The UK's tax revenues from international students post-graduation

Report for the Higher Education Policy Institute and Kaplan International Pathways

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About the Higher Education Policy Institute

The Higher Education Policy Institute (HEPI) was established in 2002 to influence the higher education debate with evidence. We are UK-wide, independent and non-partisan. We are funded by organisations and universities that wish to see a vibrant higher education debate as well as through our own events. HEPI is a company limited by guarantee and a registered charity.

About Kaplan International Pathways

Kaplan International supports the higher education sector worldwide in achieving its internationalisation and diversity ambitions. It specialises in on- and off-campus pathway programmes for international students and innovative growth solutions such as Transnational Education, online delivery, targeted direct student recruitment, and student residences.

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Foreword

The commitment to reduce net inward migration to the tens of thousands is almost a decade old. Although the inclusion of students within this goal has been opposed by many policymakers, all universities and a majority of voters, it has had a dampening effect on the demand for, and supply of, places. The number of higher education students from other countries arriving in the UK has continued to grow, but it has done so far more slowly than in the past as well as more slowly than in other countries. As a result, our university campuses are less diverse than they otherwise would have been, reducing the educational, economic and soft power benefits of hosting students from other countries.

HEPI and Kaplan International Pathways are jointly committed to improving the quality of debate about international students, using evidence. Four years ago, we jointly published polling by YouthSight showing higher education applicants relish the opportunity to study alongside people from other countries. Soon after the Brexit referendum, we commissioned London Economics to look at the likely impact of Brexit on the number of students coming to study in the UK from other EU countries. This considered changes to tuition fee loan entitlement but also the effect of the reduction in the value of the pound. In 2018, we followed this with a much larger piece of work, again produced for us by London Economics, measuring the huge net economic impact of international students to the UK. This report also broke the positive headline numbers down for every parliamentary constituency in the UK.

We were disappointed that the Migration Advisory Committee's report on international students was so selective in its use of such evidence. But we welcome the Committee's recognition that debate needs to continue and its call for new evidence to be produced. One particular gap in knowledge is over the fiscal contribution of people who come to the UK to study and then stay here to work afterwards. In other countries, such a contribution is seen as a key part of the benefit of hosting international students. In the UK, in recent times, we have taken the opposite approach: assuming that international student numbers should be reduced and that post-study work should be discouraged through tougher rules.

So the overarching goal of this paper is to fill in the most important gaps in knowledge by showing the tax and National Insurance contributions of international students who stay in the UK to work after their studies, broken down by where the students have arrived from and what type of course they have chosen.

At the outset, we expected the final numbers to be positive, and they are – very positive. But we had fewer preconceptions on other important questions. Perhaps the international students who chose to stay in the UK to work were simply taking jobs from home graduates? We show conclusively there is no evidence for this. We also consider the impact of the reduction in post-study work rules, implemented in

2012, which has – sadly – meant a loss of £150 million a year to the Treasury, and is now approaching a billion pounds in total.

The higher education sector and the whole economy faces unprecedented uncertainty. Our policies on international students need to change particularly in relation to post-study work for the reasons outlined in the pages that follow, to the benefit of students, taxpayers and educational diversity.

Nick Hillman
Director

Higher Education Policy Institute (HEPI)

Linda Cowan
Senior Vice President, UK and Middle East

Kaplan International Pathways

Executive Summary

Background

The Migration Advisory Committee's report on the contribution of international students to the UK economy following completion of their studies (2018)[1] included the following recommendation (our emphasis):

> ***"We do not recommend a separate post-study work visa though our proposals on automatic leave to remain at the end of study have some of the same effect**. One reason for not recommending a longer post-study work period is that the **earnings of some graduates who remain in the UK seem surprisingly low** and it is likely that those who would benefit from a longer period to find a graduate level job are not the most highly skilled. **We accept that the evidence for this is not as strong as it could be:** one of our recommendations is that **there is a proper evaluation, by us or others, of what students are doing in the post-study period** and when they move onto other work permits. **If, after that evaluation, a longer post-study work period seems warranted our advice could change."***

London Economics has now produced three core pieces of evidence for HEPI and Kaplan addressing the contribution of international students to the UK higher education sector – and the wider UK economy more generally:

- The first analysis (London Economics (2017)) addresses the determinants of international students **coming to the United Kingdom to undertake higher education qualifications**;
- The second report (London Economics (2018)) assesses both the costs and benefits to the public purse associated with hosting international students **during their period of study**[2]; and
- This third study addresses the **post-graduation labour market benefits** to HM Treasury associated with international students.

On the basis of the analysis we have presented in this report, **we fundamentally disagree with the Migration Advisory Committee's conclusions and recommendations.**

[1] Migration Advisory Committee (2018).

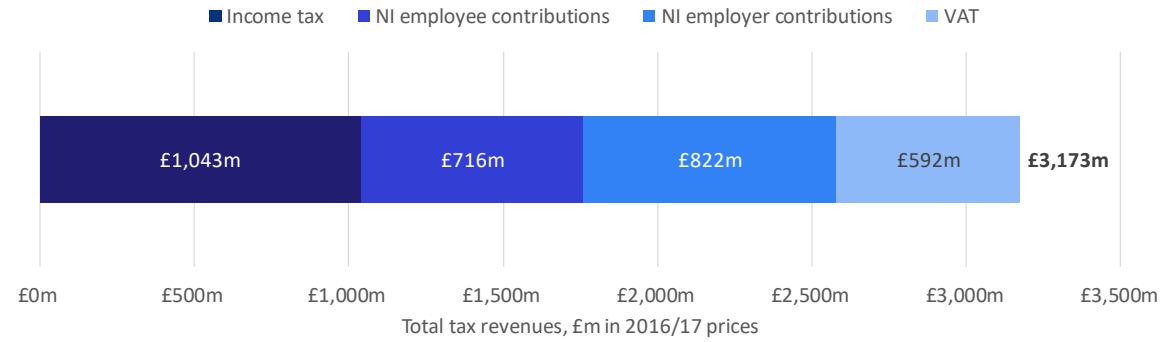
[2] This analysis provides evidence that international students make a huge economic contribution to the UK economy *during* their studies that exceeds – by a factor of 10 - the Exchequer costs of hosting them.

Results

There are sizeable economic contributions made by those international graduates entering and remaining in the UK labour market *post-graduation*. Overall, the analysis illustrates that:

- The total post-graduation contribution to the UK Exchequer made by international students in the 2016/17 cohort is estimated to be **£3,173 million** in present value terms (see Table 1 and Figure 1).
- This is made up of **£1,043 million** in income tax, **£716 million** in employee National Insurance contributions, **£822 million** in employer National Insurance contributions and **£592 million** in VAT contributions.
- The largest component was contributed by first degree holders (**£1,119 million**) and Master's graduates (**£1,591 million**), with a further **£300 million** contributed by PhD graduates and **£163 million** contributed by international students obtaining other undergraduate qualifications.
- By domicile, EU-domiciled graduates in the cohort are expected to generate **£1,181 million** for the UK Exchequer (**£108,000** on average per graduate), with non-EU-domiciled graduates generating **£1,992 million** (**£104,000** on average per graduate).

Figure 1 Total post-graduation tax revenues associated with international students in the 2016/17 cohort, in £m



Note: Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices, discounted to net present values, and totals may not add up due to rounding. ***Source: London Economics' analysis***

Table 1 Post-graduation tax revenues associated with 2016/17 international student cohort – by level of study and domicile (per graduate and £m total)

Level of study	Average £ per graduate			Total		
	EU	Non-EU	Average	EU	Non-EU	Total
Other undergraduate	£99,000	£98,000	**£98,000**	£58m	£105m	**£163m**
First degree	£97,000	£96,000	**£97,000**	£554m	£565m	**£1,119m**
Higher degree (taught)	£122,000	£105,000	**£109,000**	£451m	£1,140m	**£1,591m**
Higher degree (research)	£133,000	£132,000	**£132,000**	£119m	£181m	**£300m**
Average	**£108,000**	**£104,000**	**£106,000**			
Total				**£1,181m**	**£1,992m**	**£3,173m**

Note: Average values per graduate are rounded to the nearest £1,000 and are weighted by the respective total number of graduates in UK employment over the 10-year period post-graduation. Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding. ***Source: London Economics' analysis***

The analysis also clearly illustrates that:

- There are **acute skills shortages** in many sectors of the UK economy (in both the public and private sectors). **Rather than displacing domestic graduates from these opportunities, international graduates play a key role in filling the vacancies available and reducing these labour market gaps**.
- The adverse taxation impact suffered by HM Treasury associated with the restriction of post-study work rights for non-EU-domiciled students announced in 2011 is estimated to be **£150 million per cohort**. Given the policy has been in operation for 5 years, the total negative economic impact on HM Treasury in terms of foregone taxation receipts is in the region of **£¾ billion**.

Conclusion

This report provides the evidence that the Migration Advisory Committee has requested on post-graduation outcomes achieved by international students.

In light of the **huge taxation contribution** made by international students, the impact of international students on **mitigating skills gaps** in the UK labour market, as well as the **economic damage** that has occurred as a result of **post-study visa restrictions, the need for a longer post-study work period for international students *has been* clearly evidenced.**

The advice provided by the Migration Advisory Committee should change accordingly.

1 Introduction and context

The Migration Advisory Committee

The Migration Advisory Committee's report on the contribution of international students to the UK economy (Migration Advisory Committee (2018)) included the following recommendation (emphasis added):

> ***"We do not recommend a separate post-study work visa though our proposals on automatic leave to remain at the end of study have some of the same effect**. One reason for not recommending a longer post-study work period is that the **earnings of some graduates who remain in the UK seem surprisingly low** and it is likely that those who would benefit from a longer period to find a graduate level job are not the most highly skilled. **We accept that the evidence for this is not as strong as it could be:** one of our recommendations is that **there is a proper evaluation, by us or others, of what students are doing in the post-study period** and when they move onto other work permits. **If, after that evaluation, a longer post-study work period seems warranted our advice could change."***

We have serious concerns about the robustness of the MAC analysis, and as a result, the conclusions and recommendations provided to the Home Office.

What other recent analysis has been undertaken?

London Economics has produced three core pieces of evidence for HEPI and Kaplan addressing the contribution of international students to the UK higher education sector – and the wider UK economy more generally:

- The first analysis (London Economics (2017)) addresses the determinants of international students **coming to the United Kingdom** to undertake higher education qualifications;
- The second report (London Economics (2018)) assesses both the costs and benefits to the public purse associated with hosting international students **during their period of study**[3]; and
- This current study addresses the **post-graduation labour market benefits** to HM Treasury associated with international students.

[3] This analysis provides evidence that international students make a huge economic contribution to the UK economy *during* their studies that exceeds – by a factor of 10 - the Exchequer costs of hosting them.

What have we done here?

It is clear that a small but significant proportion of international graduates remain in the United Kingdom post-graduation to gain additional skills and experience, whilst others return to the United Kingdom after a number of years elsewhere. This analysis offers an extension to London Economics' previous studies, by considering (some of) the benefits to the UK Exchequer associated with international graduates entering the UK labour market after leaving UK higher education.[4]

To estimate these post-graduation outcomes, we use the most recent administrative information from the **Longitudinal Educational Outcomes (LEO)**[5] dataset to assess the proportion of EU-domiciled[6] and non-EU-domiciled graduates that are in **sustainable employment** in the United Kingdom in the first 10 years post-graduation, their median **earnings**, and the **additional taxation receipts** accrued by the UK Exchequer as a result of their employment.[7]

What else have we looked at?

In addition to the earnings and tax contributions of international graduates, we also present the earnings achieved by UK-domiciled graduates. Combining this data on relative earnings between the two groups with information on sectoral skills shortages (based on Home Office Tier 2 visa applications), the analysis illustrates the **extent to which international graduates are competing with UK graduates in industries with skills shortages**.

We also estimate the labour market impact associated with the restriction of post-study work rights for non-EU-domiciled students in April 2012.

[4] This assessment of the labour market benefits of international students post-graduation is comparable to a number of other countries (for instance, Germany) where this information is routinely investigated.

[5] The Longitudinal Educational Outcomes data contains information on publicly funded vocational qualification attainment from the **Individualised Learner Record;** all school enrolment and achievement in national tests undertaken as part of compulsory schooling from the **National Pupil Database;** data covering higher education records and including returns from all higher education institutions from the Higher Education Statistics Agency; employment spells (P45 records) and annual earnings (P14 records) from **HM Revenue and Customs**; and information on benefits spells is provided by the **Department for Work and Pensions**.

[6] Throughout this analysis, 'EU-domiciled' refers to those individuals that originate from one of the 27 European Union Member States *excluding* the United Kingdom.

[7] Although the data set used for the analysis is the same as that which the Migration Advisory Committee used as part of its 2018 Report, the analysis here considers the post-graduation outcomes 10 years post qualification (rather than 2 years).

Same data, better analysis and different conclusion

On the basis of the analysis we have presented in this report – and using the same data source as the Migration Advisory Committee – **we arrive at fundamentally different conclusions and recommendations.**

1.1 Scope and caveats

1.1.1 Timeframe under consideration

Given the data available on post-graduation labour market outcomes contained in the **Longitudinal Educational Outcomes** data (see footnote 5), the analysis presented here focuses on the employment and earnings outcomes achieved by international graduates in the UK labour market in the **first 10 years post-graduation only**.[8] Therefore, the analysis **underestimates** the total economic contribution of international students remaining in the UK labour market after graduating. It is probable that a substantial proportion of these graduates will remain in the United Kingdom for a significant length of time beyond the 10 years. Furthermore, the earnings and associated taxation receipts identified in this analysis are generally associated with graduates at the **start of their working lives**. Given the positive age-earnings relationship identified in the UK labour market (up until the late 40s for men in particular) for those graduates continuing to be active in the UK labour market, their individual contributions are likely to increase over time.

In addition, the analysis presented here **only considers the taxation receipts accrued by the UK Exchequer after graduation**. There is **no attempt to estimate the tax contribution of international students during study**. This applies to EU-domiciled students (where there are no working restrictions during study), but also to non-EU-domiciled students (where the right to work during both term time and vacations is permitted, but with some restrictions).

