34.09 billion** (see Figure 9), the majority of which is driven by the productivity spillovers generated (**£31.26 billion**), with the remaining **£2.83 billion** arising from the net direct economic impact of Russell Group universities' research activities.

Comparing the aggregate research impact to the total amount of public funding invested in Russell Group universities' research, the analysis indicates **that for every £1 of publicly funded research income, Russell Group universities deliver an average return of £9 to the UK economy³¹**.

Figure 9 Total impact of Russell Group universities' research activities in 2015-16



Note: All estimates are presented in 2015-16 prices. *Source: London Economics' analysis*

³¹ To arrive at this ratio, we included as public funding both the public research funding grants discussed in Section 3.1.1 (i.e. the research grants received by Russell Group universities from the UK Research Councils and the Higher Education Funding Councils (i.e. HEFCE, HEFCW, SFC and DELNI), *as well as* the additional research income which the universities receive from government-commissioned research (from UK central government bodies/local authorities, health and hospital authorities). The ratio of **9:1** excludes this funding from the total impact (in the numerator), and adds it as an Exchequer funding cost (in the denominator).

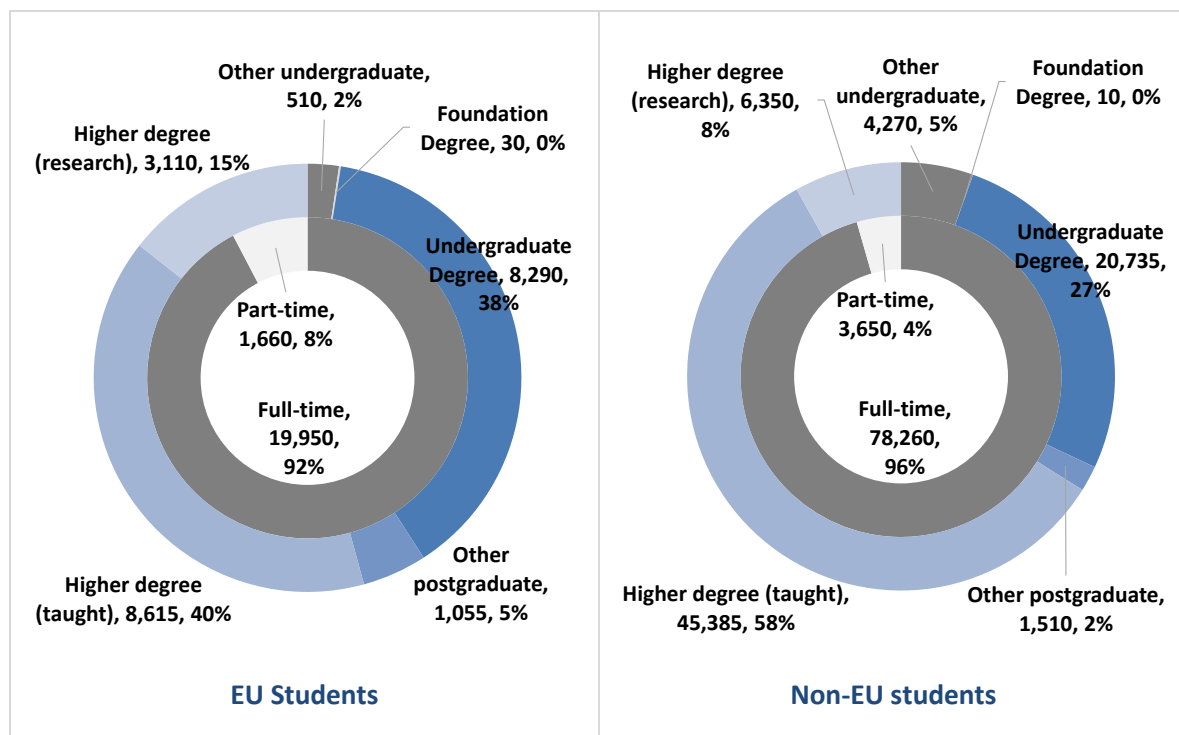
4 The impact on exports

Overseas trade, or international trade, is the sale of goods and services across national borders. These contribute to the UK economy as an injection of funding from an overseas source³² (i.e. income originating from outside the United Kingdom). Here, we focus on overseas income in the form of tuition-fee income from EU and non-EU students (net of any Exchequer costs), as well as non-tuition fee (off-campus) expenditure of EU and non-EU students during the course of their studies at Russell Group universities.

4.1 Non-UK domiciled students attending Russell Group universities

In the 2015-16 academic year there were a total of **99,870** non-UK domiciled first-year students undertaking courses or standalone modules at Russell Group universities.

Figure 10 Profile of non-UK domiciled students in the 2015-16 cohort of Russell Group university students



Note: EU Students presented in left hand side panel. Non-EU international students presented in right hand side panel. All student numbers are rounded to the nearest 5. We received HESA data on a total of **266,445** students from the Russell Group. From those, we excluded a total of **545** with an unknown domicile within the UK and **90** students with an unknown gender. Out of the remaining **265,765** students, we excluded **165,895** UK domiciled students.

Source: London Economics' analysis of HESA data

This represents approximately **38%** of all students in the 2015-16 cohort of starters. Of these, **21,610 (22%)** were domiciled within the European Union, and **78,260 (78%)** came from outside the European Union. In terms of study mode, approximately **95%** of non-UK domiciled students (**94,560**)

³² Note that other types of export income accrued directly by Russell Group universities (such as research income from non-EU sources, or any other income received from non-UK sources) are taken account of in our analysis of the impact of Russell Group universities' research activity (Section 3) and the direct, indirect and induced impacts (Section 50), and are thus excluded from the analysis of exports (to avoid double-counting).

in the cohort were studying on a full-time basis, with the remaining **5% (5,310)** undertaking their studies part-time.

In terms of study level, by contrast with domestic students, the majority (**66,025, 66%**) of non-UK domiciled students were enrolled on postgraduate programmes. Out of this number, **82%** were undertaking postgraduate taught degrees, with the remainder studying for postgraduate research qualifications (**14%**) or other postgraduate qualifications (**4%**). The most popular undergraduate programme for non-UK domiciled students were undergraduate degrees (**86%** of total undergraduate programmes), with a small share of students completing other undergraduate qualifications (**14%**).

Table 12 Non-UK domiciled students (headcount) in the 2015-16 cohort, by domicile, study mode and qualification level at Russell Group universities

Level of study	Domicile		
	EU (outside UK)	Non-EU	Total
Full-time	19,950	74,610	94,560
Other undergraduate	130	2,190	2,320
Foundation Degree	0	0	0
Undergraduate degree	8,290	20,735	29,025
Other postgraduate	545	785	1,330
Higher degree (taught)	8,045	44,710	52,755
Higher degree (research)	2,940	6,190	9,130
Part-time	1,660	3,650	5,310
Other undergraduate	380	2,080	2,460
Foundation Degree	30	10	40
Undergraduate degree	0	0	0
Other postgraduate	510	725	1,235
Higher degree (taught)	570	675	1,245
Higher degree (research)	170	160	330
Total	21,610	78,260	99,870
Other undergraduate	510	4,270	4,780
Foundation Degree	30	10	40
Undergraduate degree	8,290	20,735	29,025
Other postgraduate	1,055	1,510	2,565
Higher degree (taught)	8,615	45,385	54,000
Higher degree (research)	3,110	6,350	9,460

Note: All student numbers are rounded to the nearest 5.

We received HESA data on a total of **266,445** students from the Russell Group. From those, we excluded a total of **545** with an unknown domicile within the UK and **90** students with an unknown gender. Out of the remaining **265,765** students, we excluded **165,895** UK domiciled students.

Source: London Economics' analysis based on HESA data

4.2 Tuition fee income associated with overseas students

To assess the level of tuition fee income associated with overseas students, we made use of data on the fee income received by Russell Group universities in the 2015-16 academic year (by qualification level, study mode and domicile³³). Making similar assumptions on average study duration as in the

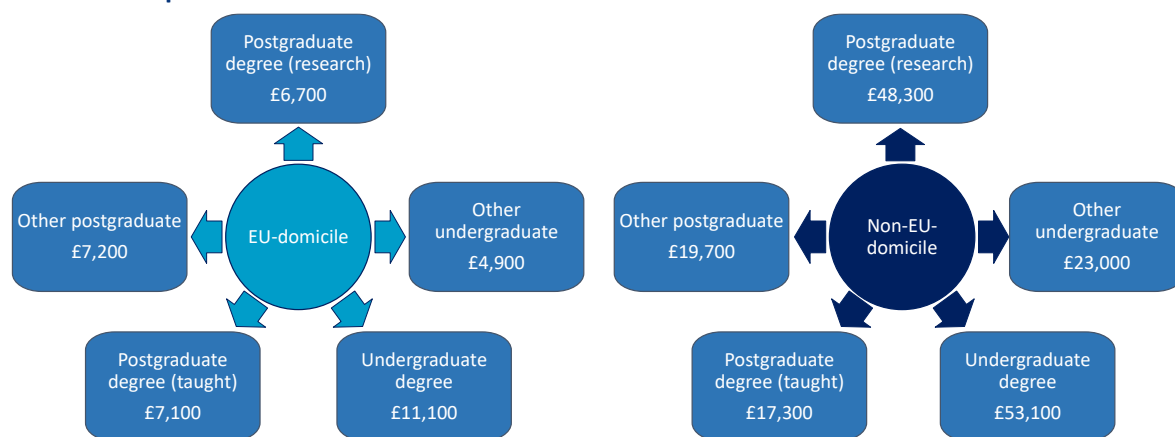
³³ As in the analysis of teaching and learning (see Section 2), we made use of information on aggregate fee income for new and continuing students in 2015-16 provided by the Russell Group, separately by institution, domicile (i.e. Home/EU vs non-EU students), study mode, and qualification group (broken down by undergraduate, postgraduate taught and postgraduate research). To derive fee levels per *full-time* student per year across these qualification groups, we divided the total levels of fee income by the underlying number of students attending Russell Group universities in 2015-16. To derive fee levels per *part-time* student, we then multiplied the respective full-time rates by information on the average study intensity amongst part-time students (again by institution, domicile and qualification level). Note that, for students undertaking other postgraduate qualifications, we assumed the same average fee levels as for students undertaking postgraduate taught degrees. Further note that the information on fee income generated by non-EU domiciled students did

teaching and learning analysis relating to UK domiciled students (Section 2), we calculated the tuition fee income from the start of a student's learning aim until completion. Expressing the total income until completion in 2015-16 prices, and applying the real discount rate³⁴, we arrived at an estimate of the **gross tuition fee income per student**.

