

Initial impact of Brexit on European students and academic staff in UK's engineering higher education

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1 INTRODUCTION

The United Kingdom has a long tradition of excellence in higher education and is recognised as being an important player in global engineering education and research.

Higher education relies on international mobility more than most sectors of society in terms of attracting experts from all over the world to research and teach in the UK and attracting international students. Moreover, engineering relies on international mobility more than most other academic disciplines.

The United Kingdom European Union membership referendum, also known as the Brexit referendum, took place on 23 June 2016, and its impact is still unfolding and under continuing analysis. However, it is widely anticipated that it is likely to disrupt student and staff mobility with negative repercussions for broader European society through research, innovation, skills shortages and economic impact.

This paper intends to start a debate on the initial findings about the emerging changes of Brexit not only for the UK's HEIs, but also the potential implications to other countries' education systems, research policies and infrastructures and the disruption of European research projects that include UK researchers and institutions.

In the UK, the Higher Education Statistics Agency (HESA) holds large datasets on all aspects of the higher education sector in England, Scotland, Wales and Northern Ireland. It includes data on students, academic and non-academic staff, universities and other education providers. These datasets can be accessed by subscribers (higher education providers and not-for-profits) on the Heidi Plus platform which allows data analysis tailored to answer to specific research questions.

Reports on HESA data prior to the Brexit referendum showed an increase in the proportion of European (EU) academic staff in Engineering and Technology in the UK sector, rising from 10% in 2006/07 to 19% in 2015/16 [1]. As for students, a 71% majority of those entering a first degree in engineering and technology (undergraduate) were of UK origin. 6% were from EU countries and 23% from other nationalities [2]. The opposite was found at postgraduate level, with only 25% UK, 15% EU and 60% other nations.

This paper presents descriptive figures of the latest student and academic staff datasets, to understand the changes in study and demographic distributions (EU nationality/domicile country) in UK HE Engineering before (up until 2015/16) and after (post 2016/17) the Brexit referendum. The study compares the latest annual growth rate of the student and academic staff numbers over time using compound annual growth rates (CAGR), following the type of data analysis that is usually adopted by the sector [1], and form the basis for a longer term assessment of the impact of Brexit on UK Engineering HE. It also analyses data trends in different HE providers, to better understand the initial impact of Brexit in research-led universities that are highly competitive in international rankings (Russell Group) in comparison to other universities. This paper aims to discuss the initial impact of the UK's decision to leave the UK by answering the following research questions:

- Has the proportion of EU engineering students decreased in 2016/17 for both undergraduate and postgraduate degrees? What are the data trends by type of university, and by nationality?
- Has the proportion of EU engineering academic staff decreased in 2016/17, in particular 'research only' staff? What are the data trends by type of university, and by nationality?

2 METHODOLOGICAL APPROACH

2.1 Data analysis

The figures provided by HESA for both students and academic staff are full person equivalent (FPE). FPE looks at how much of one person's studying or working time is engaged in a particular activity.

Compound annual growth rates (CAGR) were calculated to compare academic staff and student numbers over nine academic years, using the formula below (1),

$$CAGR(t_0, t_1) = \left(\frac{V(t_n)}{V(t_0)} \right)^{\frac{1}{t_n - t_0}} - 1 \quad (1).$$

Where, t_0 – the first year of observations; t_1 – the last year of observations; $V(t_0)$ – the start value; and $V(t_1)$ – the last value observed.

2.2 Students' data

Data for students were selected by domicile continent (Europe) and country (excluding England, Scotland, Northern Ireland and Wales), and further analysed by level of study, engineering discipline and 'mission group'.

Level of study provides the breakdown figures by: first degree/undergraduate (UG), postgraduate research, and postgraduate taught. Postgraduate research (PGR) includes doctorate, master's degree and postgraduate diplomas or certificates studied primarily through research. PGR students are trained in research methods and are expected to do a research project. Full-time programmes usually last 18 months. Because there are lower teaching costs, fees for master's by research are usually lower than for a taught master's. On the other hand, postgraduate taught students (PGT) are those studying for a qualification mostly by a taught method (learning by teaching), although there may be a research element. Full-time courses are normally one year long [3].