1.1.2 Type of economic impact considered

Based on the information relating to the earnings of international graduates contained within the LEO database, the analysis estimates the **income tax**, **employee** and **employer National Insurance contributions**, and associated **VAT** paid by international graduates.

However, it is important to note that:

- The analysis **does *not* consider the wider economic contribution of international graduates** – either **directly** as a result of their expenditures

[8] Compared to just 2 years considered by the Migration Advisory Committee.

made from their (post-tax) disposable income – or **indirectly** as these expenditures ripple through the supply chains of those organisations providing consumer goods and services[9]; and

- The analysis focuses only on the Exchequer *benefits* in terms of taxation receipts. Unlike the previous analysis undertaken (London Economics, 2018), **we make no attempt to estimate the costs incurred by the public purse** associated with hosting these graduates in the UK (e.g. in relation to National Health Insurance, social security, policing etc.).

1.1.3 Data caveats

There are **four core limitations** associated with the use of the Longitudinal Education Outcomes data for the analysis.

First, the aggregated LEO data for international graduates is available for individuals who attended **English higher education institutions only**. As such, given that there is currently no comparable information available for graduates who attended institutions in Scotland, Wales and Northern Ireland, we have extrapolated the LEO earnings and employment data to those international graduates who attended institutions in other home nations. In other words, we have assumed the same labour market outcomes for graduates who studied at higher education institutions in other home nations as for those who studied in England.

Secondly, the analysis is based on a mix of **historical cohorts of international graduates from English higher education institutions**. For example, to understand the earnings and employment outcomes achieved 10 years post-graduation (in the 2015/16 tax year), we rely on individuals who completed their studies in the 2004/05 academic year. Similarly, for estimating earnings and employment outcomes 5 years post-graduation, we rely on the outcomes associated with individuals who graduated from English institutions in 2009/10. We then apply these earnings profiles (i.e. based on historical earnings data – and subsequently adjusted for inflation and projected earnings growth) to the most recent cohort of international students (i.e. **2016/17**).[10]

[9] These wider economic impacts were not considered, as the focus of the analysis is on the **Exchequer benefits** associated with international students' post-graduation labour market outcomes.
[10] Based on the data available from the Higher Education Statistics Agency at the time of writing.

Third, the LEO data contain earnings and employment data for graduates in possession of postgraduate degrees[11] and first degrees[12], but **do not provide information on individuals in possession of 'other' undergraduate qualifications**.[13] In the absence of any other information, we have assumed that the outcomes achieved by individuals completing other undergraduate qualifications are comparable to those of individuals completing first degree qualifications.

Finally, for certain components of the analysis – in particular the analysis of the relative earnings achieved by EU-domiciled and non-EU-domiciled graduates by subject area – the **sample sizes may be relatively small**. In those cases where the size of the underlying cohort is less than 11, the relevant information is not disclosed in the LEO data.[14] However, there may be cases where the estimates are based on only between 11 and 20 individuals, and some care should be taken with respect to these cells.

1.2 Report structure

The report is set out as follows. In **Section 2**, we outline the methodological approach to estimating the number of international students entering higher education in the United Kingdom in 2016/17; the number of students expected to complete their qualifications; and subsequently, the number entering sustainable employment in the UK labour market. We then present the methodology used to assess the earnings achieved by international graduates in the first 10 years post-graduation, and the associated tax receipts generated as a result of this employment. In **Section 3**, we present our main results, while **Section 4** provides a discussion and conclusion.

[11] Specifically, according to the LEO definitions, 'graduates were broadly grouped into Level 7 and Level 8, more commonly known as Master's degrees and Doctoral degrees respectively. Enhanced undergraduate courses […] that give you a postgraduate-level qualification are not included in our Level 7 population. These degree courses are included in our first degree population as you do not need to have completed a Level 6 qualification to apply for these courses. Level 7 data was also broken down into Level 7 (taught) for taught Master's degrees and Level 7 (research) for research Master's degrees. In addition, Postgraduate Certificates in Education and Master's in Business Administration were also split from the overall Level 7 (taught) numbers. For subject level breakdowns, these two courses were also split from the other 23 subject categories'. See Department for Education (2018b) for more information.

[12] Specifically, the first degree qualification category in the LEO data covers 'qualifications commonly known as bachelor's degrees and includes postgraduate Bachelor's degrees at H level as well as integrated undergraduate/postgraduate taught Master's degrees on the enhanced/extended pattern. Not all undergraduate courses are included: for example, the Professional Graduate Certificate in Education (PGCE), foundation degrees and Higher National Diplomas (HND) are excluded'. See Department for Education (2018a) for more information.

[13] Other undergraduate qualifications include those higher education qualifications that do not constitute full first degrees. These qualifications include, for instance, Higher National Certificates and Diplomas, Foundation Degrees and other non-degree level credit bearing higher education learning.

[14] See Department for Education (2018a and 2018b) for more information on disclosure in the LEO data.

2 Methodology

The assessment of the tax revenues accrued by the UK Exchequer resulting from international graduates staying in the United Kingdom and entering the UK labour market post-graduation involved **three core steps**:

1. Based on the 2016/17 cohort of international students **starting** qualifications at higher education institutions (i.e. 'starters'), assessing the number of these students expected to **complete** their qualifications (i.e. 'completers' / graduates), and subsequently, assessing the number of these graduates expected to **enter employment** in the United Kingdom (focusing on the first 10 years post-graduation);
2. Assessing the **annual earnings** of these international graduates in the UK labour market; and
3. Estimating the **annual UK Exchequer revenues** associated with these graduates' **income tax**, **National Insurance** and **VAT** contributions, as well as the **National Insurance contributions of their employers**.

The following sections outline each of these steps in more detail.

2.1 The 2016/17 cohort of international students

To estimate the number of international graduates from the 2016/17 cohort expected to enter employment in the UK, we combined information on:

- The number of first-year international students commencing higher education qualifications at UK higher education institutions in the 2016/17 academic year;
- Expected completion rates; and
- Data on the proportion of international graduates[15] entering employment in the UK labour market post-graduation (for the first 10 years post-graduation).

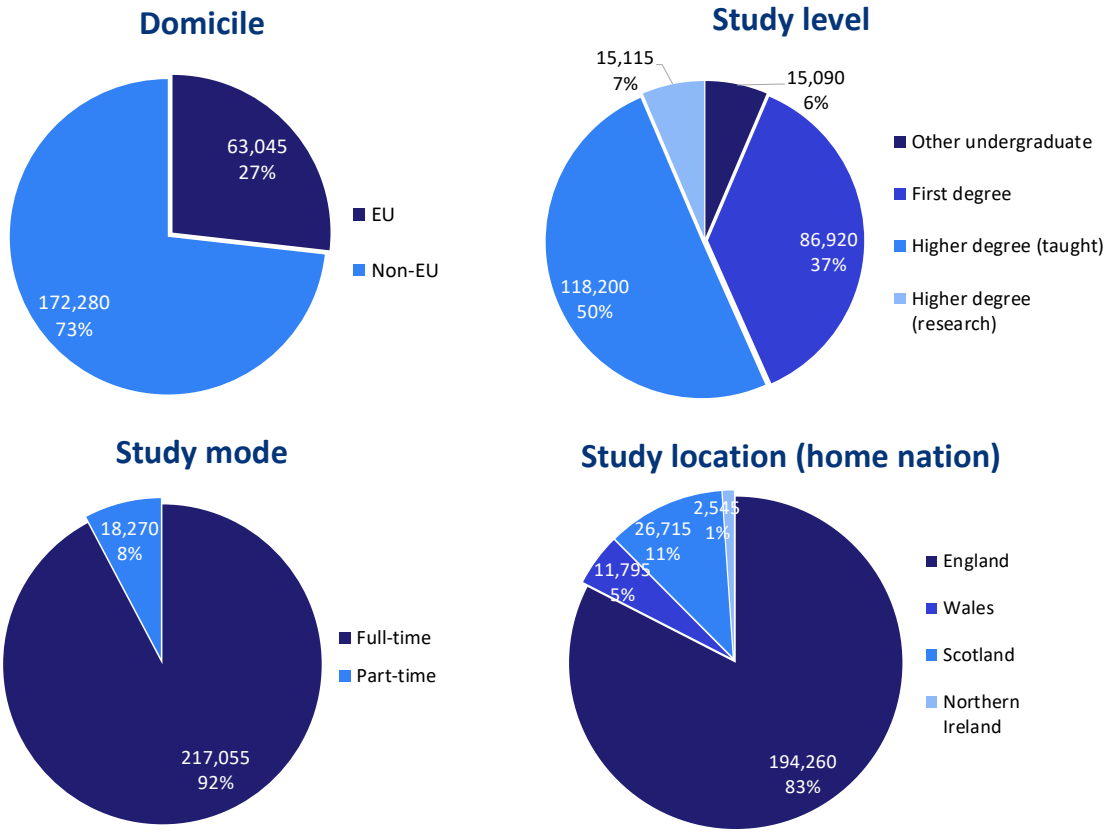
2.1.1 International students entering UK higher education

The United Kingdom has long been an attractive destination for international students. Based on data published by the Higher Education Statistics Agency (HESA), in 2016/17, there were a total of **442,375** EU-domiciled and non-EU-domiciled

[15] Where 'international graduates' refers to students from non-UK countries who completed higher education qualifications in the UK (i.e. our analysis excludes any graduates who completed their higher education qualifications outside the UK).

students enrolled at UK higher education institutions[16], of which **235,325** were first-year students (i.e. the 2016/17 cohort that forms the basis for our analysis).[17]

Figure 2 Profile of international first-year students in 2016/17 by domicile, study level, study mode, and location of study



Note: All student numbers are rounded to the nearest 5, so that there might be small differences in the total number of students between the different figures.

Source: London Economics' analysis of HESA (2018a)

Figure 2 presents a breakdown of these first-year international students by **domicile**, **study level**, **mode** and **location** of higher education provider:

- In terms of **domicile**, **73%** of these students (**172,280**) were originally from non-EU countries, while the remaining **27%** (**63,045**) were from the other 27 EU Member States.
- In terms of **study mode**, the vast majority of students (**92%**, **217,055**) were undertaking qualifications on a full-time basis, with only **8%** (**18,270**) undertaking part-time studies.

[16] See HESA (2018a).

[17] Note that the HESA 'first year marker' identifies those international students for whom it is their first year at a particular university and not necessarily first year on a particular course. A number of 'new' EU and non-EU undergraduates (i.e. according to their first-year marker) may be entering into their second or third year of a particular undergraduate course.

- Considering the **level of study**, **50%** of students (**118,200**) in the 2016/17 cohort of international students were enrolled in **higher taught degrees** (i.e. predominantly postgraduate Master's degrees), with a further **7%** (**15,115**) undertaking **higher degrees by research**. **37%** of students in the cohort (**86,920**) were undertaking undergraduate **first degrees**, with the remaining **6%** (**15,090**) enrolled in **other undergraduate qualifications**.

In terms of **location of study**, **83%** of international students attended higher education institutions in **England**, with **5%**, **11%** and **1%** attending **Welsh, Scottish** and **Northern Irish** providers respectively.[18]

2.1.2 International students completing UK higher education

The next step of the analysis involved assessing the number of students in this cohort expected to **complete** their qualification – and in what **timeframe**.

Following the approach in our previous report on the economic impact of international students *during* their period of study (see London Economics, 2018), we used data on non-continuation rates for UK-domiciled full-time and part-time first undergraduate students one year or two years after entry, respectively, in aggregate and broken down by young and mature entrants.[19,20] Combining this information with assumptions on the average duration by qualification level (see below), we calculated the proportion of students expected to continue their studies each year (for every qualification level), and ultimately **expected to complete their studies in the final year**.

In terms of **study duration**, following our previous approach, for full-time students, we assumed a typical study duration of **3 years** for full-time first degrees and higher research degrees, and a **1 year** duration for higher taught degrees and 'other' undergraduate qualifications. To achieve comparable durations for part-time students, we adjusted these full-time study durations for the average study intensity amongst part-time students (estimated at **40%**)[21]. Hence, we estimated an average

[18] A more detailed breakdown of the cohort is provided in Table 11 in Annex A2.1.
[19] See HESA (2018b). The non-continuation rates are based on the proportion of students no longer enrolled in HE one or two years after study, respectively. Hence, they implicitly take account of students who 'switch' between qualifications, or transfer to a different institution, as 'continuing' students.
[20] Note that, as the HESA data provide no comparable information for non-UK-domiciled students, we have assumed that their completion rates are identical to those estimated for UK-domiciled students. Further note that the HESA information provides separate non-continuation rates for first degree and other undergraduate students but excludes students at postgraduate level. To achieve results for postgraduate students, we assume that students undertaking higher research or taught degrees post the same non-continuation rates as *mature* first degree students.
[21] Given that HESA does not publish official statistics on part-time study intensity, we instead use previous estimates outlined in Higher Education Policy Institute (2013), including information on the number of undergraduate part-time students in English institutions broken down into different study intensity bands.

study duration of **8 years** for part-time first degrees and higher research degrees, respectively, and a **3-year** duration for part-time higher taught degrees and other undergraduate qualifications.

Table 2 presents the resulting study durations and assumed continuation rates at the end of each year, as well as the final-year completion rates (shaded in dark blue), derived from the HESA data. To take an example, we assumed that of those students starting a full-time first degree at a UK higher education institution in 2016/17, approximately **93%** will progress into the second year of study as intended (with the remaining **7%** discontinuing their studies), **86%** were expected to complete the second year, and **79%** were expected to complete their degree as intended (after 3 years of study).