To calculate the **net tuition fee income per student**, we deducted the direct costs to the UK Exchequer associated with funding higher education for non-UK students. These Exchequer costs include the subsidies associated with the **tuition fee support** provided by the **Student Loans Company** (SLC) in terms of the RAB charge on tuition fee loans provided to eligible EU-domiciled students studying in England, Wales and Northern Ireland, and the non-repayable tuition fee grants provided to EU students studying in Wales and Scotland³⁵. In addition, we deducted the recurrent **teaching grant funding** associated with EU students paid to Russell Group universities by the Higher Education Funding Councils for England and Wales, the Scottish Funding Council and the Department for Employment and Learning Northern Ireland. We also deducted any fee waivers and bursaries paid to international students by Russell Group universities³⁶.

As presented in Figure 11, the analysis indicates that the average net tuition fee expenditure associated with EU-domiciled postgraduate taught degree students over the course of their qualification is approximately **£7,100**, while the corresponding net fee income per international (non-EU) student was estimated to be **£17,300**. At undergraduate level, EU-students undertaking undergraduate degrees are associated with net tuition fee expenditure of approximately **£11,100**, while international students are associated with net tuition fee income of approximately **£53,100** over the course of their studies.

Figure 11 Net tuition fee income per student (present value over total study duration) by qualification level and domicile



Note: All estimates are presented in 2015-16 prices, discounted to present net present values, and rounded to the nearest £100. The estimates present a weighted average across full-time and part-time students. For more detailed information on the estimated levels of net fee income per student, please refer to A3.2.1. **Source: London Economics' analysis**

not allow for a breakdown by qualification level. For simplicity, we thus assumed the same average fee level for all qualification levels (for full-time students), and adjusted these average fee levels by average study intensity levels to arrive at average fees for part-time students.

³⁴ The real discount rate used adopted for this analysis was the HMT the Green Book rate of 3.5% (see HM Treasury, 2011).

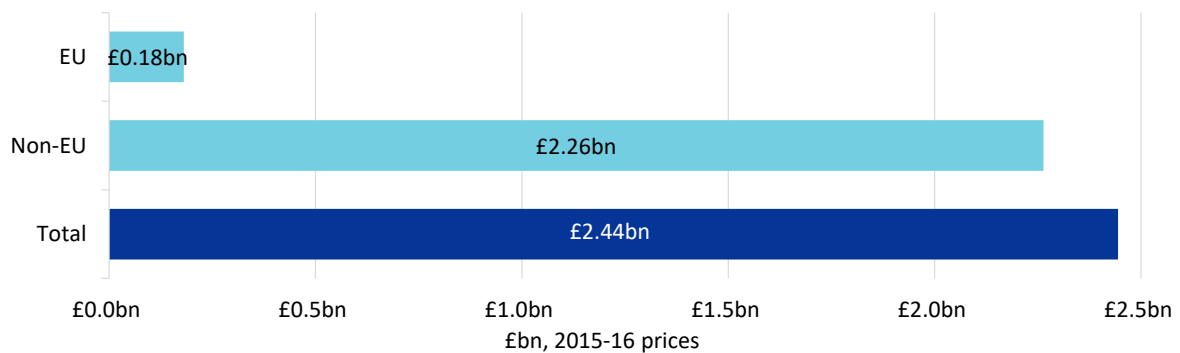
³⁵ We have assumed a RAB charge of 25% associated with tuition fee loans for EU students studying in England (and 10% for EU students studying in Wales and Northern Ireland (based on the relatively lower level of loans taken out). The RAB charge for EU students in England was based on the most recent official estimates of the RAB charge provided by the (former) Department for Business, Innovation and Skills (see UK Parliament, 2016); while the estimate for Wales and Northern Ireland is based on estimates by the Diamond Review of Higher Education in Wales (Welsh Government, 2016).

³⁶ Again, we assume that non-EU students are not eligible to receive fee waivers, bursaries or scholarships from Russell Group universities, so this deduction applies to EU students only.

Finally, using the number of students in the 2015-16 cohort, and making similar assumptions on completion rates as in the analysis of the economic impact of teaching and learning (see Section 2.4), the analysis generates Russell Group universities' total **net tuition fee income** from both EU and non-EU students.

Across all levels of qualification, the **total net tuition fee income** generated by EU students in the 2015-16 cohort was estimated to be **£0.18 billion**, with a further **£2.26 billion** generated by (non-EU) international students. Therefore, the total net tuition fee income generated by non-UK students in the 2015-16 cohort of Russell Group university students was estimated at **£2.44 billion**.

Figure 12 Aggregate net tuition fee income associated with EU and international students in the 2015-16 cohort, by domicile



Note: All estimates are presented in 2015-16 prices, and discounted to net present values. *Source: London Economics' analysis*

4.3 Non-tuition fee income associated with overseas students

In addition to the tuition fee income that overseas students generate, they also incur expenditure on non-tuition fee related items whilst acquiring their qualification. Such expenditure includes, but is not limited to, **accommodation costs** (rent, council tax, bills, etc.), **subsistence costs** (food, entertainment, personal items, etc.), **direct course costs** (textbooks, journal or library subscriptions, computer equipment, etc.), **facilitation costs** (e.g. course-related travel costs), and **spending on children** (including childcare that is not related to their study).

The level of non-tuition fee expenditure by overseas students is often found to be of equivalent size to the direct tuition fee expenditure³⁷, making non-tuition fee expenditure a significant component of the UK's export income from overseas students coming to study in the UK.

To analyse the level of non-tuition fee expenditure associated with the 2015-16 cohort of Russell Group university students, we used non-tuition fee expenditure estimates from the (most recent) **2011-12 English and 2014-15 Welsh Student Income and Expenditure Survey (SIES)**^{38 39}. The surveys respectively provide estimates of the average expenditure by *English and Welsh* domiciled students studying in England and Wales on living costs, housing costs, participation costs (including tuition fees) and spending on children, for both full-time and part-time students.

³⁷ See Department for Business, Innovation and Skills (2011b).

³⁸ SIES is currently updating the English student expenditure survey for 2014-15. Unfortunately, at the time of writing, the results had not yet been published so that the 2011-12 survey, adjusted for inflation, had to be used. Expenditure for Scotland and Northern Ireland was assumed to be in line with Wales, given the lack of any recent estimates of student expenditures for Scotland and Northern Ireland.

³⁹ See Department for Business, Innovation and Skills (2013) and Welsh Government (2017).

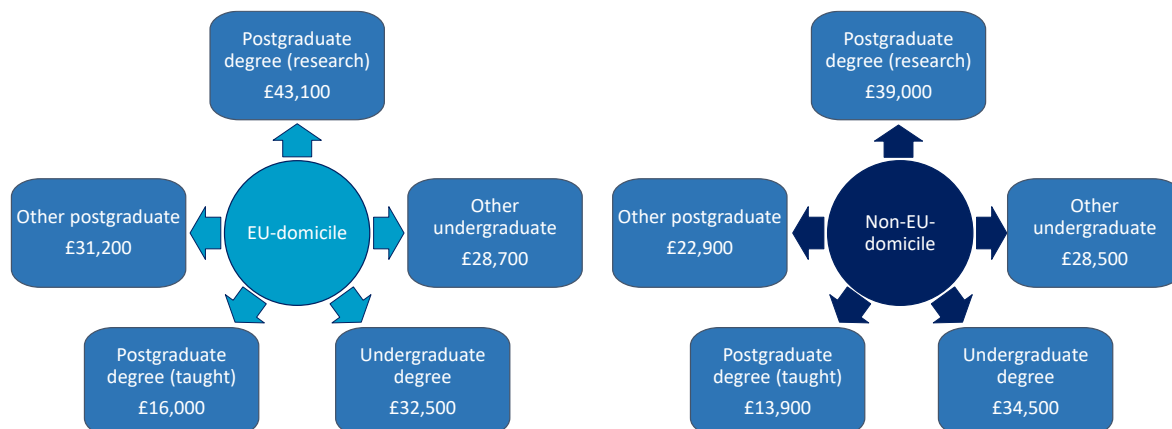
For the purpose of this analysis we made the following adjustments to the 2011-12 and 2014-2015 SIES estimates:

- We excluded estimates on *tuition fee expenditure* to avoid double-counting with the analysis presented in Section 4.2.
- We also excluded any *on-campus* expenditure of students, to avoid double-counting with the analysis undertaken in Section 5 relating to the direct, indirect and induced impacts of the universities (as this would have been accrued as income by the universities themselves)⁴⁰.
- Since SIES does 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 overseas students. We do however adjust the SIES estimates for the longer average stay durations in the UK of non-EU and international students compared to EU students⁴¹.
- Finally, we adjusted the resulting estimates for inflation to reflect 2015-16 prices⁴².

Similar to the estimates relating to tuition fee expenditure, we calculated the non-tuition fee expenditure over the duration of students' higher education courses (discounted to reflect present values). The resulting estimates provide the total average (off-campus) **non-tuition fee expenditure per student** in 2015-16 prices by level of study, study mode and domicile (EU or non-EU).