In the UK, higher education institutions are commonly grouped in 'mission groups'. The Russell Group is a self-selected group of research-led universities. Data was filtered by university type (Russell Group's member vs. non-members).

2.3 Academics' data

Data for academic staff was extracted by academic employment (academic staff only, including teaching, research, teaching and research, or neither teaching nor research) [4]. It relates to the contract of employment and not to the actual work undertaken.

3 DATA FINDINGS

3.1 European Students

The first student data released by HESA post-Brexit referendum, referring to 2016/17, shows an overall annual increase in undergraduate (8.2%) and postgraduate taught degrees (2.9%) and a decrease in postgraduate research (-1.4%) for all subjects. For engineering subjects, an overall increase was also registered in UG degrees (6.5%), but a decrease in both PGT (-1.8%) and PGR (-2.9%). These results were not expected, taking into account that the pre-Brexit trend, based on compound annual growth figures, was relatively stable for UG and PGT (0.5% and 0.9%, respectively) and showed a positive increase for PGR (4%) (Fig. 1).

Type of university

When analysing these data by type of university, Russell Group (RG) members have registered an annual increase in both UG (8.3%) and in PGT (12.8%), but a decrease in PGR degrees (-4.2%) in 2016/17, compared to the previous year. For these universities, the compound annual growth pre-Brexit was 7.8% for UG, -0.9% for PGT and 6.5% for PGR. Non-member institutions (NM) have registered an annual increase in UG (5.1%), and a decrease in both PGT (-6.7%) and PGR (-0.7%) in 2016/17 compared to 2015/16 (Fig. 2).