Table 2 Assumed total study duration and continuation rate – by academic year, level and mode of study

Study mode and year	Study level			
	Other undergraduate	First degree	Higher degree (taught)*	Higher degree (research)*
Full-time students				
Study duration	**1 year**	**3 years**	**1 year**	**3 years**
2016/17 (Year 1)	87%	93%	88%	88%
2017/18		86%		78%
2018/19		79%		69%
2019/20				
2020/21				
2021/22				
2022/23				
2023/24 (Year 8)				
Part-time students				
Study duration	**3 years**	**8 years**	**3 years**	**8 years**
2016/17 (Year 1)	83%	83%	84%	84%
2017/18	69%	69%	70%	70%
2018/19	58%	58%	59%	59%
2019/20		48%		49%
2020/21		40%		41%
2021/22		33%		34%
2022/23		28%		29%
2023/24 (Year 8)		23%		24%

Note: * Based on mature entrants to first degrees.
Shaded areas indicate the proportion of students expected to complete their intended qualification (following the assumed average study duration for each level and mode of study).
Source: London Economics' analysis of HESA (2018 a, b)

Applying the information on completion rates and expected study duration to the number of 'starters' in the 2016/17 cohort, Table 3 presents the expected number

Based on this information, we estimate that part-time students study at an intensity equivalent to approximately **40%** that of full-time students (assuming the same study intensity across students of all domiciles, studying anywhere in the UK, and at either undergraduate or postgraduate level).

of students in the cohort expected to complete their studies at the end of their assumed study duration (shaded in dark blue) – i.e. the number of graduates. Taking the same example as above, we assume that, of the **86,270** students commencing full-time first degrees in 2016/17, **68,280** (i.e. **79%**, as above) will complete their qualification (i.e. graduate) as intended (after 3 years of study).

Table 3 Number of international students in the 2016/17 cohort expected to continue and complete their studies – by academic year, level and mode of study

Study mode and year	Study level			
	Other undergraduate	First degree	Higher degree (taught)	Higher degree (research)
Full-time students				
# of starters*	**6,425**	**86,270**	**110,270**	**14,090**
2016/17 (Year 1)	5,565	79,800	97,475	12,455
2017/18		73,815		11,010
2018/19		68,280		9,735
2019/20				
2020/21				
2021/22				
2022/23				
2023/24 (Year 8)				
Part-time students				
# of starters*	**8,665**	**650**	**7,930**	**1,025**
2016/17 (Year 1)	7,215	545	6,635	855
2017/18	6,005	450	5,550	720
2018/19	5,000	375	4,640	600
2019/20		315		500
2020/21		260		420
2021/22		220		355
2022/23		185		295
2023/24 (Year 8)		150		245

Note: All student numbers are rounded to the nearest five.
Shaded areas indicate the number of students expected to complete their intended qualification (following the assumed average study duration for each level and mode of study). Number of starters refers to the number of international students who commenced their studies at UK higher education institutions in 2016/17.

2.1.3 International graduates entering the UK labour market

Finally, to estimate the number of international graduates from the 2016/17 cohort expected to enter the UK labour market, we made use of LEO data on the employment outcomes of previous cohorts of international graduates, published by the Department for Education.[22] Specifically, we made use of information on the **proportion of international graduates** who had studied at English higher education

[22] See Department for Education (2018a) and Department for Education (2018b) for information on undergraduate and postgraduate qualifications, respectively.

institutions and who were **in sustained employment**[23, 24] in the United Kingdom in the 2015/16 tax year – separately by domicile (i.e. EU-domiciled or non-EU-domiciled)[25] and level. The data are separated into different historical cohorts, differentiating between students who graduated from English higher education institutions in 2004/05, 2009/10, 2011/12 and 2013/14, presenting their graduate employment outcomes at **10, 5, 3 and 1 year(s) post-graduation**, respectively.

We use these UK employment outcomes achieved by *historical* cohorts of international graduates from English higher education institutions to represent the *expected* likelihood of being in sustained UK employment for graduates from the 2016/17 cohort of international students studying anywhere in the UK. Therefore, our analysis implicitly assumes that international students in the 2016/17 cohort have the same personal, educational and labour market characteristics as the historical cohorts of international students on which the underpinning LEO data are based. In addition, since we apply the data to students studying anywhere in the UK, our analysis assumes (given the lack of available data for other home nations) that the employment outcomes of graduates from higher education institutions in other home nations are similar to those achieved by graduates from English institutions.

Figure 3 presents the relevant LEO data on the proportion of international graduates in sustained UK employment by level of study[26], domicile and year post-graduation (where we have used a weighted average to fill the gaps and arrive at a full series for up to 10 years post-graduation).

[23] Outcomes for graduates are presented for all graduates within the specified academic years (i.e. including graduates who left the UK after completing their studies and could thus not be matched to the required UK administrative data on employment, income and benefits). Here, we focus on the proportion of graduates who were in sustained UK employment *only* (i.e. excluding any further study), based on the fact that the required information on median earnings (see Section 2.2) was only available for individuals in this category (and not for individuals who were working while in further study).

[24] Based on the LEO definitions, graduates are considered to be in sustained employment 'if they were recorded as being employed in five out of the six months between October and March in the tax year, for example, five out of six months between October 2010 and March 2011 for the 2010/11 tax year. Additionally, graduates are counted in sustained employment if they have returned a Self-Assessment tax return stating that they have received income from self-employment and their earnings from a Partnership or Sole-Trader enterprise are more than £0 (profit from self-employment)'. See Department for Education (2018a) for more information.

[25] i.e. by domicile prior to entry into UK higher education.

[26] Note that while the LEO data cover first degrees only, we apply the same assumptions to graduates who completed 'other undergraduate' qualifications (for lack of any available data on the actual employment outcomes of these types of graduates). In terms of higher degrees, the LEO data provide separate breakdowns for taught and research qualifications at Level 7 (i.e. Master's degrees), and a single category for Level 8 (i.e. Doctorate degrees). The 'higher degree (taught)' category presented here is based on the original data for Level 7 taught qualifications, while the 'higher degree (research)' data constitute weighted averages across Level 7 research qualifications and all Level 8 qualifications (weighted by the number of graduates in the LEO data).

Considering the breakdown by domicile, driven by free movement across EU Member States and relative geographical proximity, graduates from EU Member States are more likely to be in sustained UK employment compared to graduates from non-EU countries – at all qualification levels. For example, the analysis indicates that at undergraduate level, **18%** to **28%** of EU-domiciled graduates are in sustained UK employment in the first 10 years after completing their studies, compared to **9%** to **16%** for non-EU-domiciled graduates.

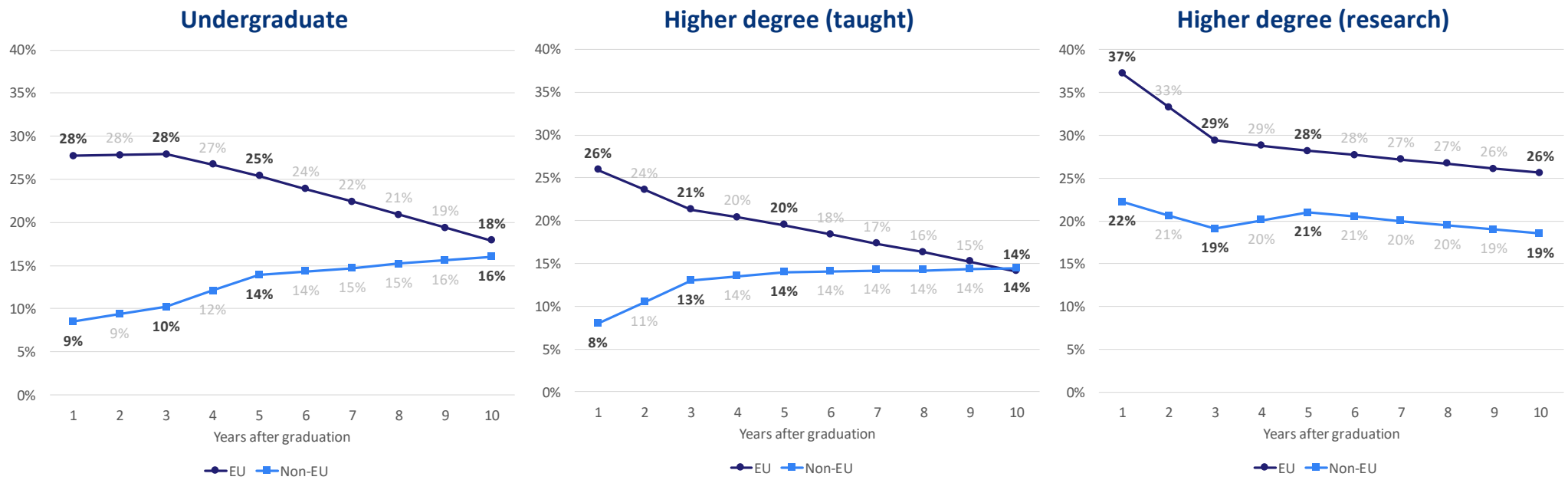
Further note that, while the proportions of EU graduates in sustained UK employment *decrease* with the number of years elapsed since graduation, the opposite *appears* to be true for non-EU graduates (at undergraduate and higher degree (taught) level). It is likely that these patterns do **not** accurately reflect the migration patterns of non-EU graduates, but that they are instead driven by the **decision (in 2011) to cease the automatic ability of non-EU students to undertake two years of post-study work in the UK** from the Tier 1 Post-Study Work (PSW) visa system. This restriction to the visa system did not affect earlier cohorts (on which the employment outcomes between 5 and 10 years post-graduation are based), thus resulting in the observed upward-sloping curves.[27]

After multiplying the number of students in the cohort expected to complete their qualifications (Table 3) by the respective probabilities of graduates being in sustained UK employment (separately by year, study level, study mode[28] and domicile), Table 4 presents the expected number of international graduates from the 2016/17 cohort in sustained UK employment (by tax year, level and mode). Figure 4 presents this information broken down by student domicile (only).

[27] In the case of undergraduate qualifications, the analysis suggests that there has been a **2 percentage point** increase in the proportion of non-EU-domiciled graduates achieving sustained employment in the UK labour market between 5 and 10 years post-graduation. If this trend persists, then for the more recent cohorts, the proportion of graduates in sustained UK employment is likely to be closer to **10-12%** (compared to the current **14-16%**).

[28] Note that the LEO data do not distinguish by mode of study, so we assume the same likelihood of being in sustained UK employment across graduates who studied on a full-time and part-time basis.

Figure 3 Proportion of international graduates in sustained UK employment – by year after graduation, level of study and domicile



Note: The original data were available for 1, 3, 5 and 10 years post-graduation (black number labels), and we used a linear interpolation (weighted average) to fill in the gaps (grey labels) and achieve a full time series.
The undergraduate LEO data cover first degrees as well as postgraduate bachelor's degrees at level H as well as integrated undergraduate/postgraduate taught Master's degrees on the enhanced/extended pattern.
In terms of higher degrees, the LEO data provide separate breakdowns for taught and research qualifications at Level 7 (i.e. Master's degrees), and a single category for Level 8 (i.e. Doctorate degrees). The 'higher degree (taught)' category presented here is based on the original data for Level 7 taught qualifications, while the 'higher degree (research)' data constitute weighted averages across Level 7 research qualifications and all Level 8 qualifications (weighted by the number of graduates in the LEO data).
Source: London Economics' analysis of Department for Education (2018a, b)

Table 4 Number of international graduates from the 2016/17 cohort in sustained UK employment – by tax year, level and mode of study

Year	Full-time students				Part-time students				Total
	Other undergraduate	First degree	Higher degree (taught)	Higher degree (research)*	Other undergraduate	First degree	Higher degree (taught)	Higher degree (research)	
# of completers*	**5,565**	**68,280**	**97,475**	**9,735**	**5,000**	**150**	**4,640**	**245**	**191,090**
2016/17	Studying	Studying	Studying	Studying	Studying	Studying	Studying	Studying	**0**
2017/18	680	Studying	10,940	Studying	Studying	Studying	Studying	Studying	**11,620**
2018/19	720	Studying	12,530	Studying	Studying	Studying	Studying	Studying	**13,250**
2019/20	755	10,460	14,130	2,610	700	Studying	745	Studying	**29,400**
2020/21	830	10,880	14,370	2,380	740	Studying	765	Studying	**29,965**
2021/22	895	11,255	14,610	2,165	765	Studying	780	Studying	**30,470**
2022/23	900	11,805	14,500	2,220	815	Studying	770	Studying	**31,010**
2023/24	895	12,280	14,385	2,260	865	Studying	765	Studying	**31,450**
2024/25	905	12,090	14,210	2,210	855	30	745	70	**31,115**
2025/26	910	11,900	14,100	2,160	845	30	725	65	**30,735**
2026/27	910	11,765	13,985	2,110	845	30	705	60	**30,410**
2027/28	-	11,575	-	2,065	835	35	680	60	**15,250**
2028/29	-	11,385	-	2,015	830	30	665	60	**14,985**
2029/30	-	-	-	-	-	30	-	60	**90**
2030/31	-	-	-	-	-	30	-	60	**90**
2031/32	-	-	-	-	-	30	-	60	**90**
2032/33	-	-	-	-	-	25	-	60	**85**
2033/34	-	-	-	-	-	25	-	50	**75**
2034/35	-	-	-	-	-	-	-	-	**0**
2035/36	-	-	-	-	-	-	-	-	**0**
Average p.a.†	**840**	**11,535**	**13,775**	**2220**	**810**	**30**	**735**	**60**	**30,000**