Presented in Figure 13, reflecting the differences in qualification duration, the total average non-tuition fee expenditure for a full-time **undergraduate** degree student from the European Union was estimated to be **£32,500**, compared to **£16,000** for an EU-domiciled **postgraduate taught** degree student. With respect to (non-EU) international students, the non-tuition fee expenditure associated with a full-time undergraduate degree student was estimated to be **£34,500** compared to **£13,900** for a postgraduate taught degree student.

Figure 13 Non-tuition fee income per student (present value over total study duration) by qualification level and domicile



Note: All estimates are presented in 2015-16 prices, discounted to present net present values, and rounded to the nearest £100. The estimates present a weighted average across full-time and part-time students. For more detailed information on the estimated levels of non-tuition fee income per student, please refer to A3.2.3. **Source: London Economics' analysis**

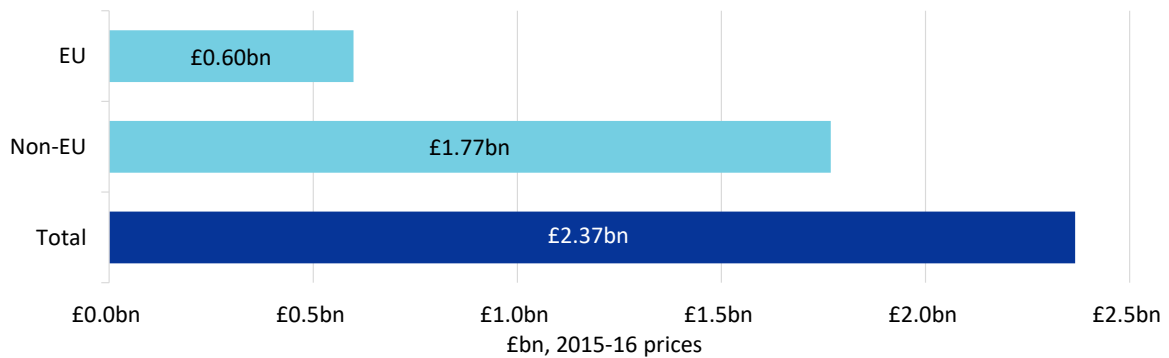
⁴⁰ In line with the analysis by Kelly et al. (2014), we assume that, on average, **13%** of students' non-tuition fee expenditures are incurred on campus.

⁴¹ These adjustments are based on the approach outlined by the Department for Business, Innovation and Skills (2011b) in estimating the value of educational exports to the UK economy. For more information, please refer to Table 21 in A3.2.2.

⁴² Inflation estimates are based on data provided by the Office for National Statistics (2017).

Combining the non-tuition fee estimates per student with the number of non-UK students in the 2015-16 cohort and assumed completion rates, provided the total monetary value of (off-campus) **non-tuition fee expenditure**. Across all qualification levels, this stood at **£0.60 billion** for EU-domiciled students and at **£1.77 billion** for non-EU students. The total non-tuition fee expenditure generated by non-UK students in the 2015-16 cohort of Russell Group university students was estimated at **£2.37 billion**.

Figure 14 Aggregate non-tuition fee expenditure of overseas students in the 2015-16 cohort, by domicile

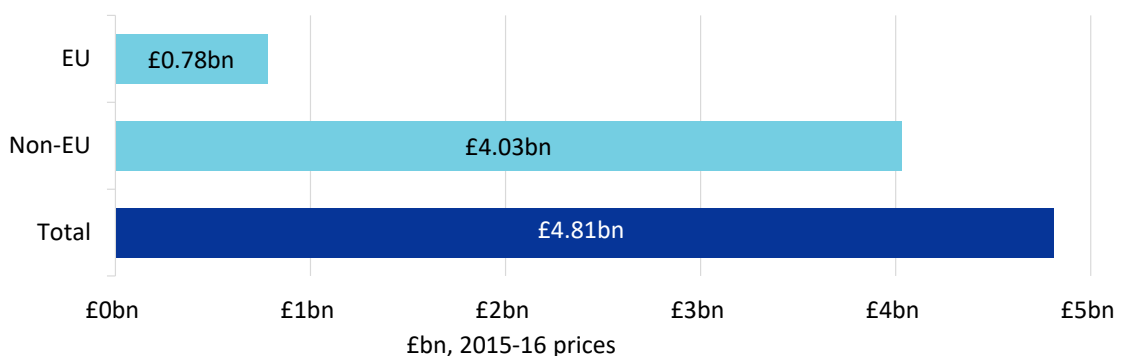


Note: All estimates are presented in 2015-16 prices, and discounted to net present values. *Source: London Economics' analysis*

4.4 Aggregate impact of Russell Group universities on exports

Combining the information on both tuition fee and non-tuition fee expenditure provides estimates of the aggregate impact of Russell Group universities on exports. The total export income generated for the UK economy as a result of the **99,870** non-UK domiciled first-year students who attended a Russell Group university in 2015-16 was estimated to be approximately **£4.81 billion**. Approximately **£4.03 billion** of the total export income was generated by non-EU students, while the remaining **£0.78 billion** was generated by students from the EU.

Figure 15 Aggregate economic impact of Russell Group on exports by domicile



Note: All estimates are presented in 2015-16 prices, and discounted to present net present values. *Source: London Economics' analysis*

4.5 Total economic impact per overseas student

In addition to the total impact of Russell Group universities' EU and non-EU student enrolments on exports across the total 2015-16 cohort, we further estimated the **aggregate economic contribution generated per EU and non-EU student in the cohort**. This aggregate impact arises both *directly* from the tuition fee and non-tuition fee income generated by these students throughout their studies (as

outlined above), but also includes **the indirect and induced economic effects (through supply chain and employee spending) associated with this income** (outlined in further detail in Section 5).

Table 13 presents the total economic impact per non-UK student on the UK economy – again throughout their total study duration, and net of the Exchequer costs of provision and university bursary support (for EU students only, as above). This is presented separately by domicile (EU versus non-EU) and level of study.

The analysis indicates that the aggregate economic impact associated with the tuition fee and non-tuition-fee expenditures of a student in the 2015-16 cohort of Russell Group university students completing an **undergraduate degree** stands at approximately **£176,000** per non-EU domiciled student. Of this amount, approximately **£87,600** is due to direct economic effects and **£88,400** is due to indirect and induced economic effects. The comparable estimate for an EU domiciled undergraduate degree student stands at approximately **£91,400**. Of this total, the direct economic effects account for **£43,600** per student, and the remaining **£47,800** is due to indirect and induced economic effects.

This implies that there is a total of **£1 million** of economic impact generated by every **6** non-EU students or **11** EU-domiciled students undertaking undergraduate degrees at a Russell Group university in the 2015-16 cohort. Taking a weighted average across all **study levels** and **domiciles** (weighted by the number of students in the 2015-16 cohort in each category), the analysis indicates that there is an economic impact of **£1 million** for every **11** non-UK domiciled students (at all levels of study) in the 2015-16 cohort.

The analysis further indicates that every **7 non-UK students** undertaking an undergraduate degree at a Russell Group university generate **£1 million** of impact to the UK economy.

Table 13 Total direct, indirect and induced economic impact per non-UK student, by level of study and domicile

Level of study	Domicile		
	EU	Non-EU	Average
Other undergraduate	£62,300	£96,500	£90,900
Foundation Degree	£102,000	£139,600	£109,200
Undergraduate degree	£91,400	£176,000	£151,700
Other postgraduate	£67,300	£80,400	£76,900
Higher degree (taught)	£43,800	£61,100	£58,400
Higher degree (research)	£81,800	£171,600	£142,000
Average	£69,100	£101,500	£94,400

Note: All estimates are presented in 2015-16 prices, discounted to reflect net present values, and rounded to the nearest £100. The estimates illustrated are a weighted average across full-time and part-time students.

Source: London Economics' analysis

5 The direct, indirect and induced impact of Russell Group universities

5.1 The impact of Russell Group universities' expenditures

The majority of existing literature on the economic impact of higher education institutions focuses almost exclusively on the direct, indirect and induced impact of universities on their local, regional or national economies. This assessment of economic impact considers a university as an economic unit creating output within the local economy by purchasing products and services from different industries and hiring employees. These **direct**, **indirect** and **induced** impacts of a university on the economy are defined as follows:

- **Direct effect:** This considers the economic output generated by a university itself, by purchasing goods and services (including labour) from the economy in which it operates.
- **Indirect effect:** This effect arises from a university's purchases of goods and services from other sectors in the economy to support its activities. These purchases generate income for the supplying industries, which they in turn spend on their own purchases from suppliers to meet the university's demands. This results in a chain reaction of subsequent rounds of spending across industries, often referred to as the 'ripple effect'.
- **Induced effect:** The induced effect is based on a university's status as an employer. In return for their services, a university pays salaries to its employees, who will use this income to buy consumer goods and services within the economy. This generates wage income for employees within the industries producing these goods and services, who in turn spend their own income on goods and services. Again, this leads to subsequent rounds of wage income spending, i.e. a 'ripple effect' throughout the economy as a whole.

The total of the direct, indirect and induced effects constitutes the *gross* economic impact of a university on its local economy (commonly measured both in terms of monetary output as well as employment). An analysis of the *net* impact needs to include two additional factors potentially reducing the size of any of the above effects⁴³:

- **Leakage** into other geographical areas, by taking account of how much of the additional economic activity actually occurs in the area of consideration. For example, it might be the case that the university sources some of its inputs from areas outside of its local economy, thus reducing the economic impact which it has on its local surroundings.
- **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.

While the above definitions were discussed in the context of the **expenditures of higher education institutions themselves**, an additional important strand of impacts relates to the corresponding effects of the **spending of university students in the local economy**. Again, this spending leads to additional knock-on effects throughout the economy (through indirect effects within the supply

⁴³ Please note that the economic multipliers used throughout the analysis already (implicitly) take account of any leakage and displacement effects across the UK economy.