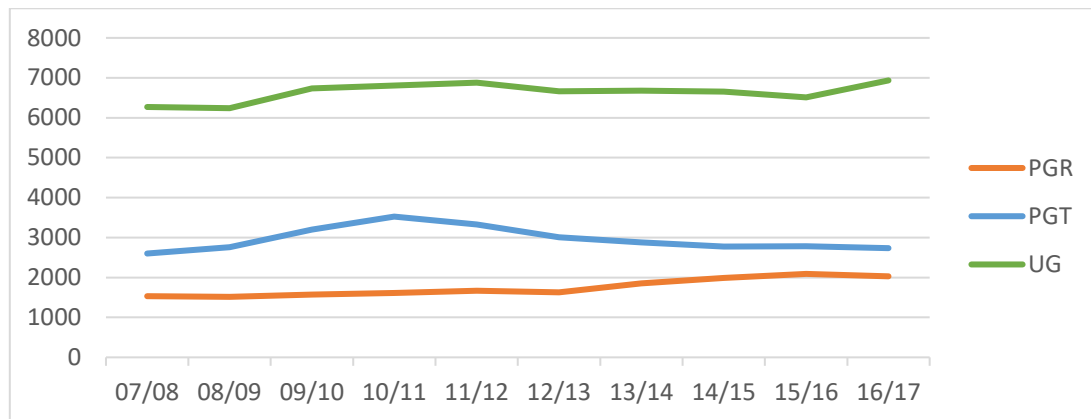


Fig. 1. Number of EU engineering students by degree level

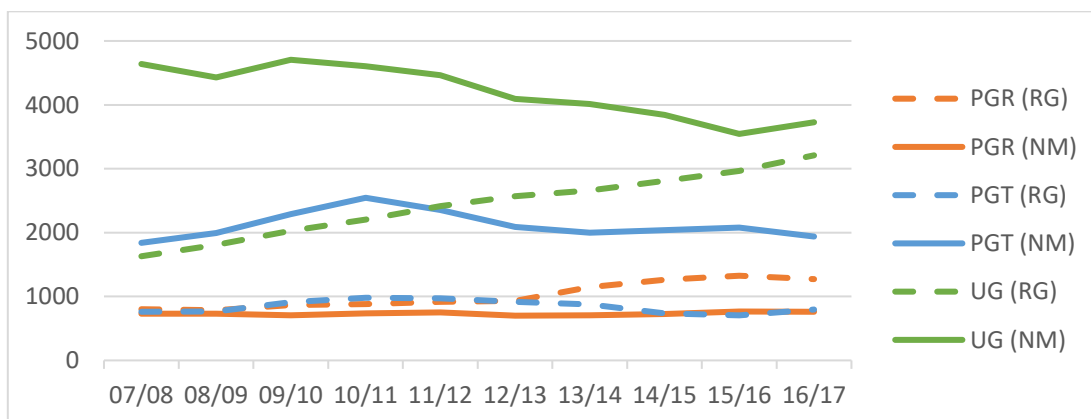


Fig. 2. Number of EU engineering students by degree level and type of university

Domicile country

A breakdown by country showed that the top five EU countries exporting engineering students, both at undergraduate and postgraduate levels, into UK Higher Education institutions in the last two years were France, Germany, Greece, Italy and Spain.

After the decision for the UK to leave the EU, with the exception of Greece (with a decrease of -0.7% in their UG numbers), the UK's universities had registered an overall annual increase in the numbers of engineering UG students from Germany (25.3%), Italy (19.8%), France (17.6%), and Spain (12.3%). This contrasts with the figures in postgraduate study (Fig. 3). Post-referendum figures were:

- France (FR): PGR (-2.8%) and PGT (-8.0%);
- Greece (EL): PGR (-7.1%) and PGT (-9.8%);
- Germany (DE): PGR (-1.8%) and PGT (1.5%);
- Italy (IT): PGR (0%) and PGT (-5.0%);
- Spain (ES): PGR (-4.9%) and PGT (-1.3%).