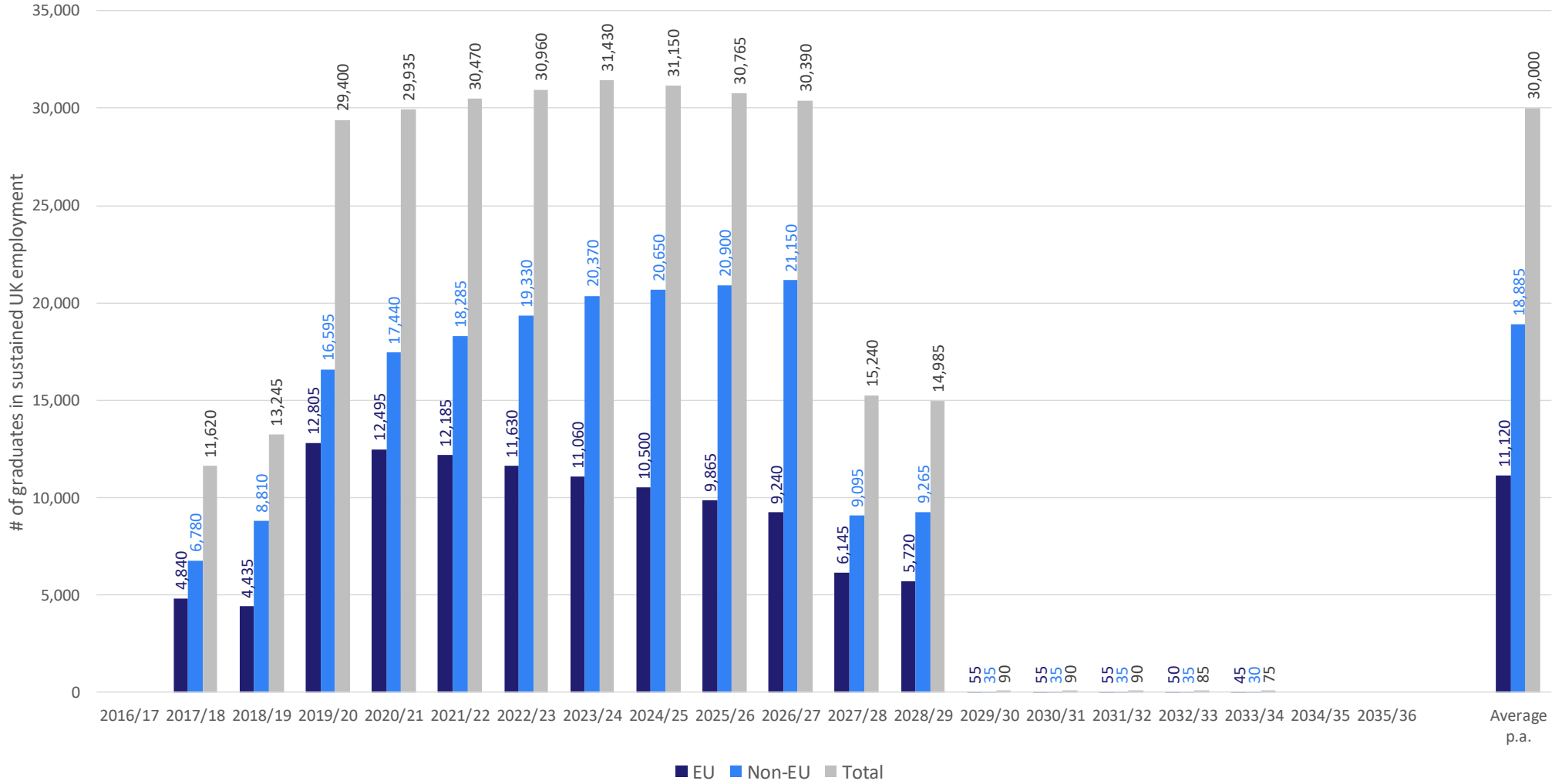
Note: All numbers are rounded to the nearest 5.

* Number of completers refers to the number of international students who commenced their studies at UK higher education institutions in 2016/17 and who were expected to complete their qualification as intended (after different assumed study durations (see Table 2)).

† Averages per annum constitute averages over 10 years post-graduation.

Source: London Economics' analysis of HESA (2018a, b) and Department for Education (2018a, b)

Figure 4 Number of international graduates from the 2016/17 cohort expected to be in sustained UK employment – by tax year and domicile



Note: All numbers are rounded to the nearest 5. Averages per annum constitute averages over 10 years post-graduation. Rounding issues mean these totals may not match those presented in Table 4. The small number of graduates from 2029/30 onwards reflects the delayed entrance of part-time first degree and higher degree research students into the labour market (by 2024/25).

Source: London Economics' analysis of HESA (2018a, b) and Department for Education (2018a, b)

2.2 Estimating the earnings of international graduates in the UK labour market

To undertake this second step of the analysis, we again made use of the LEO data on the employment outcomes of previous cohorts of international graduates.[29] In addition to the proportions of graduates entering sustained UK employment, the data also contain information – for the same previous cohorts of graduates – on **annual median earnings**[30] in the 2015/16 tax year. Again, using this information for *historical* cohorts to estimate the *expected future* annual earnings of graduates from the 2016/17 cohort of international students in the UK, we:

- Used a **weighted average** to fill the gaps and arrive at a full series of **median earnings** per graduate for up to 10 years post-graduation (as with the above employment outcomes); and
- Adjusted the resulting post-graduation median earnings profiles to account for the fact that earnings would be expected to increase over time (based on long-term **annual real earnings growth** rates and consumer price inflation indices estimated by the Office for Budget Responsibility[31]).

As with the employment outcomes, this was undertaken separately by domicile (prior to entry into higher education), level of study[32], and mode of study.

2.3 Estimating the tax revenues associated with international graduates in the UK labour market

In the final stage, based on the above-described median earnings profiles, we estimated the tax contributions per international graduate in the UK by tax year, including:

- **Income tax**, based on the relevant thresholds and rates in the 2016/17 tax year, with the income thresholds and allowances in each subsequent year

[29] Again, see Department for Education (2018a) and Department for Education (2018b) for the LEO data on undergraduate and postgraduate qualifications, respectively.
[30] Note that the median earnings information in the LEO data is based on individuals in sustained employment only, as the earnings of those in further study are expected to be more likely to relate to part-time jobs.
[31] Specifically, we use the historical real average earnings growth rate for 2016 (based on Office for Budget Responsibility, 2017) and medium- and long-term forecasts of real average earnings growth rates (based on Office for Budget Responsibility, 2018a and 2018b), all calculated by adjusting the nominal earnings growth rates for (Consumer Price) inflation in each year.
[32] Again, note that whereas the LEO data cover first degrees only, we apply the same assumptions to graduates who completed 'other undergraduate' qualifications (for lack of any available data on the actual employment outcomes of these types of graduates). Our estimates for higher taught degrees are again based on the original LEO data for Level 7 taught qualifications, while the estimates for higher research degrees constitute weighted averages across Level 7 research qualifications and all Level 8 qualifications (weighted by the number of graduates in the LEO data).

adjusted for average nominal earnings growth (i.e. we assume fiscal neutrality throughout the analysis, asserting that the income tax bands grow at the same rate of annual earnings growth);

- **Employee National Insurance contributions** paid by the graduates themselves (again based on the relevant 2016/17 income thresholds, adjusted for average earnings growth in each subsequent tax year);
- **Employer National Insurance contributions** paid by the organisations employing the graduates (with the same adjustments to the annual income thresholds as above); and
- **Value Added Tax** charged on the goods and services consumed by the international graduates. This is calculated by assuming that individuals consume **94%** of their annual after-tax income[33,34], and that **50%** of their consumption is subject to the standard VAT[35] at a rate of **20%**.

We then calculated the **discounted** total stream of each of these estimated future tax revenue profiles[36] to generate a **present value** estimate of UK Exchequer revenues across the first 10 years post-graduation (all discounted back to 2016/17), again separately by domicile, study mode and study level.

Finally, we combined the resulting estimates per graduate with the above-described number of international students in the 2016/17 cohort expected to graduate and enter the UK labour market, to arrive at an aggregate estimate of the post-graduation tax revenues associated with the cohort.

[33] This is based on a long-term savings rate forecast of **6%** published by the Office for Budget Responsibility (2018a).
[34] I.e. after income tax and National Insurance employee contributions have been deducted.
[35] This is based on standard rate VAT estimates provided by the Office for Budget Responsibility (2018c).
[36] For the discounting, we used the standard HM Treasury Green Book real discount rate of **3.5%** (HM Treasury, 2011), combined with OBR Consumer Price Inflation forecasts to arrive at nominal discount rates per year (see Office for Budget Responsibility, 2018a and 2018b).

3 Results

3.1 International graduates' contribution to filling skills shortages

Before presenting our findings on the earnings and associated tax revenues generated by international graduates entering and/or remaining in the UK labour market post-graduation, this section provides an analysis of the **extent to which these graduates fill specific skills shortages within the UK labour market**.

Although there are official shortage occupation lists provided by the Home Office under the auspices of the Migration Advisory Committee[37], there is no perfect means of understanding the exact industries or sectors where skills shortages occur (as there is no perfect correlation between subject of study at university and subsequent occupation).

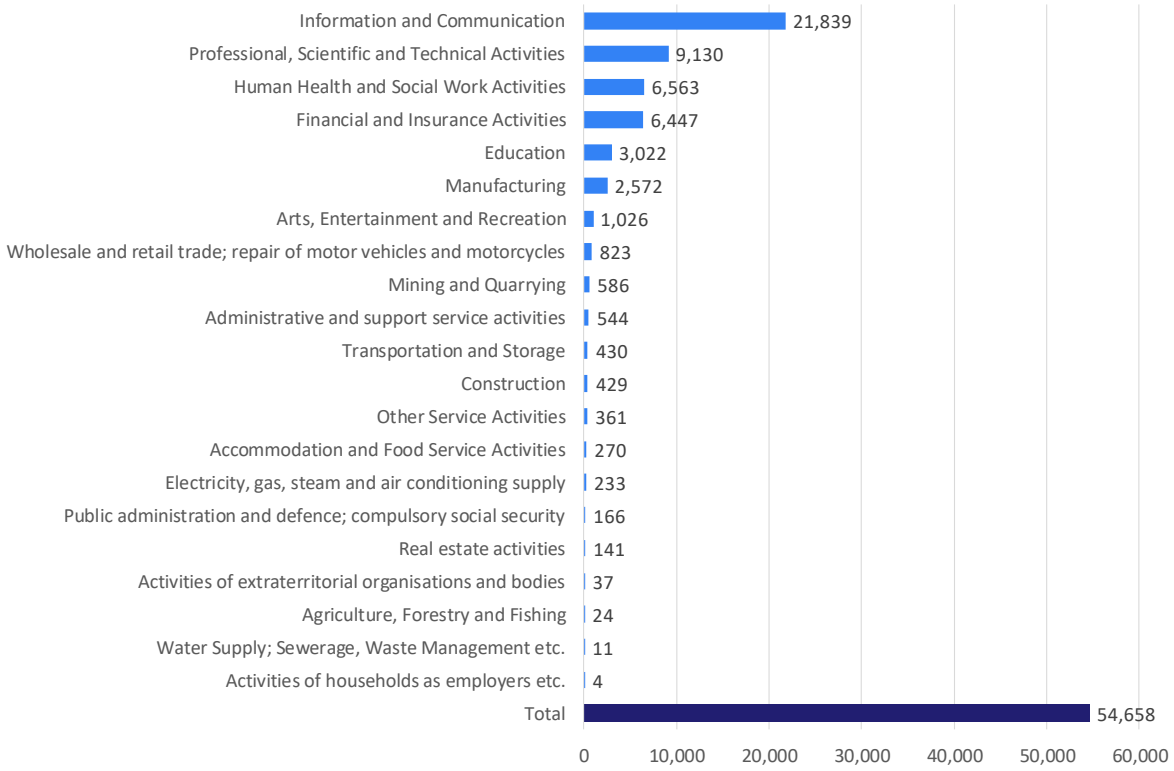
However, to provide an indication or proxy of the particular UK sectors facing skills shortages, we considered data on the number of applicants to the Tier 2 (general worker) visa programme by industry (presented in Figure 5).[38]

In 2017, there were a total of **54,658** Tier 2 applications. Considering the top 5 industries in terms of the number of visa applications received, the data suggest there are core skills shortages in the **Information and Communication** sector (**21,839** applicants, equivalent to **40%** of total); **Professional, Scientific and Technical Activities** (**9,130** applicants, **17%**); **Human Health and Social Work** (**6,563** applicants, **12%**); **Finance and Insurance** (**6,447** applicants, **12%**); and **Education** (**3,022** applicants, **6%**).

[37] See Home Office (2019).

[38] Note that the data includes individuals from outside the EEA and Switzerland only (given the free movement rights between EEA countries).

Figure 5 Number of applicants for Tier 2 (general work) visas using sponsorship certificates by industry, in 2017



Note: Refers to individuals from outside the European Economic Area (EEA) and Switzerland only.

Source: London Economics' analysis of Home Office (2018)

3.1.1 Number of international graduates in the UK labour market

To provide an understanding of the extent to which international graduates who remain in the United Kingdom fill these vacancies, Figure 6 presents information (again based on LEO data) on the number of international graduates in **sustained UK employment five years post-graduation** (in 2015/16, based on individuals who graduated from English institutions in 2009/10) **by subject studied**.[39,40] The information is presented separately by **qualification level** (including undergraduate (i.e. first degrees) and Level 7 qualifications (i.e. Master's degrees)[41]) and **domicile** (at entry into higher education).

Assuming that these international graduates are likely to enter employment in fields or industries broadly related to the subject they studied at university (though in some cases, this will not be the case), the data indicate that these graduates

[39] All numbers were estimated by multiplying the number of graduates included in the LEO data in each category (i.e. by subject, domicile and level) by the corresponding proportion of graduates in sustained UK employment in each category.

[40] A full explanation of the subject abbreviations in the LEO data is provided in Annex A2.2.

[41] Results for Level 8 (Doctorate) qualifications have not been presented here, as the information by subject is largely suppressed in the LEO data (due to small sample sizes).

contribute to the UK economy by filling a number of the key UK sectoral skills shortages identified above.[42] For example:

- The data indicate that there are relatively large numbers of international graduates (approximately **2,200** from the 2009/10 cohort of graduates[43]) possessing qualifications in **Computer Science ("Comp")** and **Mass Communications & Documentation ("Comm")** subjects entering the UK labour market post-graduation, thereby reducing the **skills shortages in the Information and Communication sector**.
- Similarly, there are high numbers of international graduates (in excess of **2,100** from the 2009/10 cohort of graduates) with qualifications in **Engineering and Technology ("EngT")** who find sustained employment in the UK, again mitigating the shortage of skilled labour in the **Professional, Scientific and Technical Activities Sector**.
- In terms of the shortages in **Human Health and Social Work**, with approximately **1,500** graduates from the 2009/10 cohort in sustained UK employment having studied in **Subjects Allied to Medicine ('AMed'[44]), Medicine and Dentistry ('Med') and Nursing ('Nurs'),** another key skills gap in the National Health Service is being addressed by international students remaining in the UK.