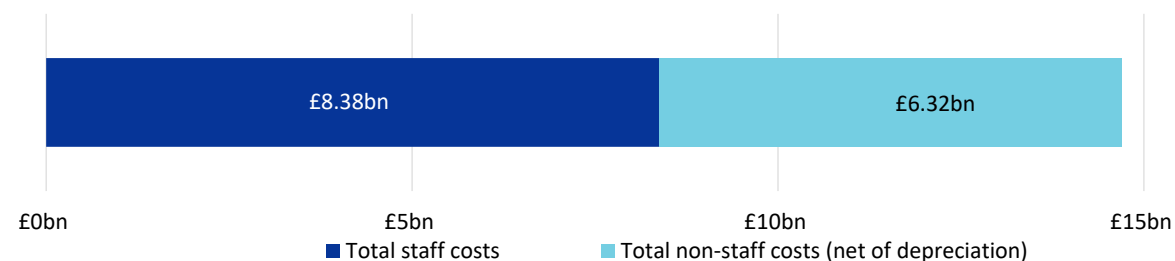
chain, and induced effects arising from the additional wage income), adding further economic value to a university's physical footprint.

5.1.1 The direct economic impact of Russell Group universities

To measure the direct economic impact of Russell Group universities' purchases of labour, goods and services within the UK economy, following the common approach across existing economic impact analyses of higher education institutions, we used data on the universities' total direct economic output (captured by staff and non-staff expenditure), as well as the number of staff employed (measured in terms of full-time equivalent employees)⁴⁴. In accordance with the other strands of impact included in this analysis, we focus on expenditure and employment in the 2015-16 academic year.

Based on this, the total **direct impact** associated with the universities' expenditures (in terms of monetary output (net of depreciation⁴⁵)) was estimated at **£14.70 billion** in 2015-16, based on approximately **£8.38 billion** of staff costs and **£6.32 billion** spent on other operating expenses in that academic year.

Figure 16 Direct economic impact associated with Russell Group universities' expenditure in the UK in 2015-16



Note: All estimates are presented in 2015-16 prices.

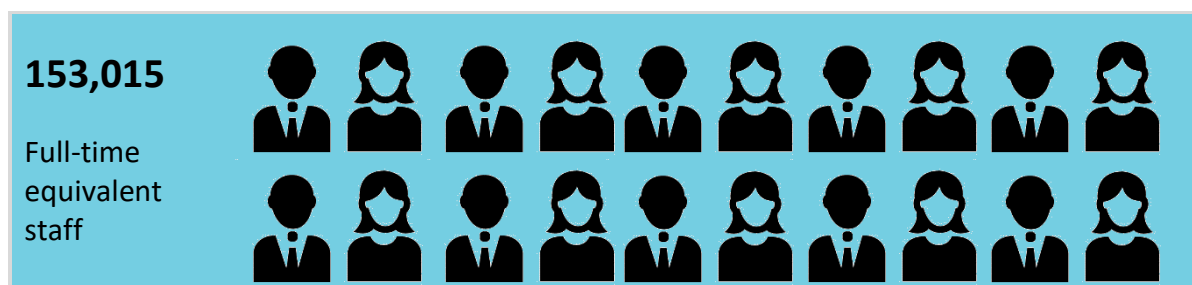
Source: London Economics' based on HESA

In terms of employment, the universities employed **153,015** full-time equivalent staff directly in the 2015-16 academic year (corresponding to a headcount of **171,340** staff)⁴⁶ (see Box 3).

⁴⁴ The staff data were based on information included in Higher Education Statistics Agency (2017). 'Staff in Higher Education 2015/16'. <https://www.hesa.ac.uk/data-and-analysis/publications/staff-2015-16>. Note that all staff numbers provided here exclude any staff on atypical contracts.

⁴⁵ We exclude from aggregate expenditure a total of **£988 million** in depreciation costs, 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).

⁴⁶ Again, we exclude any staff on atypical contracts.

Box 3 Direct employment by Russell Group universities in the UK, 2015-16

Source: London Economics' analysis based on HESA data

5.1.2 Indirect and induced impacts of Russell Group universities' expenditure

In relation to the wide body of existing literature assessing the economic impact of higher education institutions, the **indirect** and **induced** effects of universities on the economy are typically estimated with the help of **Input-Output** models. Such models develop a series of **multipliers** to estimate the **extent to which the direct output produced by a university generates additional activity throughout the economy**. As with the direct impact presented above, these knock-on multipliers are commonly measured in terms of both output (e.g. total turnover or expenditure by a university) and additional employment.

For the purpose of our analysis, we applied output and employment multipliers to Russell Group universities' total direct expenditure and total direct employment, focusing on impacts across the United Kingdom during the 2015-16 academic year. To gain an understanding of the size of these multipliers, we undertook a review of recent economic impact analyses of universities across the United Kingdom.

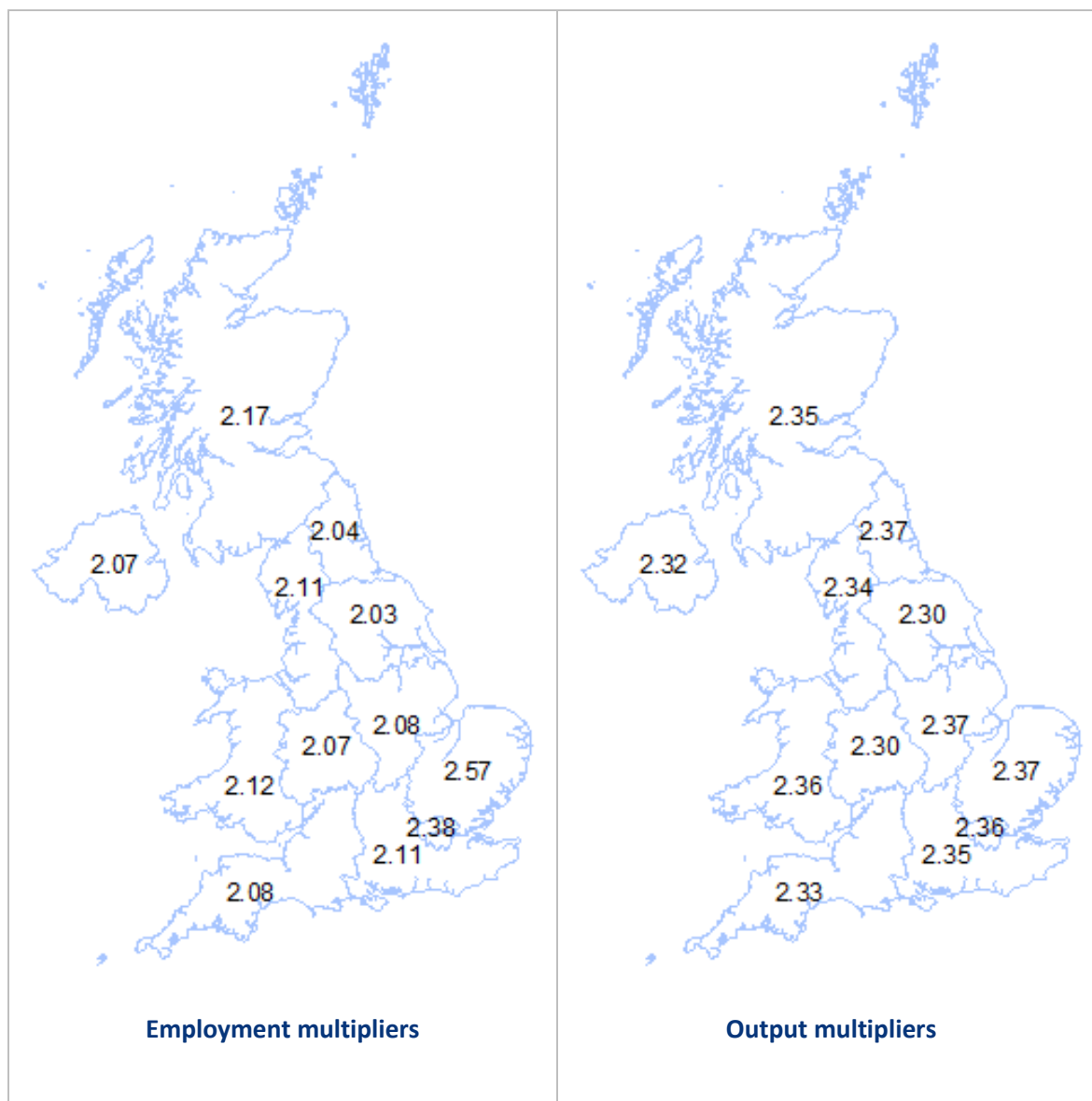
To enable us to compare figures across studies, we used a consistent and common methodology to calculate multipliers, following the approach taken by Kelly et al. (2014). Based on the estimates derived from their input-output models, Kelly et al. (2014) define the total multipliers capturing both indirect and induced effects as 'the ratio of the aggregate effect on economic activity arising from an initial injection [compared] to that initial injection'⁴⁷.

To interpret the resulting estimates, for example, an output multiplier of 1.5 implies that each £1 million of (direct) expenditure by a university on goods and services (including labour services) generates an additional £0.5 million throughout the economy. Similarly, an employment multiplier of 1.25 implies that for every 1,000 employees hired directly by a university, another 250 jobs are created in other industries.

In Figure 17, we present the multipliers which we apply to estimate the total direct, indirect and induced effects associated with Russell Group universities' expenditures and employment on the UK economy – by region within which each institution is located. The estimates for the English regions and for Scotland are based on multipliers provided by Kelly et al. (2014) in assessing the combined economic impact of UK higher education institutions. The estimates for Wales and Northern Ireland are based on separate studies (see Kelly et al. (2015a) and Kelly et al. (2015b)) specifically estimating the impact of higher education in each of these Home Nations, respectively.