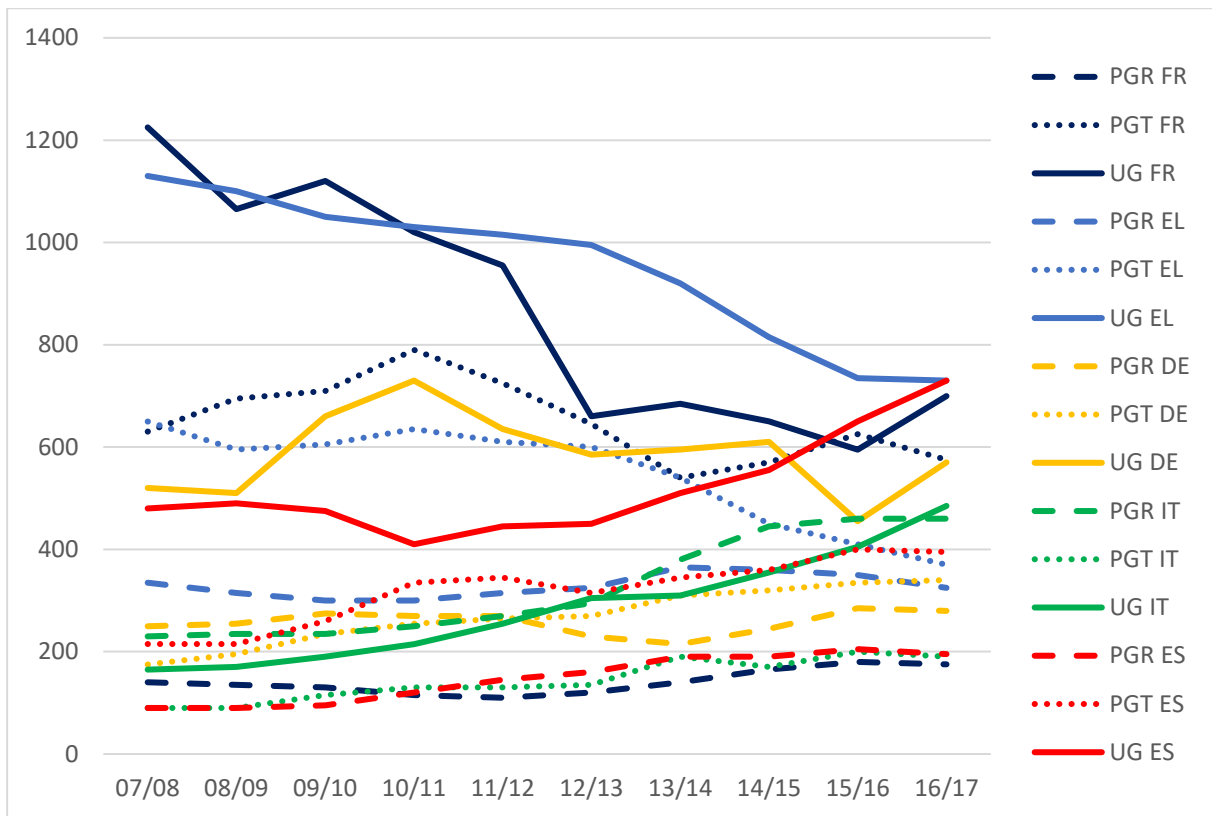


Fig. 3. Number of students by EU country and degree level

In 2015/16, UG degrees were the most popular among students from Greece, Germany and Spain; PGT was the most popular among students from France, and PGR from Italy. In 2016/17, UG degrees were the most popular among students from all the above top five European countries.

3.2 European Academic Staff

The first post-referendum staff data released by HESA, referring to 2016/17, shows that the proportion of European engineering academic staff (including teaching, research, teaching and research, or neither teaching and research) in engineering HEIs is 17.4%. When analysing research staff only, one in four research academics was European (26.4%).

Data analysis revealed an overall annual increase for all academic staff (all domiciles) working in engineering HEIs in the UK (2.7%) and a smaller increase for research-only staff (0.9%) in 2016/17 compared to 2015/16. The figures for European staff were 6.5% for all academic staff and 3.1% for research-only (Fig. 4)

Type of university

Data analysis of type of academic employment and university group revealed that the proportion of EU academic staff working in Russell Group universities was 22.8% (27.2% in 'research-only' contracts) and 13.4% in non-member universities (23.9% in 'research-only' contracts).

Both groups of universities were able to contract EU academic staff in 2016/17 (increase of 5.1% in Russell Group and 8.2% in non-members) (Fig. 5). However, when data on 'research-only' staff was analysed, Russell Group universities increased the number of EU staff by 3.9% (whereas the CAGR up until 2015/16 was 7.8%) and non-members increased just 0.2% (whereas the CAGR up until 2015/16 was 5.2%). These findings may suggest the potential negative impact of the UK's

Brexit decision on EU engineering academic staff recruitment, particularly staff in 'research-only' contracts.