These observations are further corroborated by the Migration Advisory Committee report (2018) on the impact of international students in the UK, which presents data on the number of UK visa holders switching from Tier 4 (study) visas to Tier 2 visas by occupation.[45] The report concludes that 'nearly 85 per cent of jobs were in **managerial or professional occupations**, with **information and communications technicians** making up nearly all the remainder […]. **Science and Engineering** was the dominant occupation group, which ties in with the evidence provided by businesses that retention of skilled and talented international students trained in STEM subjects is vital, and can help fill jobs'.

[42] It is important to note that international students would not only fill sectoral skills shortages, but have relatively strong labour market prospects more generally. This is because, in addition to having a high level of English competency, these individuals have already displayed a desire to live and work in the United Kingdom; have already become acclimatised to the UK environment and culture; and have proved themselves to be compliant, "genuine" students. Post Brexit, the UK may be forced to look globally to fill skills shortages and may overlook some of the best candidates already in the United Kingdom.

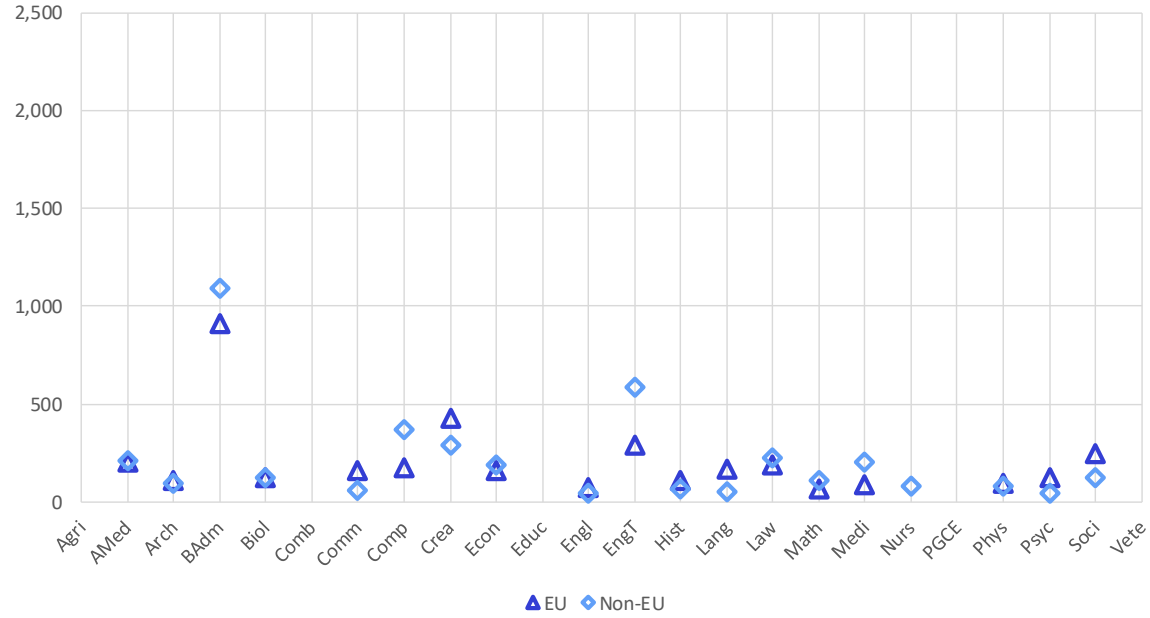
[43] Note that this is a lower bound estimate, since there are gaps in the LEO data due to small sample sizes (e.g. the information for graduates who completed Level 8 qualifications is largely suppressed). See the notes to Figure 6 for more information.

[44] This category excludes Nursing.

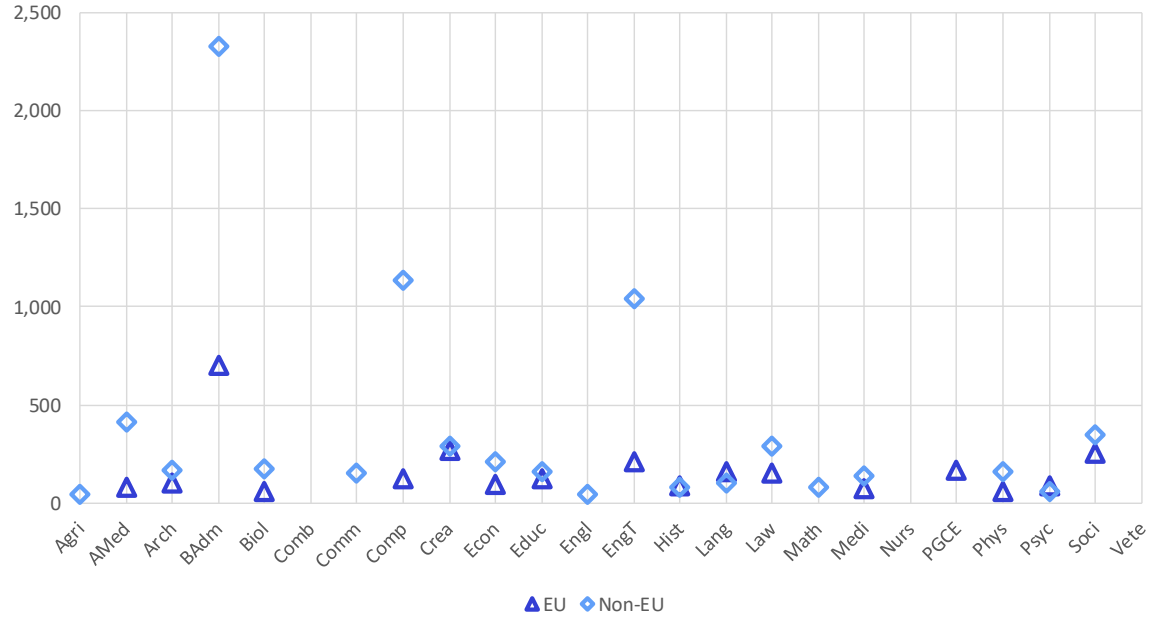
[45] Based on Home Office administrative data for 2012 to 2018. See Figure 7.5 in Migration Advisory Committee (2018).

Figure 6 Number of graduates in sustained UK employment in the 2015/16 tax year, five years after graduation, by domicile, level and subject studied

Undergraduate



Master's (Level 7)



Note: Gaps may arise where the LEO data have been suppressed due to small sample sizes. Based on students who graduated from English higher education institutions in 2009/10.
The undergraduate LEO data cover first degrees as well as postgraduate Bachelor's degrees at level H as well as integrated undergraduate/postgraduate taught Master's degrees on the enhanced/extended pattern.
In terms of higher degrees, due to small sample sizes and resulting gaps in the LEO data, it was not possible to split the data into higher taught degrees and higher research degrees, so we instead present the original LEO data for Level 7 (Master's) qualifications.
Results for Level 8 (Doctorate) qualifications have not been presented here, as the information by subject is largely suppressed in the LEO data (due to small sample sizes).
The PGCE (Postgraduate Certificate in Education) subject category applies to qualifications at Level 7 only. 'BAdm' (Business & Administrative Studies) at Level 7 excludes MBAs.
Source: London Economics' analysis of Department for Education (2018a, b)

3.1.2 A comparison of earnings between UK, EU and non-EU graduates in the UK labour market

Based on the above-described LEO data, the analysis presented in Figure 7 illustrates the **median earnings** achieved by UK-domiciled, EU-domiciled and non-EU-domiciled students 5 years post-graduation in 2015/16 (again based on individuals who graduated in 2009/10) by subject of degree (for different levels of qualification).

At **undergraduate level**, across all subjects, compared to a median salary of approximately **£25,700** achieved by UK-domiciled first degree holders (5 years post-graduation), the median salary posted by comparable EU-domiciled and non-EU-domiciled degree holders is considerably higher – standing at approximately **£29,000** for both groups (equivalent to a **13%** premium). This outcome is not driven by any particular outlying subject area (although there is clearly some variation), as in the majority of subject areas, either EU-domiciled and/or non-EU-domiciled graduates **have higher median earnings compared to their UK counterparts**. Only in the cases of **Medicine** and **Architecture** are the median earnings achieved by UK-domiciled graduates higher than those achieved by international degree holders (**£47,300** compared to **£45,500** in **Medicine** and **£30,900** compared to **£28,500** in **Architecture** (on average across EU-domiciled graduates and non-EU-domiciled graduates)).

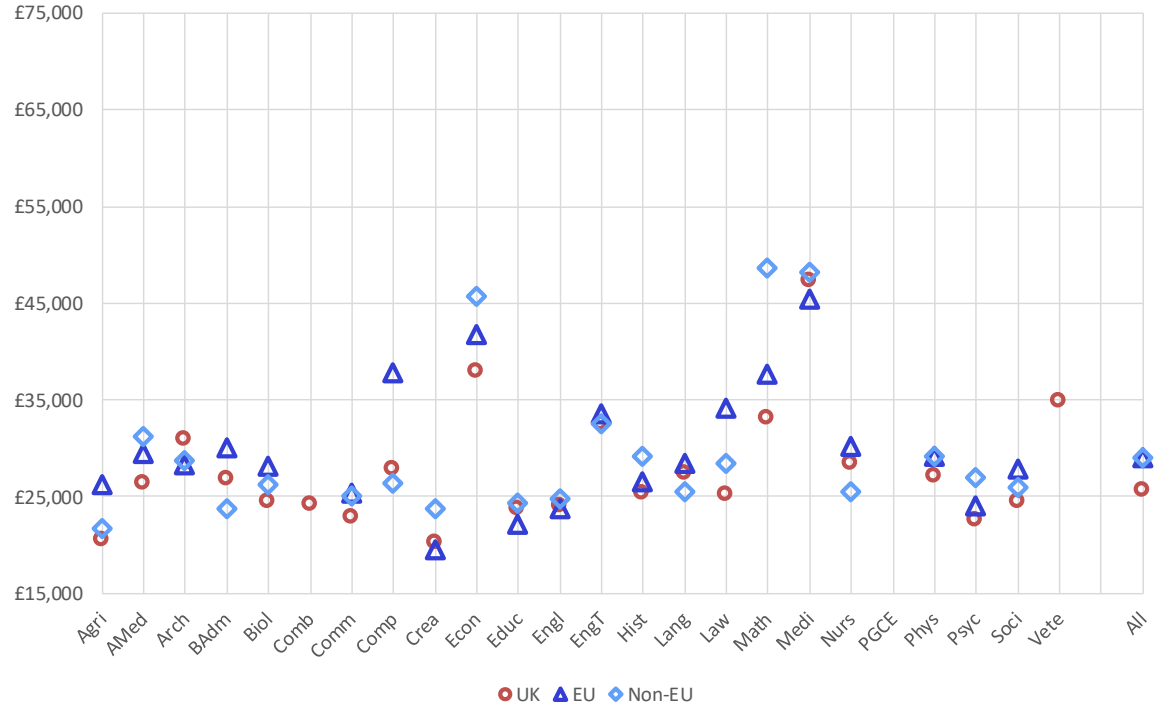
Considering the breakdown by EU and non-EU-domiciled graduates, the earnings premia achieved by **EU-domiciled** graduates are highest compared to UK-domiciled graduates in **Computer Science** (**36%**), and it is notable that this subject area is associated with the sector where there are the most acute skills shortages (Figure 5). Relatively high premia are also achieved in **Law** (**36%** premium) and **Mathematics** (**14%** premium). The highest earnings premium achieved by **non-EU-domiciled** degree holders compared to UK-domiciled degree holders occurs in **Subjects Allied to Medicine** (**18%** premium), again reflecting sectors with acute skills shortages, but also **Mathematics** (**47%** premium) and **Economics** (**21%** premium).

At **Master's level** (and more so at Doctorate level), the **outcomes achieved by UK-domiciled graduates are closer to those achieved by international graduates**. The median earnings achieved 5 years post-graduation stand at approximately **£31,500** compared to median earnings of **£33,600** posted by EU-domiciled graduates. However, the median earnings posted by UK-domiciled Master's graduates are higher than the earnings posted by non-EU-domiciled graduates (**£30,600**). In general, the earnings achieved by the different groups are much less dispersed, although the uplift achieved by EU-domiciled graduates in possession of Master's qualifications in **Law** (**33%** premium) or **Mathematics** (**94%** premium) persists.[46]

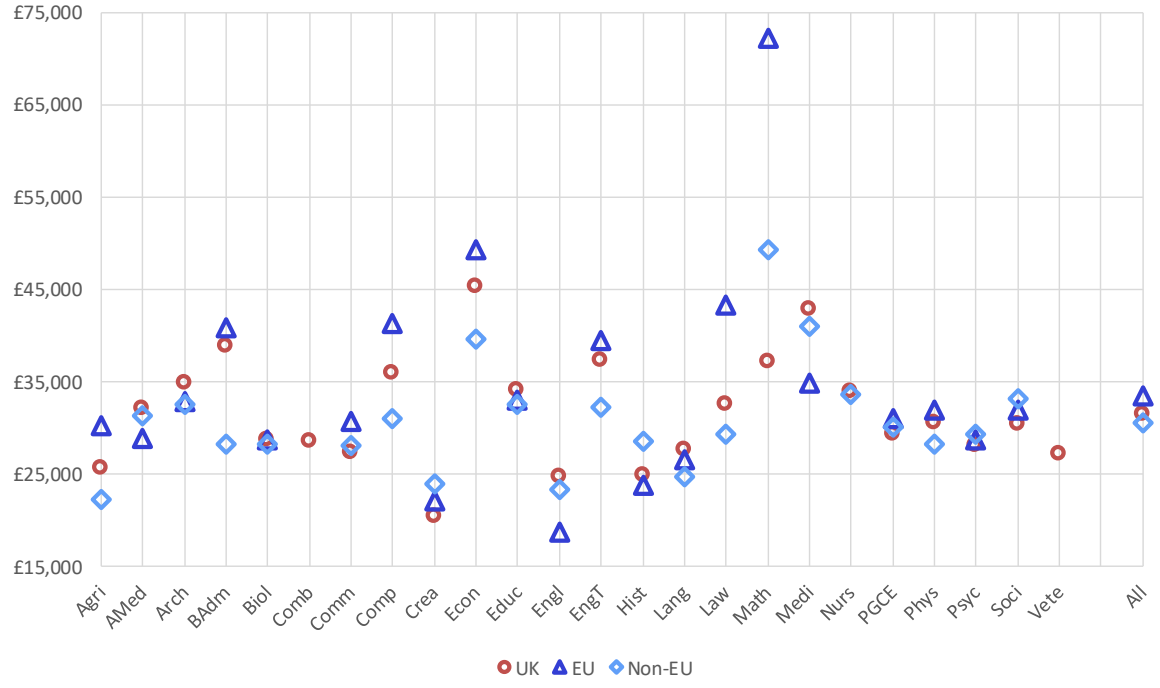
[46] Some care should be taken with this estimate as it is based on a small number of observations.