⁴⁷ In mathematical terms, multipliers are thus calculated as: Output multiplier = (Direct output + Indirect output + Induced output) / Direct Output, and Employment multiplier = (Direct employment + Indirect employment + Induced employment) / Direct employment.

Figure 17 Economic multipliers applied to Russell Group universities' expenditure and employment: UK impact by region where the universities are located



Note: Whilst we apply multiplier effects to Russell Group universities' expenditure, the analyses by Kelly et al. (2014), Kelly et al (2015a) and Kelly et al. (2015b) instead focus on institutional revenue as a measure of universities' output; however, the use of different measures of output should, in theory, not influence output measures to a large extent, based on the assumption that institutional revenue approximately equates to the expenditure of universities.

Source: *London Economics' analysis of Kelly et al. (2014), Kelly et al. (2015a) and Kelly et al. (2015b)*

5.2 Impacts associated with student expenditure

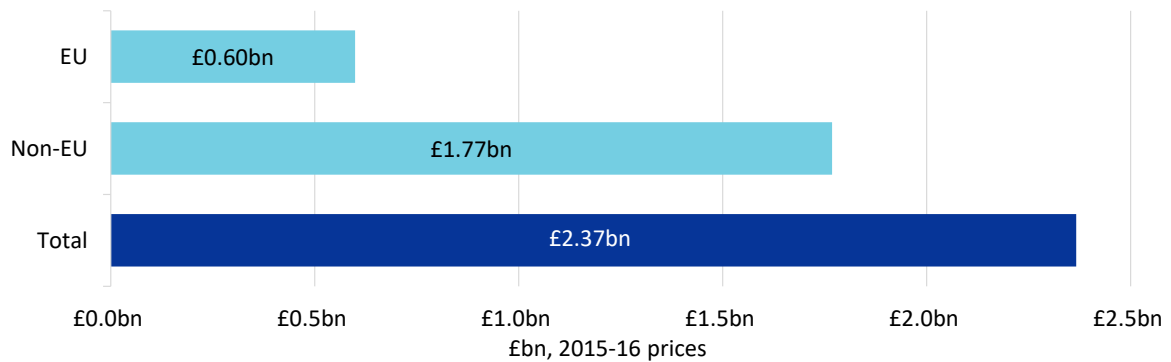
5.2.1 Direct effects

In addition to the direct, indirect and induced impacts of higher education institutions' own expenditures, traditional university impact analyses further consider the impact of additional spending by students at these universities from outside the local economy. Since we estimate impacts at the UK level, we thus include the **non-tuition fee expenditure** associated with non-UK domiciled students.

The approach to estimating the non-tuition fee expenditure amongst the **non-UK domiciled** students in the 2015-16 cohort was already discussed in Section 4 (i.e. when deriving the impact of Russell Group universities on educational exports).

As presented in Figure 18, the total non-fee (off-campus) expenditure of students starting qualifications or credit bearing modules at Russell Group universities in 2015-16 was estimated at **£2.37 billion** in 2015-16 prices. Out of this total, approximately **£0.60 billion** was contributed by EU students, with a further **£1.77 billion** contributed by non-EU students.

Figure 18 Aggregate non-tuition fee expenditure of overseas students in the 2015-16 cohort, by domicile



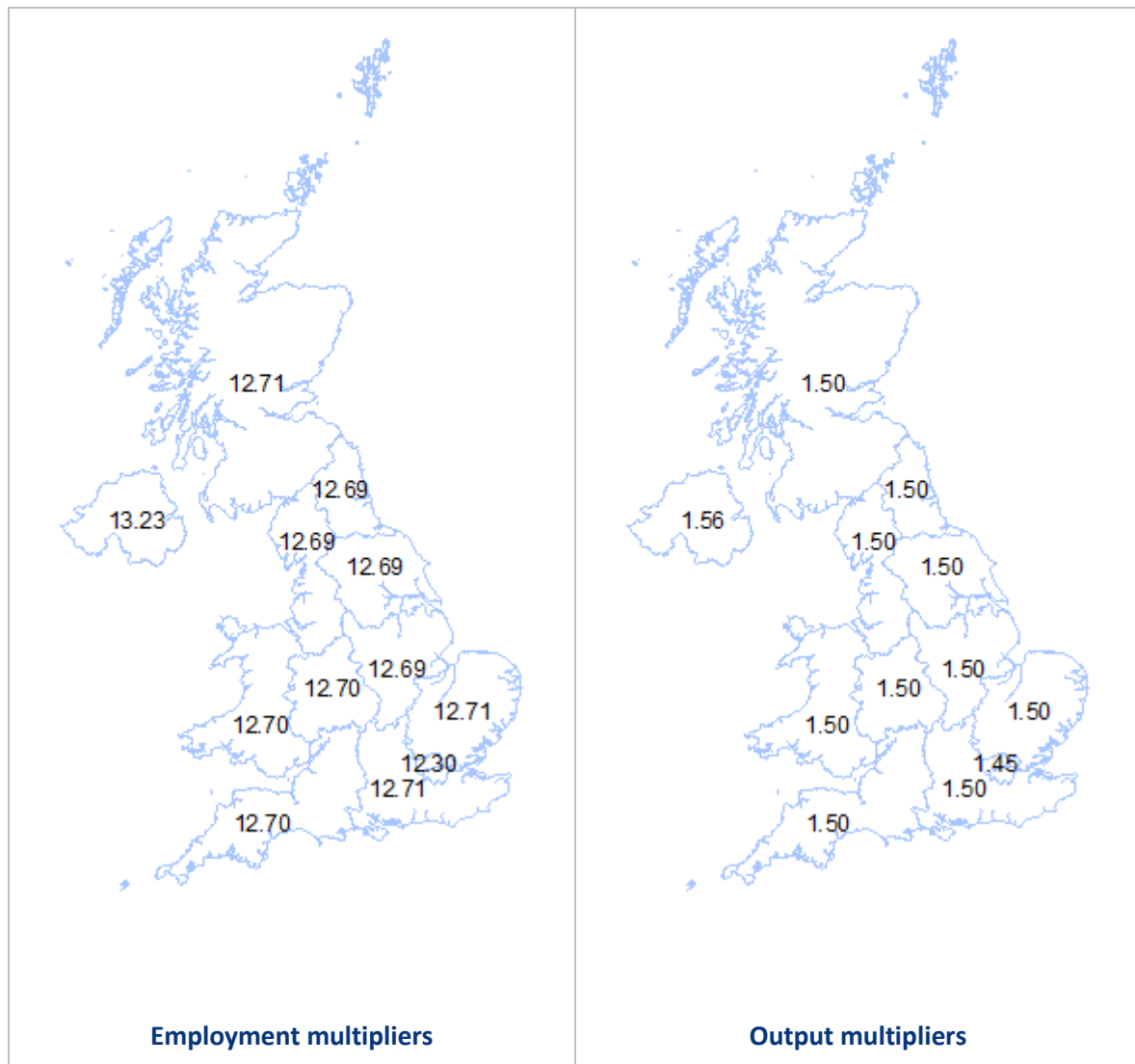
Note: All estimates are presented in 2015-16 prices.

Source: London Economics' analysis

5.2.2 Indirect and induced impacts of Russell Group student expenditure

To estimate the total direct, indirect and induced economic impacts of the expenditures associated with the 2015-16 cohort of Russell Group students, we again make use of multipliers presented in the previously discussed literature presented in Figure 19.

Figure 19 Economic multipliers applied to Russell Group student expenditure



Source: London Economics' analysis of Kelly et al. (2014), Kelly et al. (2015a) and Kelly et al. (2015b)

5.3 Adjusting for double counting

Before arriving at a total direct, indirect and induced impact associated with Russell Group universities' institutional expenditure and the spending of their non-UK students throughout the economy, it is necessary to deduct a number of items to avoid double counting, and to take account of the 'netting out' between the costs and benefits associated with the 24 universities and their students to different agents in the UK economy.

Specifically, we deducted from the **impact of the universities' expenditures**:

- **£0.18 billion** in university spending on fee waivers and other bursaries for UK domiciled students⁴⁸ as this was included in the analysis of teaching and learning (Section 2).

⁴⁸ The bursary support provided to UK domiciled students is considered as a benefit to the student in the analysis of the impact of teaching and learning activities. It is therefore necessary to deduct those support costs from the direct impact of Russell Group universities' spending, to correctly take account of the fact that these bursaries are merely a transfer from the institutions to their students, and not an additional benefit to the UK economy.

- The public cost of research funding (£2.86 billion) and the universities’ research income (£2.83 billion net of public costs) as these items were included in the estimate of research impact (Section 3); and
- £2.45 billion of net tuition fee expenditure generated by international students, £0.04 billion costs relating to tuition fee loan support for EU students, £0.07 billion in teaching grant funding for EU students, and £0.02 billion in fee waivers and bursaries paid to EU students, as all of these items were included in the impact on exports (Section 4).

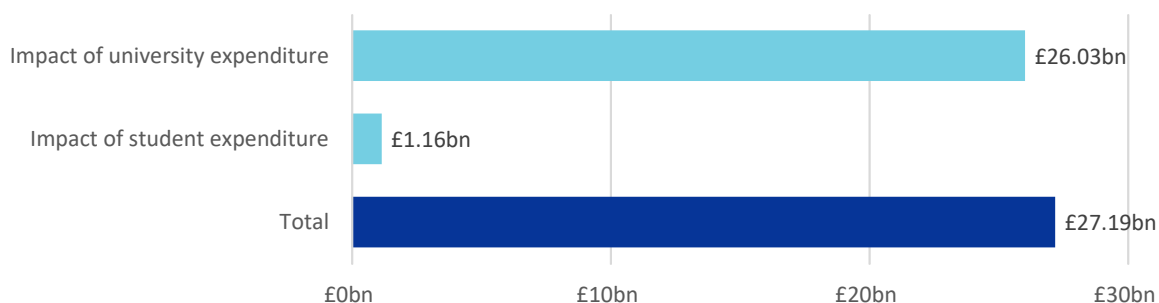
Similarly, £2.37 billion of non-tuition fee expenditure incurred by non-UK students was removed from the impact of the expenditure of Russell Group students, in order to avoid double-counting with the impact on exports (Section 4).