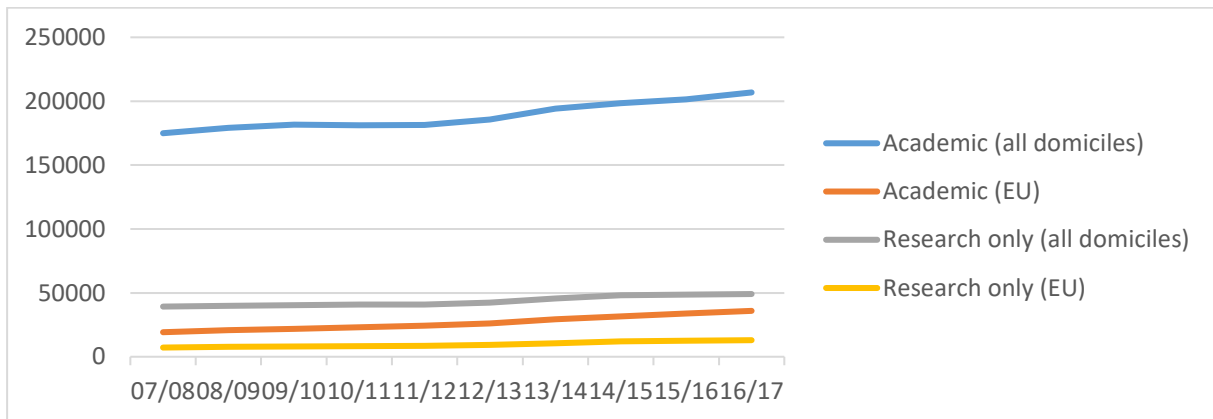


Fig. 4. Number of staff by domicile and academic contract

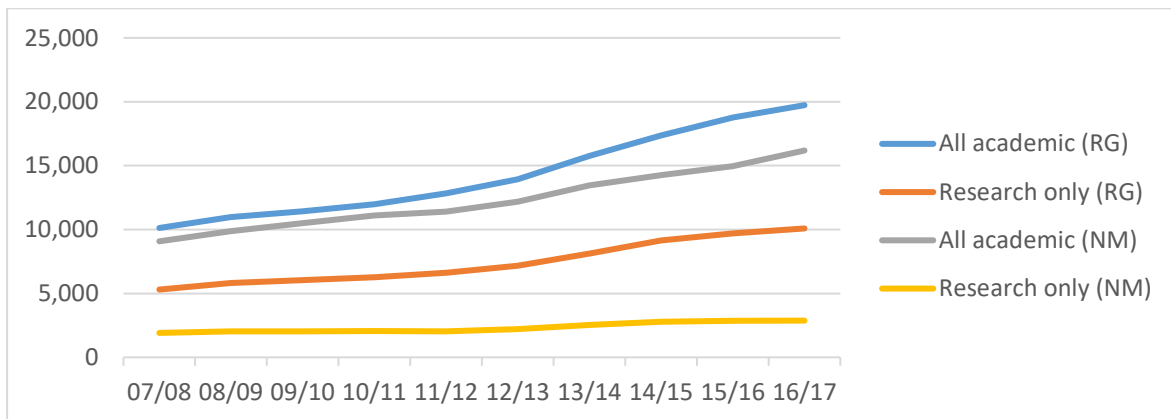


Fig. 5. Number of EU staff by academic contract and university group

Nationality

Similarly to what was found for students, the most represented countries of EU academic staff in the last two years were France, Germany, Greece, Italy and Spain, but also Ireland, followed by the Netherlands, Poland and Portugal. In 2016/17, within each nationality, the proportion of 'research-only' staff was 44.3% for France, 29.8% for Germany, 30.3% for Greece, 39.6% for Italy, and 47.5% for Spain.

4 DISCUSSION

Data analysis revealed an increase in the number of engineering undergraduate students from EU countries in the academic year following the referendum. This may suggest that EU students are taking the opportunity to study engineering in the UK as a 'last chance' before fees, funding and visa requirements change. The fall in the pound's value since the referendum has made studying in the UK more affordable and this may be particularly attractive to non-UK students.

In terms of recruitment of undergraduates and postgraduate taught degrees, Russell Group universities have thrived. Other universities have fared less well suggesting universities with international brands have greater resilience in the face of political realignments.

The decline in EU students in PGR degrees, particularly in Russell Group universities, needs further research: for many, these degrees represent a longer-term commitment in terms of both study and career and so, even for resilient brands, the prospect of moving to the UK as a country outside the EU may have undermined its attractiveness as a destination.

The increase in rates of EU academic staff recruitment seem to have been negatively impacted as well, particularly for staff in 'research-only' contracts [5]. Currently, the lack of clarity over the right to remain in the UK and the uncertainty about the UK's capability to host EU-funded projects seem to be two of the main drivers of EU academics leaving the UK [6].

More data analysis is needed to better understand the impact of the Brexit decision on European students and staff studying and working in the UK. Data on the 2017/18 academic year, available in early 2019, may help to provide a clear picture.

It is important to remember that, although the Brexit referendum triggered a process of withdrawal from the EU, the UK will remain a member until at least 29th March 2019 and UK Government policy is to remain within EU structures for a transition period of 21 months thereafter.

Therefore the significance of any patterns remains to be demonstrated, not least because of the concurrent impact of other factors such as the attractiveness of Trump-era USA as a destination for students and academics. Our research and the available data to date provide no basis to draw conclusions, but they do raise questions:

Will the UK remain as significant an international hub for engineering higher education and research post-Brexit?

Certain universities seem to have avoided most negative effects so far, but how deep is their resilience?

Other universities appear to be experience an impact already. Will this pattern grow or disappear?

Is there an opportunity or a threat to other EU institutions?

What would the impact on ongoing and future research projects and infrastructures be in the EU?

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