Figure 7 Median earnings of graduates in the UK in the 2015/16 tax year, five years after graduation, by domicile, level and subject studied

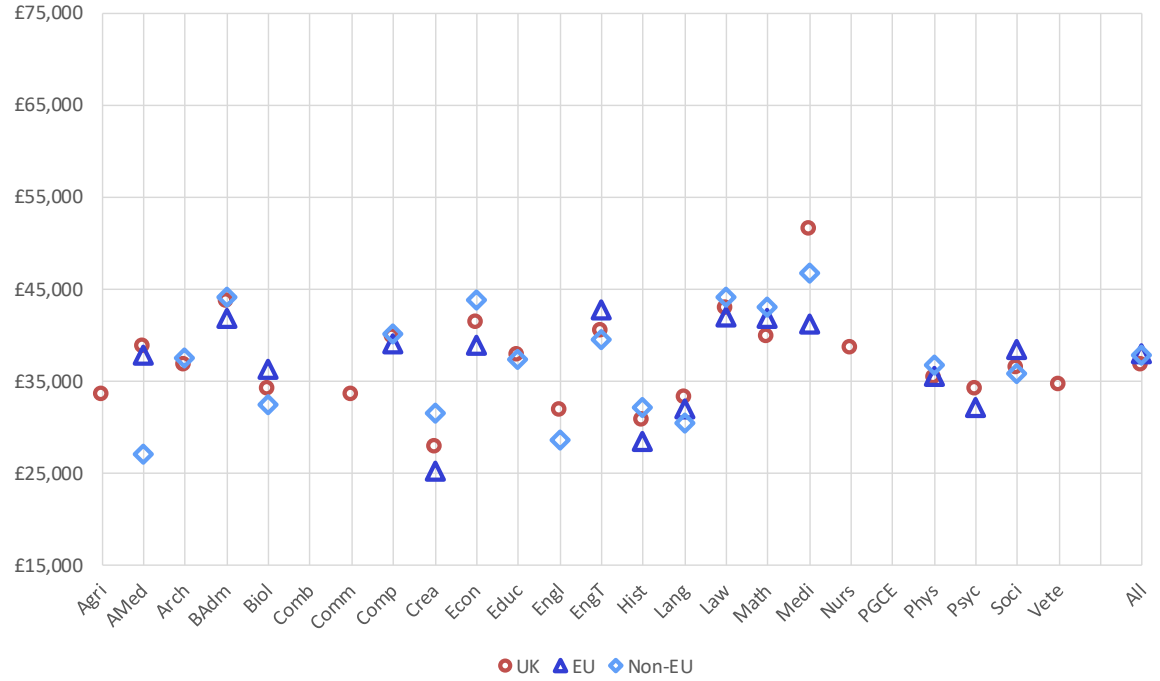
Undergraduate



Master's (Level 7)



Doctorate (Level 8)



Note: Gaps may arise where the LEO data have been suppressed due to small sample sizes. Based on students who graduated from English higher education institutions in 2009/10.
The undergraduate LEO data cover first degrees as well as postgraduate Bachelor's degrees at level H as well as integrated undergraduate/postgraduate taught Master's degrees on the enhanced/extended pattern. In terms of higher degrees, due to small sample sizes and resulting gaps in the LEO data, it was not possible to split the data into higher taught degrees and higher research degrees, so we instead present the original LEO data for Level 7 (Master's) and Level 8 (Doctorate) qualifications.
The PGCE (Postgraduate Certificate in Education) subject category applies to qualifications at Level 7 only. 'BAdm' (Business & Administrative Studies) at Level 7 excludes MBAs.
Source: London Economics' analysis of Department for Education (2018a, b)

At **Doctorate level**, the difference in median earnings for those in possession of **Mathematics** degrees stands at approximately **£1,900** per annum (**5%** premium), with few significant earnings gaps between UK and international graduates in other subject areas (**4%** overall). UK-domiciled graduates in possession of **Medicine** degrees (at Level 8 or PhD equivalent) continue to achieve a sizeable earnings premium over both EU-domiciled and non-EU-domiciled degree holders 5 years post-graduation (between **9%** and **20%** depending on the comparison group).

Overall, the analysis suggests that many international graduates finding sustained employment in the United Kingdom are doing so **in sectors that suffer from acute skills shortages**. At undergraduate level, while the overall median earnings achieved by international graduates exceeds that of UK-domiciled graduates, there are particularly large premia posted in those sectors where there are more acute shortages (although these premia occur only in those predominantly private sector industries where there is some degree of wage flexibility).

The sectoral employment and wage data suggest there is **limited displacement** of UK graduates from jobs by international graduates, but rather, international graduates are supporting the UK economy by plugging skills shortages – and job

vacancies – that would otherwise exist. Given the high likelihood of skills shortages being exacerbated post Brexit, it would appear to be economically illiterate to limit a key source of highly qualified talent entering and remaining in the UK labour market.

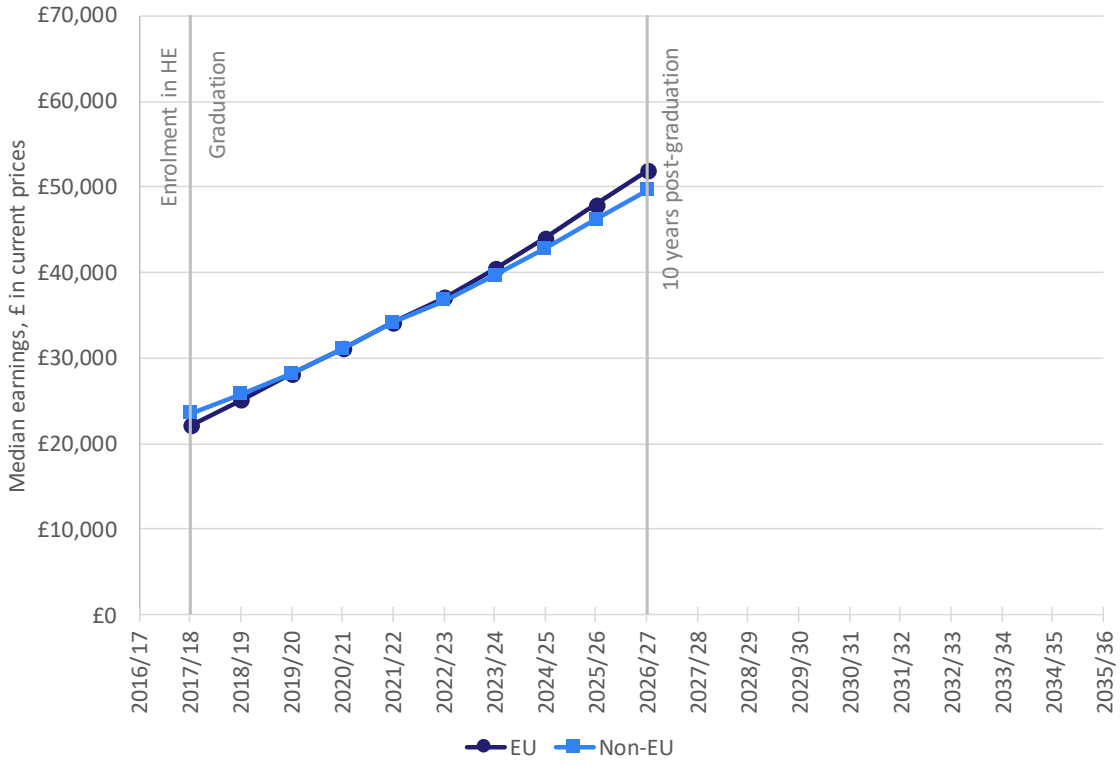
3.2 Earnings of international graduates in the UK labour market

In Figure 8, we present information on the *expected* earnings achieved by international students in the 2016/17 cohort in each of the first 10 years post-graduation. The information is presented for graduates who studied on a full-time basis only. Again, note that the information is derived from earnings data obtained from LEO data in the 2015/16 tax year (across multiple past cohorts). It is then adjusted (for real annual earnings growth and inflation) to reflect the expected entry of these international graduates into the UK labour market (e.g. in 2017/18 for graduates at 'other undergraduate level' and 2019/20 for first degree graduates, etc).

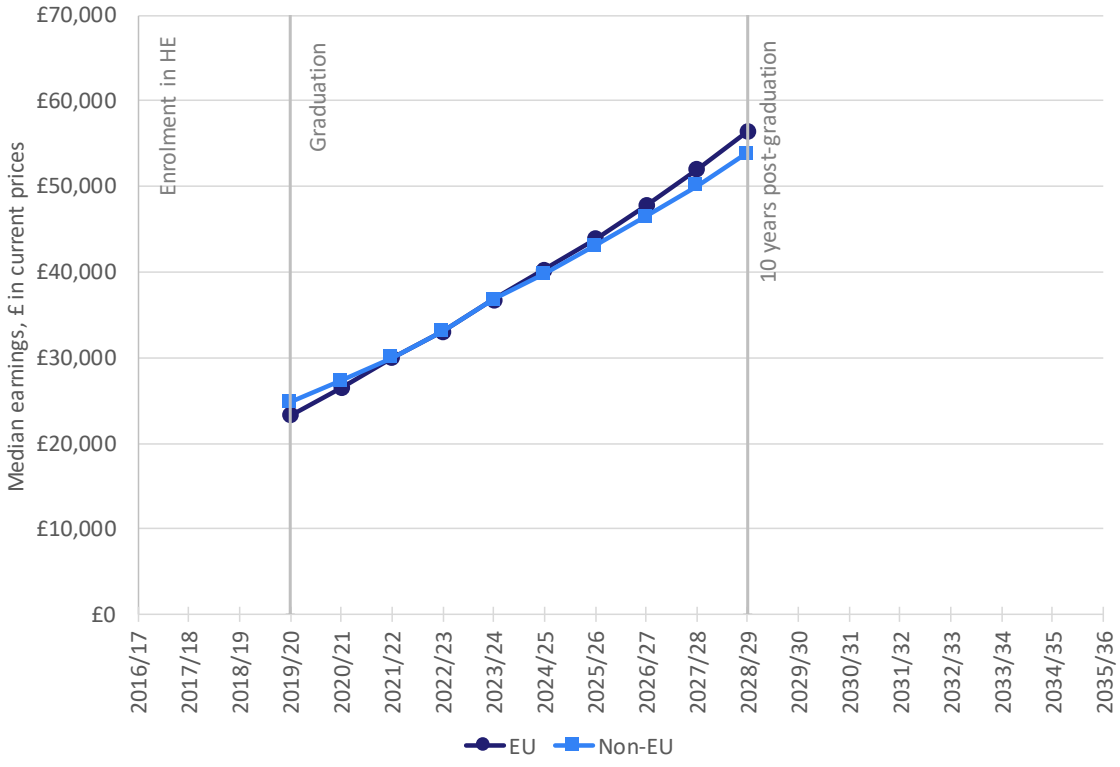
The analysis demonstrates the **enhanced financial return associated with higher levels of qualification** (illustrated by the higher starting earnings posted by individuals with postgraduate qualifications compared to undergraduate qualifications (e.g. **£27,600** for EU-domiciled graduates with taught higher (Master's) degrees compared to **£23,300** for EU-domiciled graduates first degrees in the first year post-graduation). The analysis also illustrates **the return to experience** (illustrated by the increase in earnings as more time is spent in the UK labour market). Finally, comparing EU and non-EU-domiciled graduates, at **undergraduate level**, earnings amongst the two groups are broadly comparable, although EU graduates' earnings move from slightly behind to lightly above those of non-EU graduates by the end of the 10-year period. In contrast, the earnings achieved by EU-domiciled graduates with **higher taught degrees** exceed those posted by non-EU-domiciled graduates in every year of the 10 years post-graduation (with the gap increasing over time).