5.4 Aggregate direct, indirect and induced impact

Figure 20 presents the estimates of the total direct, indirect and induced impacts associated with expenditures incurred by Russell Group universities and their students (based on the 2015-16 cohort), after the above-described double-counting and ‘netting’ adjustments have been made.

The analysis indicates that the aggregate impact of Russell Group universities’ physical and digital footprint on the UK economy stands at approximately £27.19 billion per year, of which £26.03 billion is associated with Russell Group universities themselves, while £1.16 billion is associated with the expenditures of their students.

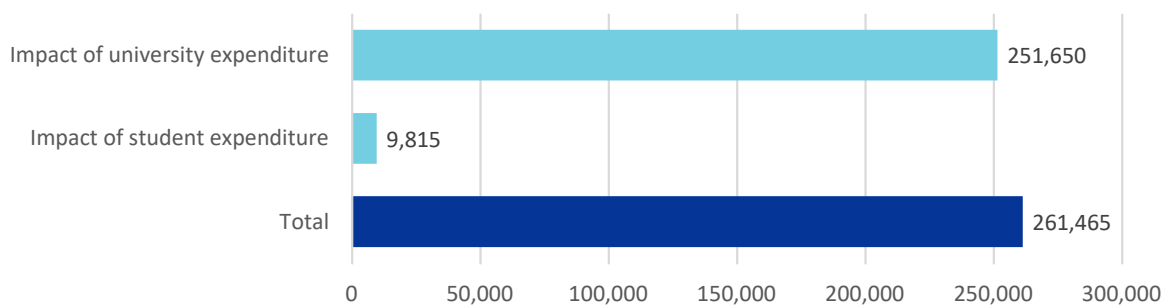
Figure 20 Direct, indirect and induced impact associated with Russell Group universities’ institutional and student expenditures, £ billion



Note: All estimates are presented in 2015-16 prices. Estimates have been adjusted to avoid double-counting with other sources of economic impact as analysed in previous sections, as well as to take account of transfers between different agents in the economy that cannot be counted as an additional impact to the UK economy. The impacts which would be double-counted and any inter-economy transfers that have not ‘netted out’ in other strands of the analysis were deducted from the total UK impact in £m of expenditure. All estimates are presented in 2015-16 prices. *Source: London Economics’ analysis*

In addition to these monetary impacts, the analysis also estimated the direct, indirect and induced impact of the Russell Group universities’ activities in terms of the number of jobs supported. The results indicate that in addition to the 153,015 full-time equivalent staff directly employed by Russell Group universities, there are a further 108,450 full-time equivalent jobs supported by Russell Group universities across the UK.

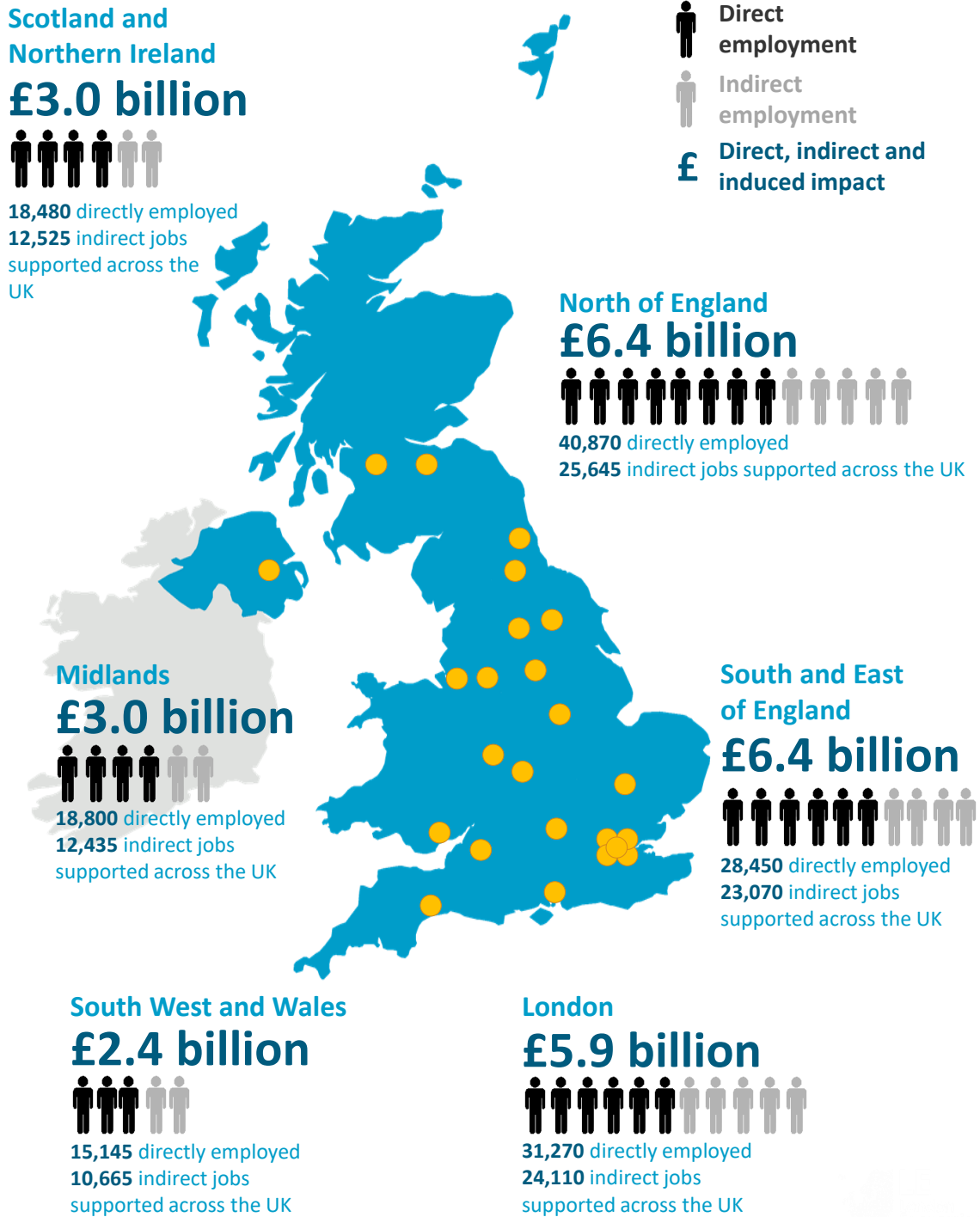
Figure 21 Direct, indirect and induced impact associated with Russell Group universities' institutional and student expenditures, # of FTE jobs supported



Note: All estimates are presented in # of jobs, and have been rounded to the nearest 5. Estimates have been adjusted to avoid double-counting with other sources of economic impact as analysed in previous sections, as well as to take account of transfers between different agents in the economy that cannot be counted as an additional impact to the UK economy. The impacts which would be double-counted and any inter-economy transfers that have not 'netted out' in other strands of the analysis were deducted from the total UK impact in £m of expenditure. All estimates are presented in 2015-16 prices, and rounded to the nearest £0.1 billion. **Source: London Economics' analysis**

To provide a geographical split of these impacts, Figure 22 presents the above aggregate estimates of Russell Group universities' direct, indirect and induced impacts on the UK economy, separately by university location. The analysis indicates that approximately **£6.4 billion** of the total UK impact of the universities' expenditures and the spending of their students is generated by the Russell Group universities located in the North of England (North East, North West and Yorkshire and the Humber), with an equivalent contribution made by Russell Group universities in the South and East of England. Similarly, a further **£5.8 billion** of impact is generated by the five Russell Group universities located in London.

Figure 22 The direct, indirect and induced impact of Russell Group universities on the UK economy, by university location



Source: London Economics' analysis. Contains National Statistics data © Crown copyright and database right 2016; NISRA data © Crown copyright and database right 2016; NRS data © Crown copyright and database right 2016; Ordnance Survey data © Crown copyright and database right 2016





6 The aggregate economic impact of Russell Group universities

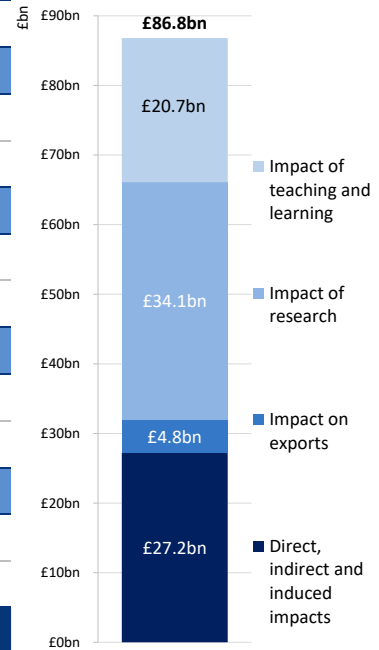
In 2015-16, the 24 Russell Group universities taught **609,285** students, including **265,765** first-year students, and employed **153,015** FTE staff. **The total economic impact associated with Russell Group universities' activities across the UK was estimated to be £86.75 billion in 2015-16.**

In terms of the components of economic impact, the value of Russell Group universities' **teaching and learning** activities stood at approximately **£20.65 billion (24%** of the total), while **research** activity contributed a further **£34.09 billion (39%)**. The economic contribution associated with the **direct, indirect and induced impact** from the Russell Group universities' operational and staff expenditure, as well as the expenditure of its overseas students was estimated to be **£27.19 billion (31%)**. The remaining **6%** (or **£4.81 billion**) was associated with the universities' contribution to **educational exports**.