Figure 8 Estimated earnings (in current prices) for international graduates who completed full-time qualifications, by tax year, level of study and domicile

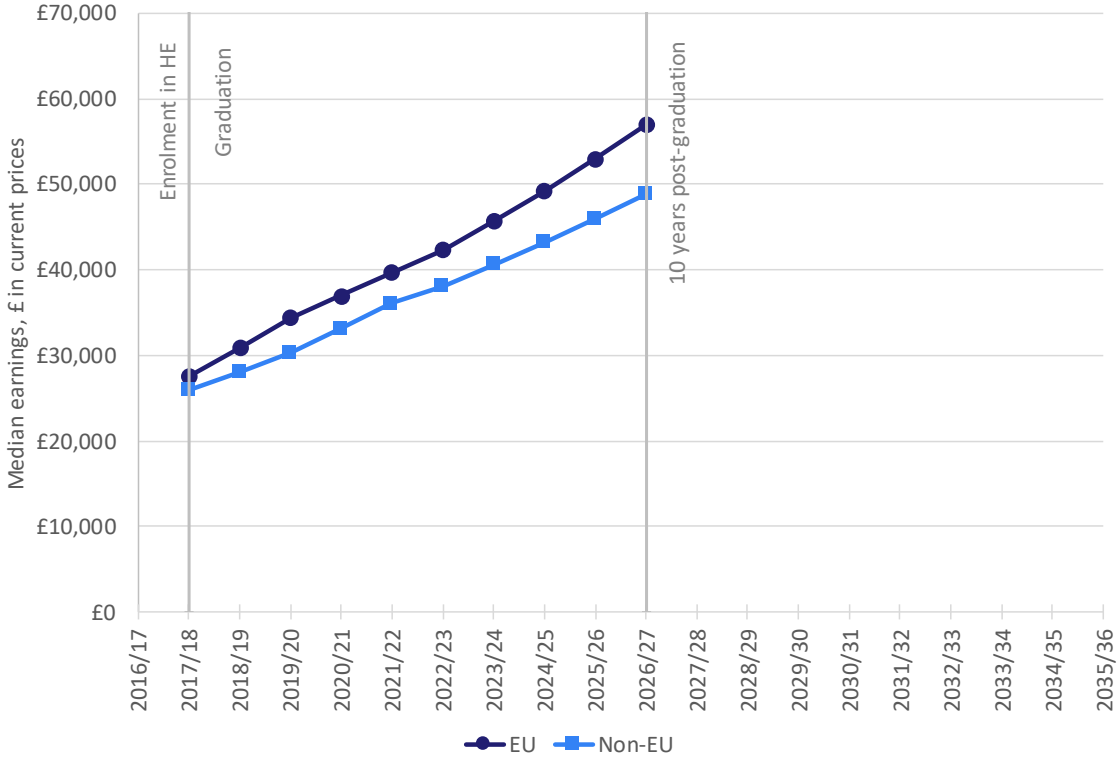
Other undergraduate



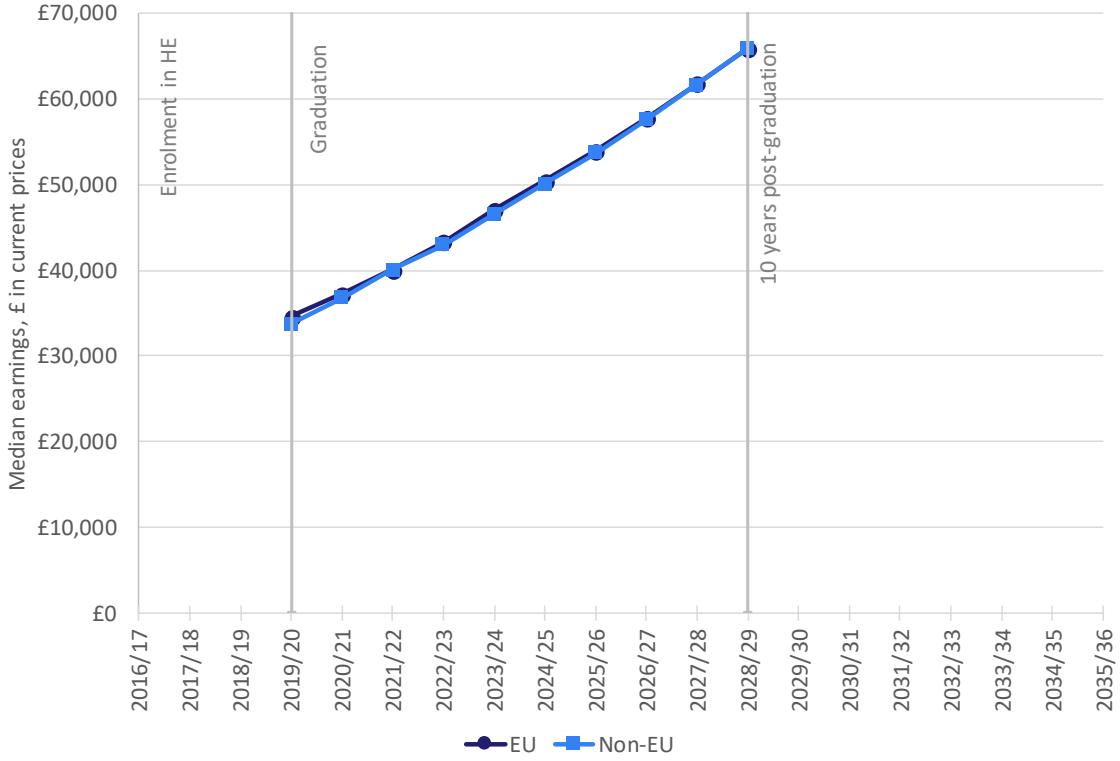
First degree



Higher degree (taught)



Higher degree (research)



Note: All earnings are presented in nominal terms (i.e. in current (rather than constant) prices).
Note again that the estimated earnings for graduates at 'other undergraduate' level were based on the LEO information for graduates with first degrees (since comparable information for sub-degree qualifications was not available). This results in the similarities between the shape of the graphs for first degree and 'other undergraduate' qualification holders.
Source: London Economics' analysis

3.3 International graduates' contribution to Exchequer tax revenues

Based on the information presented in Figure 8, this section presents the estimated tax receipts (by type of tax) accrued by the UK Exchequer **per representative international graduate** from the 2016/17 cohort **completing their studies and finding sustained employment in the UK labour market post-graduation**. Alongside the information per graduate, we then present the **total tax contribution** associated with the 2016/17 cohort (estimated by combining the results per graduate with the expected number of international graduates from the cohort entering and/or remaining in the UK labour market in the first 10 years post-graduation - see Table 4). Note that the information is presented in 2016/17 prices and discounted to net present values across the entire 10-year period post-graduation.

3.3.1 Income tax

In Table 4, we present the income tax contributed to the UK Exchequer by international graduates from the 2016/17 cohort.

Across all qualification levels, the average income tax contribution **per graduate** (in present value terms, over the first 10 years post-graduation)[47] is estimated to be approximately **£36,000** per EU-domiciled graduate and **£34,000** per non-EU domiciled graduate.

Considering the breakdown by level, we estimate that, on average, a representative EU-domiciled first degree holder contributes approximately **£32,000** in income tax to the public purse in the first 10 years post-graduation (in present value terms)[48]. This compares to **£31,000** for non-EU-domiciled degree holders. The additional taxation generated by postgraduates is even greater – reflecting their enhanced human capital and subsequent higher earnings. In particular, EU-domiciled Master's (higher taught) degree holders contribute approximately **£41,000** per person to the UK Exchequer in the first 10 years post-graduation, while EU-domiciled PhD (higher research degree) graduates contribute **£45,000**, on average. Amongst non-EU-domiciled graduates, the comparable estimates for Master's and PhD degree holders stand at **£34,000** (reflecting non-EU Master's degree graduates' relatively lower earnings compared to EU-domiciled graduates) and **£45,000** respectively.

The **aggregate** post-graduation income tax associated with international graduates in the 2016/17 cohort was estimated to be approximately **£1,043 million** (again in

[47] Given that the additional taxation payments will occur at different points in the future, to ensure the comparability and consistency of the results, all results have been discounted and presented in real value terms.

[48] All of these estimates are presented in 2016/17 prices and discounted to net present values.

present value terms over the first 10 years post-graduation), of which **£388 million** was generated by EU-domiciled graduates, with the remaining **£655 million** generated by the greater number of non-EU graduates.

Given the significant number of international graduates at first degree or Master's level, the impact is concentrated amongst these qualification levels. Specifically, the analysis indicates that first degree graduates from the 2016/17 cohort will be expected to contribute approximately **£363 million** to the UK economy, with **£525 million** generated by graduates with Master's (i.e. higher degree taught) degrees. The remaining **£53 million** and **£102 million** of tax revenue was associated with graduates in possession of other undergraduate and higher degree (research) qualifications.

Table 5 Post-graduation income tax associated with international students in the 2016/17 cohort – by level of study and domicile (per graduate and total (£m))

Level of study	Average £ per graduate			Total		
	EU	Non-EU	Average	EU	Non-EU	Total
Other undergraduate	£32,000	£32,000	**£32,000**	£19m	£34m	**£53m**
First degree	£32,000	£31,000	**£31,000**	£179m	£184m	**£363m**
Higher degree (taught)	£41,000	£34,000	**£36,000**	£150m	£374m	**£525m**
Higher degree (research)	£45,000	£45,000	**£45,000**	£40m	£62m	**£102m**
Average	**£36,000**	**£34,000**	**£35,000**			
Total				**£388m**	**£655m**	**£1,043m**

Note: Average values per graduate are rounded to the nearest £1,000 and are weighted by the respective total number of graduates in UK employment over the 10-year period post-graduation. Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding.

Source: London Economics' analysis

3.3.2 National Insurance contributions

Employee contributions

Table 6 presents the employee National Insurance (NI) contributions to the UK Exchequer by international graduates from the cohort.

In terms of the estimates **per graduate**, the average employee National Insurance contribution over the first 10 years post-graduation stands at approximately **£24,000** per representative EU-domiciled graduate and **£23,000** per non-EU domiciled graduate.

By qualification level, for those in possession of a first degree, a representative international graduate contributes approximately **£22,000** in employee NI to the

public purse (irrespective of domicile)[49]. Again, the taxation generated by postgraduates is higher, with EU-domiciled Master's degree holders contributing **£28,000** each to the UK Exchequer in the first 10 years post-graduation, and non-EU-domiciled Master's graduates contributing **£24,000** per graduate. International PhD students were estimated to pay **£30,000** in employee National Insurance (for both EU- and non-EU-domiciled graduates).

Table 6 Post-graduation NI employee contributions associated with international students in the 2016/17 cohort – by level of study and domicile (per graduate and total (£m))

Level of study	Average £ per graduate			Total		
	EU	Non-EU	Average	EU	Non-EU	Total
Other undergraduate	£22,000	£22,000	**£22,000**	£13m	£24m	**£37m**
First degree	£22,000	£22,000	**£22,000**	£125m	£127m	**£252m**
Higher degree (taught)	£28,000	£24,000	**£25,000**	£102m	£257m	**£359m**
Higher degree (research)	£30,000	£30,000	**£30,000**	£27m	£41m	**£68m**
Average	**£24,000**	**£23,000**	**£24,000**			
Total				**£266m**	**£449m**	**£716m**

Note: Average values per graduate are rounded to the nearest £1,000 and are weighted by the respective total number of graduates in UK employment over the 10-year period post-graduation. Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding. ***Source: London Economics' analysis***

In **aggregate,** the employee National Insurance contributions associated with the cohort were estimated to be **£716 million**, **£266 million** was generated by EU-domiciled students, with the remaining **£449 million** generated by non-EU students.

By qualification level, first degree graduates in the cohort are expected to contribute approximately **£252 million** in employee NI payments, while graduates with Master's degrees are expected to contribute **£359 million**, and graduates with other undergraduate and higher degree (research) qualifications are expected to contribute **£37 million** and **£68 million**, respectively.

Employer contributions

While the previous section presented our estimates relating to *employee* contributions, Table 7 presents the corresponding results in relation to the (slightly larger) National Insurance contributions made by international graduates' *employers*.

[49] Note that although National Insurance contributed to paying the state pension upon retirement, a proportion of international graduates will receive this state pension, so the net contribution to the Exchequer will be less than the gross estimate presented here.

Overall, the average employer National Insurance contribution **per graduate** over the first 10 years post-graduation was estimated at approximately **£28,000** per EU-domiciled graduate and **£27,000** per non-EU domiciled graduate.

In terms of qualification levels, the average employer NI contribution per representative international graduate with a first degree stands at approximately **£25,000** (irrespective of domicile). The employers of EU-domiciled Master's degree holders contribute an estimated **£32,000** each, with the corresponding estimate per non-EU-domiciled Master's graduate standing at **£27,000**. Finally, international EU-domiciled and non-EU-domiciled graduates with PhDs were estimated to generate **£35,000** and **£34,000** in employer National Insurance payments for the Exchequer, respectively.

Table 7 Post-graduation NI employer contributions associated with international students in the 2016/17 cohort – by level of study and domicile (per graduate and total (£m))

Level of study	Average £ per graduate			Total		
	EU	Non-EU	Average	EU	Non-EU	Total
Other undergraduate	£26,000	£25,000	**£25,000**	£15m	£27m	**£42m**
First degree	£25,000	£25,000	**£25,000**	£143m	£146m	**£289m**
Higher degree (taught)	£32,000	£27,000	**£28,000**	£117m	£295m	**£412m**
Higher degree (research)	£35,000	£34,000	**£34,000**	£31m	£47m	**£78m**
Average	**£28,000**	**£27,000**	**£27,000**			
Total				**£306m**	**£516m**	**£822m**

Note: Average values per graduate are rounded to the nearest £1,000 and are weighted by the respective total number of graduates in UK employment over the 10-year period post-graduation. Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding.

Source: London Economics' analysis

The **total** estimated NI employer contributions associated with the cohort stand at **£822 million**, of which **£306 million** is associated with EU-domiciled graduates, and **£516 million** is associated with non-EU graduates in the cohort expected to complete their studies and enter/remain in the UK labour market.

Of the total, **£289 million** is associated with international graduates in possession of first degrees, while **£412 million** is estimated to be generated by graduates who completed Master's degrees. Graduates with other undergraduate and higher degree (research) qualifications are expected to contribute **£42 million** and **£78 million**, respectively.

3.3.3 VAT revenue

Finally, in Table 8, we present the Value Added Tax (VAT) receipts contributed to the UK Exchequer associated with the expenditures made by international graduates out of their (post-taxation) disposable income. The analysis indicates that the average VAT revenues to the public purse associated with a representative international (EU-

domiciled or non-EU-domiciled) graduate in the 2016/17 cohort stand at around **£20,000 per graduate**.

For those in possession of a first degree, a representative EU-domiciled graduate contributes approximately **£19,000** in VAT to the public purse in present value terms in the first 10 years post-graduation – with approximately **£18,000** contributed by non-EU-domiciled graduates. The VAT paid by EU-domiciled Master's graduates stands at **£22,000** per graduate (**£20,000** for non-EU-domiciled graduates from Master's programmes), while international PhD graduates contribute **£23,000** in additional VAT contributions (irrespective of domicile).