Compared to Russell Group universities' total operational costs of approximately **£15.69 billion** in 2015-16, the total economic contribution to the UK in 2015-16 was estimated to be approximately **£86.75 billion**, which corresponds to a benefit to cost ratio of **5½:1**.

Table 14 Aggregate economic impact of Russell Group universities in the UK in 2015-16 (£bn. and % of total impact)

Type of impact (£bn. in 2015-16)	£bn.	%
 Impact of teaching and learning	£20.65bn	24%
Students	£9.87bn	11%
Exchequer	£10.78bn	12%
 Impact of research	£34.09bn	39%
Net direct research income	£2.83bn	3%
Spillover impact	£31.26bn	36%
 Impact of exports	£4.81bn	6%
Net tuition fee income	£2.44bn	3%
Non-tuition fee income	£2.37bn	3%
 Direct, indirect and induced impacts	£27.19bn	31%
Impact of university expenditure	£26.03bn	30%
Impact of overseas student expenditure	£1.16bn	1%
Total economic impact	£86.75bn	100%



Note: All estimates are presented in 2015-16 prices. *Source: London Economics' analysis*

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Annex 2 List of Russell Group universities

Table 15 List of the 24 Russell Group universities

List of Russell Group of universities

The University of Birmingham
The University of Bristol
The University of Cambridge
Cardiff University
University of Durham
The University of Edinburgh
The University of Exeter
The University of Glasgow
Imperial College of Science, Technology and Medicine
King's College London
The University of Leeds
The University of Liverpool
London School of Economics and Political Science
The University of Manchester
Newcastle University
University of Nottingham
The University of Oxford
Queen Mary University of London
The Queen's University of Belfast
The University of Sheffield
The University of Southampton
University College London
The University of Warwick
The University of York

Annex 3 Methodological Annex

A3.1 The impact of the Russell Group universities' teaching and learning activities

A3.1.1 Qualifications and counterfactuals considered in the econometric analysis

In total, the econometric analyses considered six different higher education qualification groups (i.e. six 'treatment' groups) within the National Qualifications Framework: three at postgraduate level (postgraduate degree (taught), postgraduate degree (research), and 'other' postgraduate) and three at undergraduate level or sub-degree level (undergraduate degree, Foundation Degree and 'other' undergraduate⁴⁹).

Table 16 presents the 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. We compare the earnings of the group of individuals in possession of the 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.

Table 16 Treatment and comparison groups for analysis of marginal returns

Treatment – highest academic qualification	Comparison - highest academic qualification
Other undergraduate	2 or more GCE 'A' Levels or equivalent
Foundation Degree	2 or more GCE 'A' Levels or equivalent
Undergraduate degree	2 or more GCE 'A' Levels or equivalent
Other postgraduate	Undergraduate Degree
Higher degree (taught)	Undergraduate Degree
Higher degree (research)	Undergraduate Degree

Source: *London Economics*

For the analysis of marginal returns, postgraduate degree holders are compared to undergraduate degree holders, while for individuals holding an undergraduate or sub-degree level higher education qualifications, the counterfactual group consists of individuals holding 2 or more GCE 'A' Levels (or equivalent) as their highest qualification.

In addition to the analysis of higher education outcomes, 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

⁴⁹ The other undergraduate category within the LFS analysis includes other degrees, HE diplomas, Higher National Certificates, Higher National Diplomas, undergraduate teaching qualifications, and other higher education below degree level. Interviewers are instructed to use *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.

‘distance travelled’ by a (small) proportion of Russell Group university students 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 2015-16 cohort, the academic ‘distance travelled’ is **lower** than the traditional prior attainment level (e.g. a small proportion of students undertaking an undergraduate degree had previously already completed another undergraduate-level qualification).

In instances where the level of prior attainment for students undertaking qualifications at Russell Group universities was higher or lower than the traditional counterfactual qualifications outlined in Table 16, 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 an undergraduate degree at a Russell Group 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 an undergraduate 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 an undergraduate degree**, 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 an undergraduate degree (relative to the possession of 2 or more GCE ‘A’ Levels)⁵⁰.

A3.1.2 Estimating the wage and employment returns to higher education qualifications

Analysis of wage returns

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

$$\ln(\omega_i) = \alpha + \beta' X_i + \varepsilon_i \quad \text{for } i = 1 \text{ to } n$$

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

- Age and age-squared;
- Ethnic origin;
- Region of usual residence;
- Qualifications;
- 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;

⁵⁰ 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).

- Workplace size; and
- Yearly Dummies.

Using the above specification, we estimated earnings returns in aggregate and **for men and women separately**. Further, to analyse the benefits associated with different education qualifications over the lifetime for individuals holding these qualifications, the regressions were estimated separately across **a range of specific age bands** for the working age population, depending on the gender and qualification considered. 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 Exchequer for students domiciled in and studying 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 2016. The selection of information over this period is the longest time for which information on the education and earnings for all of the qualification levels of interest is available on a relatively consistent basis.

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*⁵¹. Combining these subject-level returns with the number of students in the 2015-16 cohort of Russell Group university students by subject, we then calculated a **subject mix adjustment factor** – separately for each Russell Group university (as well as by gender and qualification level). These adjustment factors were then applied to the average marginal wage returns estimated as above, to adjust for the specific subject composition of each university's student cohort.

Analysis of employment returns

We adopted a **probit model** to estimate 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:

$$\text{probit}(EMPNOT_i) = \alpha + \gamma'Z_i + \varepsilon_i$$

The dependent variable adopted represents the binary variable *EMPNOT*, which is coded 1 if the individual is in employment and 0 otherwise. We specified the model to contain a constant term 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

⁵¹ The HESA subject classification, 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.

- Region of usual residence
- Qualifications
- 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 undertaken by **age-band**, and adjusted for the specific **subject mix** of students attending each of the Russell Group universities. Further, and again similar to the analysis of earnings returns, employment returns were estimated at the national (i.e. UK-wide) level.

A3.1.3 Age-decay function

Many of the economic analyses (e.g. Walker and Zhu (2013)) considering the lifetime benefits associated with higher education qualifications to date have focused on the returns associated with the ‘traditional path’ of higher education qualification attainment – namely 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; generally undertake their studies over an extended period of time; and often combine their studies with full-time employment. Similarly, at some Russell Group universities, full-time students also tend to start their higher education qualifications later than ‘typical’ UK full-time students. Table 17 presents the average age at enrolment and completion for students in the 2015-16 Russell Group student cohort⁵².

Given these characteristics, significant adjustments to the methodology need to be made when estimating the returns to some full-time and all part-time education attainment at Russell Group universities.

⁵² The average age at enrolment (by university, qualification level, gender and study mode) and the average duration of study (by university and qualification level, for full-time students only) is based on HESA information provided by the Russell Group. The average study duration for part-time students was derived by combining the average duration of study for full-time students with average part-time study intensity (calculated by dividing the number of full-time equivalent part-time students to the headcount of part-time students). To avoid over-estimating the average part-time study duration, we assume a maximum study duration of 10 years.

Table 17 Average age at enrolment, study duration, and age at completion for students undertaking higher education qualifications at Russell Group of universities, in 2015-16

Qualification level	Full-time students			Part-time students		
	Age at enrolment	Duration (years)	Age at completion	Age at enrolment	Duration (years)	Age at completion
Men						
Other undergraduate	20	2	22	46	4	50
Foundation Degree	19	2	21	23	3	26
Undergraduate degree	19	3	22	31	8	39
Other postgraduate	26	1	27	35	3	38
Higher degree (taught)	25	1	26	34	3	37
Higher degree (research)	25	3	28	37	7	44
Women						
Other undergraduate	21	2	23	43	4	47
Foundation Degree	32	2	34	33	3	36
Undergraduate degree	19	3	22	36	8	44
Other postgraduate	26	1	27	35	3	38
Higher degree (taught)	25	1	26	33	3	36
Higher degree (research)	26	3	29	36	7	43

Source: London Economics' analysis based on HESA data

The key change relates to the introduction 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 25 (for undergraduate qualifications) or 30 (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 individual⁵³. This calibration ensures that those individuals completing qualifications at a relatively older age will see relatively low 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 18 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 Russell Group universities. To interpret the information, we have assumed that a male student undertaking a postgraduate taught qualification on a full-time basis achieves the full earnings and employment premium indicated from the econometric analysis (for their entire working life). However, for a part-time male student undertaking a similar qualification, we assume that because of the late attainment, these students recoup only 71% of the corresponding full-time earnings and employment premiums from the age of attainment.

⁵³ 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- and full-time study being employed according to their age or motivations to study.