Table 8 Post-graduation VAT revenues associated with international students in the 2016/17 cohort – by level of study and domicile (per graduate and total (£m))

Level of study	Average £ per graduate			Total		
	EU	Non-EU	Average	EU	Non-EU	Total
Other undergraduate	£19,000	£19,000	**£19,000**	£11m	£20m	**£31m**
First degree	£19,000	£18,000	**£19,000**	£107m	£107m	**£214m**
Higher degree (taught)	£22,000	£20,000	**£20,000**	£82m	£213m	**£295m**
Higher degree (research)	£23,000	£23,000	**£23,000**	£21m	£31m	**£52m**
Average	**£20,000**	**£20,000**	**£20,000**			
Total				**£220m**	**£372m**	**£592m**

Note: Average values per graduate are rounded to the nearest £1,000 and are weighted by the respective total number of graduates in UK employment over the 10-year period post-graduation. Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding.

Source: London Economics' analysis

The **total** estimated VAT revenues generated by the 2016/17 cohort were estimated to be **£592 million**, of which **£220 million** is generated by EU-domiciled graduates, and **£372 million** is associated with non-EU graduates in the cohort expected to complete their studies and enter/remain in the UK labour market.

First degree graduates in the cohort are expected to contribute approximately **£214 million** in VAT revenues, while graduates with Master's degrees will contribute **£295 million**, and graduates with other undergraduate and higher degree (research) qualifications are expected to contribute **£31 million** and **£52 million**, respectively.

3.3.4 Total UK tax revenues generated by international graduates

In aggregate, the total post-graduation contribution to the UK Exchequer made by international students in the 2016/17 cohort was estimated to be **£3,173 million** in present value terms (see Table 9 and Figure 9). This was made up of **£1,043 million** in income taxation, **£716 million** in employee National Insurance contributions, **£822 million** in employer National Insurance payments and **£592 million** in VAT contributions.

The largest component was contributed by first degree holders (**£1,119 million**) and Master's graduates (**£1,591 million**), with a further **£300 million** contributed by PhD graduates and **£163 million** contributed by international students obtaining other undergraduate qualifications.

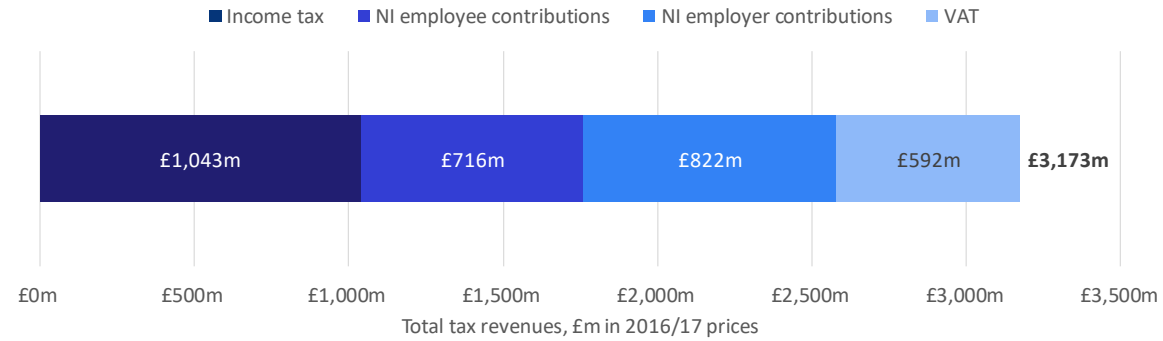
By domicile, EU-domiciled graduates in the cohort are expected to generate **£1,181 million** for the UK Exchequer (**£108,000** on average per graduate), with non-EU-domiciled graduates generating a further **£1,992 million** (**£104,000** on average per graduate).

Table 9 Total post-graduation tax revenues associated with international students in the 2016/17 cohort – by level of study and domicile (per graduate and total (£m))

Level of study	Average £ per graduate			Total		
	EU	Non-EU	Average	EU	Non-EU	Total
Other undergraduate	£99,000	£98,000	**£98,000**	£58m	£105m	**£163m**
First degree	£97,000	£96,000	**£97,000**	£554m	£565m	**£1,119m**
Higher degree (taught)	£122,000	£105,000	**£109,000**	£451m	£1,140m	**£1,591m**
Higher degree (research)	£133,000	£132,000	**£132,000**	£119m	£181m	**£300m**
Average	**£108,000**	**£104,000**	**£106,000**			
Total				**£1,181m**	**£1,992m**	**£3,173m**

Note: Average values per graduate are rounded to the nearest £1,000 and are weighted by the respective total number of graduates in UK employment over the 10-year period post-graduation. Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding. ***Source: London Economics' analysis***

Figure 9 Total post-graduation tax revenues associated with international students in the 2016/17 cohort, in £m



Note: Total values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices, discounted to net present values, and totals may not add up due to rounding. ***Source: London Economics' analysis***

Ignoring the **£22.6 billion gross economic benefit** accruing to the UK economy during the period of study (London Economics, 2018), the **total cost** associated with hosting these international students during their study was previously estimated to be approximately **£2.3 billion**, split roughly equally between EU-domiciled (**£1.1 billion**) and non-EU-domiciled (**£1.2 billion**) students (see London Economics, 2018). This implies that the total tax contribution of international graduates in the short to

medium term post-graduation (**£3.173 billion**) exceeds the costs of hosting these students by approximately **38%**.

3.4 Estimating the cost of restricting post-study work rights

As briefly discussed in Section 2.1.3, prior to April 2012, international students studying in the UK had the automatic right to undertake two years of post-study work. With restrictions to this system, there was a decline in the number of international students coming to the United Kingdom from particular countries (especially India), as well as the proportion of international graduates entering and/or remaining in the UK labour market post-graduation.[50] Using the above analysis, it was possible to assess the lost post-graduation tax revenues to the UK Exchequer resulting from these post-study work visa restrictions.

Specifically, based on the LEO data for multiple cohorts presented in Figure 3, the proportion of individuals from the 2004/05 and 2009/10 cohorts of non-EU-domiciled graduates (prior to the policy change) in sustainable UK employment (in 2015/16) *exceeded* the proportion of completers from the 2011/12 cohort in sustainable employment 3 years post-graduation (or the proportion of completers from the 2013/14 cohort in employment 1 year post-graduation). Based on this, we assessed what might be the total Exchequer contribution made by international students in the 2016/17 cohort *if* the proportion of non-EU graduates entering the UK labour market from the 2011/12 and 2013/14 cohorts were *increased* to the observed proportion in sustainable employment after 5 years post-graduation (based on the 2009/10 cohort, which graduated prior to the visa restrictions).

Presented in Table 10, the analysis indicates that the total tax contribution to the UK Exchequer would be approximately **£3,323 million** in present value terms, which represents a **£150 million** increase on the baseline estimate (Table 9). In other words, the restriction of post study working rights for non-EU students in the 2016/17 cohort is associated with a **£150 million** cost to the Exchequer in terms of foregone tax revenues post-graduation (up to 10 years, as before).

This represents the adverse economic effect associated with one particular cohort. Clearly, there are several previous cohorts that have been impacted by this policy. Assuming that the size and composition of future cohorts remains approximately the same as the 2016/17 cohort, the ongoing cost to the Exchequer will stand at approximately **£150 million** per annum.

[50] According to the Migration Advisory Committee (2018, see Figure 7.2 of the report), in 2011, more than 46,000 international students switched to a Tier 1, 2 or 5 visa post-graduation (with the corresponding number in 2012 standing at more than 38,000). In contrast, between 2013 and 2017, the number of students who had transferred to a different visa category was between 5,000 and 7,000 in each of the five years.

It is important to note that this analysis does not include the lost contribution to the UK economy during study resulting from the decision of some international students to *not* come to the UK to study following the imposition of post-study work restrictions.

Table 10 Total post-graduation tax revenues associated with international students in the 2016/17 cohort – assuming no change to post-study work rights

Level of study	Total (Baseline)			Total (no change to post-study work rights)		
	EU	Non-EU	Total	EU	Non-EU	Total
Other undergraduate	£58m	£105m	**£163m**	£58m	£116m	**£174m**
First degree	£554m	£565m	**£1,119m**	£554m	£619m	**£1,173m**
Higher degree (taught)	£451m	£1,140m	**£1,591m**	£451m	£1,224m	**£1,674m**
Higher degree (research)	£119m	£181m	**£300m**	£119m	£183m	**£302m**
Total	**£1,181m**	**£1,992m**	**£3,173m**	**£1,181m**	**£2,141m**	**£3,323m**

Note: Values are rounded to the nearest £1m. All estimates are presented in 2016/17 prices and discounted to net present values. Totals may not add up due to rounding. ***Source: London Economics' analysis***

4 Conclusions

The Migration Advisory Committee's report on the contribution of international students to the UK economy following completion of their studies (2018)[51] included the following recommendation (our emphasis):

> ***"We do not recommend a separate post-study work visa though our proposals on automatic leave to remain at the end of study have some of the same effect.*** *One reason for not recommending a longer post-study work period is that the* ***earnings of some graduates who remain in the UK seem surprisingly low*** *and it is likely that those who would benefit from a longer period to find a graduate level job are not the most highly skilled.* ***We accept that the evidence for this is not as strong as it could be:*** *one of our recommendations is that* ***there is a proper evaluation, by us or others, of what students are doing in the post-study period*** *and when they move onto other work permits****. If, after that evaluation, a longer post-study work period seems warranted our advice could change****."***

London Economics has produced three core pieces of evidence for HEPI and Kaplan addressing the contribution of international students to the UK higher education sector – and the wider UK economy more generally:

- The first analysis (London Economics (2017)) addresses the determinants of international students **coming to the United Kingdom to undertake higher education qualifications**;
- The second report (London Economics (2018)) assesses both the costs and benefits to the public purse associated with hosting international students **during their period of study**[52]; and
- The third study addresses the **post-graduation labour market benefits** to HM Treasury associated with international students.

On the basis of the analysis we have presented in this report, we fundamentally disagree with the Migration Advisory Committee's conclusions and recommendations.

[51] Migration Advisory Committee (2018).

[52] This analysis provides evidence that international students make a huge economic contribution to the UK economy *during* their studies that exceeds – by a factor of 10 - the Exchequer costs of hosting them.

Results

This analysis illustrates that:

- The **total post-graduation contribution** to the UK Exchequer made by international graduates associated with the 2016/17 cohort was estimated to be **£3,173 million** in present value terms (over the first 10 year post-graduation);
- Reflecting the size of the initial cohort and the relative proportions of graduates from different domiciles entering the labour market, the total contribution is generated by graduates from both the European Union (**£1,181 million**) and outside the European Union (**£1,992 million**); and
- With an expected average contribution of **£106,000** per international graduate from the 2016/17 cohort finding sustained employment in the UK labour market, there are **sizeable contributions to the Exchequer** associated with every level of study (ranging from **£97,000** in the case of first degree holders to **£132,000** in the case of PhD graduates).

In addition:

- There are **acute skills shortages** in many sectors of the UK economy (in both the public and private sectors), and, rather than displacing domestic graduates from these opportunities, international graduates play a key role in filling the vacancies available and reducing these labour market gaps.
- By assessing the cohort effects of the proportion of non-EU-domiciled students entering the UK labour market over time, the analysis estimated a **£150 million per cohort** negative labour market impact associated with the restriction of post-study work rights for non-EU-domiciled students announced in 2011. Given the policy has been in operation for 5 years, the total negative economic impact on HM Treasury in terms of foregone taxation receipts is in the region of **£¾ billion**.

This report provides the evidence that the Migration Advisory Committee has requested on post-graduation outcomes achieved by international students.

In light of the **huge taxation contribution** made by international students, the impact of international students on **mitigating skills gaps** in the UK labour market, as well as the **economic damage** that has occurred as a result of **post study visa restrictions, a longer post-study work period for international students *has been* clearly evidenced.**

The advice provided by the Migration Advisory Committee should change accordingly.

Index of Tables, Figures and Boxes

Tables

Figures

ANNEXES

Annex 1 References

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Annex 2 Supplementary information

A2.1 Detailed breakdown of the 2016/17 cohort of international students

Table 11 Number of international first-year students in 2016/17 by domicile, study level and study mode

Level and mode of study	Domicile		
	EU	Non-EU	Total
Full-time			
Other undergraduate	1,225	5,200	**6,425**
First degree	30,640	55,630	**86,270**
Higher degree (taught)	19,855	90,415	**110,270**
Higher degree (research)	4,315	9,775	**14,090**
Total	**56,035**	**161,020**	**217,055**
Part-time			
Other undergraduate	2,515	6,150	**8,665**
First degree	370	280	**650**
Higher degree (taught)	3,605	4,325	**7,930**
Higher degree (research)	520	505	**1,025**
Total	**7,010**	**11,260**	**18,270**
Total			
Other undergraduate	3,740	11,350	**15,090**
First degree	31,010	55,910	**86,920**
Higher degree (taught)	23,460	94,740	**118,200**
Higher degree (research)	4,835	10,280	**15,115**
Total	**63,045**	**172,280**	**235,325**

Note: All student numbers are rounded to the nearest 5. ***Source: London Economics' analysis of HESA (2018a)***

A2.2 LEO subject categories

Table 12 List of subjects included in the LEO data

Abbreviation	Full name
Agri	Agriculture & Related Subjects
AMed	Subjects Allied to Medicine (excluding Nursing)
Arch	Architecture, Building & Planning
BAdm	Business & Administrative Studies
Biol	Biological Sciences (excluding Psychology)
Comb	Combined
Comm	Mass Communications & Documentation
Comp	Computer Science
Crea	Creative Arts & Design
Econ	Economics
Educ	Education
Engl	English Studies
EngT	Engineering & Technology
Hist	Historical & Philosophical Studies
Lang	Languages (excluding English Studies)
Law	Law
Math	Mathematical Sciences
Medi	Medicine & Dentistry
Nurs	Nursing
PGCE	Postgraduate Certificate in Education
Phys	Physical Sciences
Psyc	Psychology
Soci	Social Studies (excluding Economics)
Vete	Veterinary Science

Source: Department for Education (2018a).

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