Table 18 Assumed age decay adjustment factors for students undertaking higher education qualifications at Russell Group universities

Qualification level	Male									
	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65
Other undergraduate	100%	100%	88%	75%	63%	50%	38%	25%	13%	0%
Foundation Degree	100%	100%	88%	75%	63%	50%	38%	25%	13%	0%
Undergraduate degree	100%	100%	88%	75%	63%	50%	38%	25%	13%	0%
Other postgraduate	100%	100%	100%	86%	71%	57%	43%	29%	14%	0%
Higher degree (taught)	100%	100%	100%	86%	71%	57%	43%	29%	14%	0%
Higher degree (research)	100%	100%	100%	86%	71%	57%	43%	29%	14%	0%
Qualification level	Female									
	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65
Other undergraduate	100%	100%	88%	75%	63%	50%	38%	25%	13%	0%
Foundation Degree	100%	100%	88%	75%	63%	50%	38%	25%	13%	0%
Undergraduate degree	100%	100%	88%	75%	63%	50%	38%	25%	13%	0%
Other postgraduate	100%	100%	100%	86%	71%	57%	43%	29%	14%	0%
Higher degree (taught)	100%	100%	100%	86%	71%	57%	43%	29%	14%	0%
Higher degree (research)	100%	100%	100%	86%	71%	57%	43%	29%	14%	0%

Note: Shaded areas indicate relevant average graduation age per full-time / part-time student at each level of study at Russell Group universities:

■ Full-time students ■ Part-time students

Source: London Economics' analysis based on HESA data

A3.1.4 Estimating the gross graduate premium and gross public 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 reduction of foregone earnings) relative to an individual in possession of the counterfactual qualification. To estimate the value of gross graduate premium, it is necessary to extend the econometric analysis (presented in A3.1.2). In particular, the following elements of analysis were undertaken (separately by gender, Russell Group university 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 equivalent), or an undergraduate degree).
2. We inflated these baseline or counterfactual earnings using the above-described earnings premiums and employment probabilities, adjusted to reflect late attainment (as outlined in section A3.1.3) and **subject mix**, to produce **annual age-earnings** profiles associated with the possession of each particular qualification **at each university**.
3. We adjusted these age-earnings profiles to account for the fact that earnings would be expected to increase in real terms over time (at an assumed rate of **1.3%** per annum (based on the long-term real earnings growth rate estimated by the Office for Budget Responsibility (2017))).
4. Based on the earnings profiles generated by qualification holders, and income tax and National Insurance rates and allowances for the relevant academic year⁵⁴, we computed

⁵⁴ I.e. 2015-16. Note that the analysis assumes fiscal neutrality, i.e. it is asserted that the earnings tax and National Insurance income bands grow at the same rate of annual earnings growth of **1.3%**.

the future stream of net earnings (i.e. post-tax)⁵⁵. Using similar assumptions, we further calculated the stream of (employment-adjusted) foregone earnings (based on earnings in the relevant counterfactual group⁵⁶) during the period of study, again net of tax, for full-time students only.

5. We calculated the **discounted** stream of additional (employment-adjusted) future earnings compared to the relevant counterfactual group (using a standard discount rate of **3.5%** for the first 30 years and **3.0%** thereafter, as presented in HM Treasury Green Book (HM Treasury, 2011)), 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 at each Russell Group university.

Note that the (employment-adjusted) additional income and taxation revenue associated with 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 an undergraduate degree undertaking an additional undergraduate degree at a Russell Group university will not incur any wage or employment benefits from this additional qualification attainment (while still incurring the costs of foregone earnings during the period of study).

Further note that the analysis of gross graduate premiums and public purse benefits was undertaken at a **national** (UK-wide) level, i.e. on an aggregated level across individuals with different Home Nation domiciles. 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.

A3.1.5 Net graduate premium and net public benefit

Table 19 provides information on the average net graduate premiums and net public benefits for UK domiciled students associated with all higher education qualifications offered by Russell Group universities, based on the 2015-16 cohort. While the table provides a breakdown by gender, study level and study mode, all values constitute **weighted averages** across the 24 Russell Group universities and across students domiciled in the different Home Nations (weighted by the number of students expected to complete the different qualifications).

⁵⁵ The tax adjustment also takes account of increased VAT revenues for HMG, by assuming that individuals spend **69%** of their annual income consuming goods and services within the economy (i.e. assuming a 69% propensity to consume), and a VAT rate of **20%**.

⁵⁶ The foregone earnings calculations are based on the baseline or counterfactual earnings associated with either 2 or more GCE 'A' Levels (for undergraduate qualifications), or an undergraduate degree (for postgraduate qualifications). However, as outlined in A3.1.1, some students in the 2015-16 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 HE qualifications other than undergraduate degrees are based on the level of foregone earnings associated with 2 or more GCE 'A' Levels (adjusted for the age at enrolment and completion associated with the relevant qualification obtained). Similarly, the estimated foregone earnings for students previously in possession of postgraduate qualifications are based on the level of foregone earnings associated with an undergraduate degree.

Table 19 Net graduate premium and net Exchequer benefit associated with higher qualification attainment at Russell Group universities, by gender, level of study and mode of study

Study level and mode	Net graduate premium			Net Exchequer benefits		
	Male	Female	Average	Male	Female	Average
Full-time students						
Other undergraduate (vs. A-levels)	£8,000	£26,000	£17,000	£10,000	£25,000	£17,000
Foundation Degree (vs. A-levels)	-£9,000	£26,000	£11,000	-£9,000	£28,000	£12,000
Undergraduate degree (vs. A-levels)	£108,000	£73,000	£88,000	£118,000	£66,000	£89,000
Other postgraduate (vs. undergraduate degrees)	£44,000	£60,000	£54,000	£74,000	£69,000	£71,000
Higher degree (taught) (vs. undergraduate degrees)	£50,000	£73,000	£62,000	£76,000	£79,000	£78,000
Higher degree (research) (vs. undergraduate degrees)	£102,000	£90,000	£97,000	£159,000	£106,000	£135,000
Part-time students						
Other undergraduate (vs. A-levels)	-£6,000	£3,000	£0	-£8,000	£1,000	-£2,000
Foundation Degree (vs. A-levels)	£12,000	£21,000	£17,000	£21,000	£26,000	£24,000
Undergraduate degree (vs. A-levels)	£66,000	£24,000	£40,000	£81,000	£19,000	£43,000
Other postgraduate (vs. undergraduate degrees)	£42,000	£49,000	£47,000	£59,000	£50,000	£53,000
Higher degree (taught) (vs. undergraduate degrees)	£48,000	£68,000	£60,000	£66,000	£68,000	£67,000
Higher degree (research) (vs. undergraduate degrees)	£68,000	£67,000	£67,000	£87,000	£66,000	£76,000

Note: All estimates are presented in 2015-16 prices, discounted to reflect net present values, and rounded to the nearest £1,000.

The returns to undergraduate degrees, Foundation Degrees and other undergraduate qualifications are measured relative to holding 2 or more GCE 'A' levels as their highest qualification.

The returns to postgraduate (taught) degrees, postgraduate (research) degrees and other postgraduate qualifications are measured relative to undergraduate degrees.

Source: London Economics' analysis

A3.2 The impact on exports

A3.2.1 Net tuition fee income per student

In Table 17 below, we provide more detailed information on the estimates of the **net tuition fee income** associated with EU and non-EU International students in the 2015-16 cohort of Russell Group university students over the course of their studies – by domicile, level of study and study mode.

Table 20 Net tuition fee income per student (present value over total study duration) by qualification level, domicile and study mode

Level of study	Domicile	
	EU (non-UK)	Non-EU
Full-time		
Other undergraduate	£6,400	£28,000
Foundation Degree		
Undergraduate degree	£11,100	£53,100
Other postgraduate	£7,900	£20,100
Higher degree (taught)	£7,100	£17,300
Higher degree (research)	£6,800	£48,500
Part-time		
Other undergraduate	£1,900	£13,600
Foundation Degree	£11,000	£27,400
Undergraduate degree	£13,900	£41,800
Other postgraduate	£5,600	£17,700
Higher degree (taught)	£5,800	£17,200
Higher degree (research)	£4,600	£38,800
Average		
Other undergraduate	£4,900	£23,000
Foundation Degree	£11,000	£27,400
Undergraduate degree	£11,100	£53,100
Other postgraduate	£7,200	£19,700
Higher degree (taught)	£7,100	£17,300
Higher degree (research)	£6,700	£48,300

Note: All estimates are presented in 2015-16 prices, discounted to present net present values, and rounded to the nearest £100. Gaps may arise where there are no students in the 2015-16 cohort expected to complete the given qualification (of the given characteristics).

Source: *London Economics' analysis*

A3.2.2 Assumptions on average stay duration

As outlined in Section 4.3, to estimate the non-tuition fee income associated with EU and non-EU students in the 2015-16 cohort of Russell Group of university students, we adjusted estimates of non-tuition fee expenditure per academic year provided by the Student Income and Expenditure Survey (based on English and Welsh students) to reflect longer stay durations for overseas students.

In particular, following a similar approach as outlined by the Department for Business, Innovation and Skills (2011b), we assume that EU domiciled postgraduate, and non-EU undergraduate and postgraduate students spend a greater amount of time in the UK, on average, than prescribed by the duration of the academic year (39 weeks) (see Table 21)⁵⁷. Hence, we assume that all

⁵⁷ There may be significant variation around these assumed average stay durations depending on individual students' circumstances, such as country of origin, parental income etc.

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 relatively small number for EU undergraduate students reflects the fact 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.

Table 21 Assumed average stay durations (in weeks) for non-UK domiciled students, by domicile and level of study

Level of study	Domicile	
	EU (non-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)

A3.2.3 Non-tuition fee income per student

In Table 22, we provide more detailed information on the estimates of the **non-fee income** associated with EU and non-EU International students in the 2015-16 cohort of Russell Group university students over the course of their studies.

Table 22 Non-fee income per student (present value over total study duration) by qualification level, domicile and study mode

Level of study	Domicile	
	EU (non-UK)	Non-EU
Full-time		
Other undergraduate	£16,500	£19,500
Foundation Degree		
Undergraduate degree	£32,500	£34,500
Other postgraduate	£16,400	£15,800
Higher degree (taught)	£13,300	£13,300
Higher degree (research)	£37,300	£36,800
Part-time		
Other undergraduate	£51,900	£45,100
Foundation Degree	£47,500	£51,100
Undergraduate degree	£112,800	£126,000
Other postgraduate	£65,700	£64,400
Higher degree (taught)	£60,900	£60,900
Higher degree (research)	£143,500	£137,000
Average		
Other undergraduate	£28,700	£28,500
Foundation Degree	£47,500	£51,100
Undergraduate degree	£32,500	£34,500
Other postgraduate	£31,200	£22,900
Higher degree (taught)	£16,000	£13,900
Higher degree (research)	£43,100	£39,000

Note: All estimates are presented in 2015-16 prices, discounted to present net present values, and rounded to the nearest £100. Gaps may arise where there are no students in the 2015-16 cohort expected to complete the given qualification (of the given characteristics).

Source: London Economics' analysis



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