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for Education

Your Future | Their Future: Impact of Department for Education's marketing campaign

2019 update

Main report

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Responsibility for the contents of this report remains with London Economics.

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Glossary

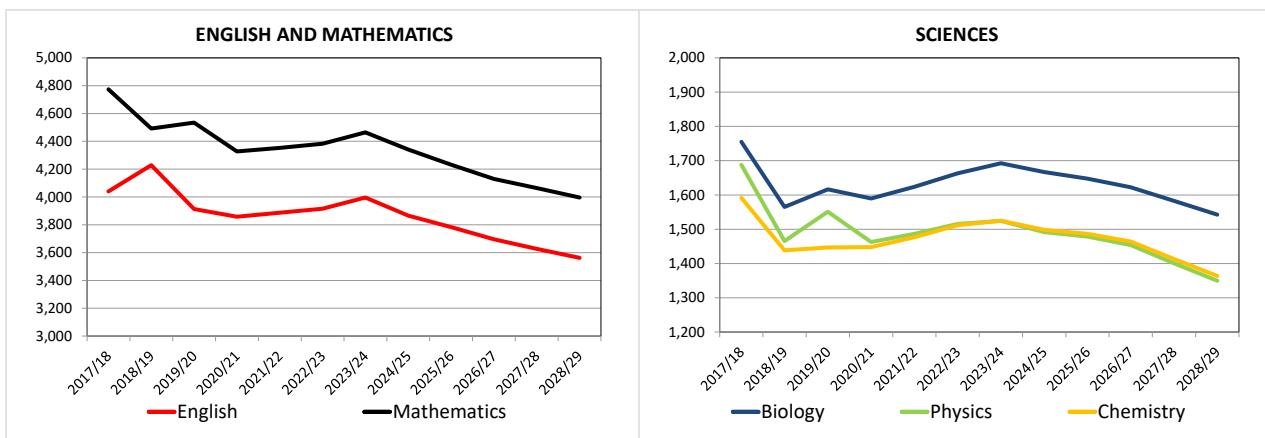
Digital display	Advertising which incorporates text, logos and pictures or images positioned on a website or search engine
ITT	Initial Teacher Training
OLS	Ordinary Least Squares
Search	<p>Advertisement within the sponsored listings of a search engine, which is usually paid for each time the ad is clicked.</p> <p>Throughout the report, ‘search’ refers to paid search, and not organic search. Two types of paid search have been considered: <i>generic</i> and <i>branded</i>.</p> <p>The ‘paid search’ results discussed throughout the report refer to ‘generic paid search’ activity. The information on ‘branded paid search’ has been used to disentangle the impact of other activities, since brand search phrases appear on other advertising channels.</p>
TVRs	TV Rating points - a given percentage of a base population watching a TV programme, where that base is defined as a given target audience in a given geographical area
UCAS	The Universities and Colleges Admissions Service
VOD	Video-on-Demand – an overarching term for online advertising in video format (for example, You Tube, catch-up TV)
Website registration	A submitted registration form on the ‘Get Into Teaching’ website
Website session	A visit to the ‘Get Into Teaching’ website

1 Introduction

1.1 Background

One of the main aims of the Department for Education is to ensure that enough high-quality trainees enter teacher training to meet the needs of the sector. Looking forward, the Department for Education (DfE) has forecasted an increased need for entrant teachers in all subjects to persist over the next few years to address the growing pupil population, as well as the increased vacancy rate¹. Clearly, there is some degree of variation in the requirements for entrant teachers depending on the subject under consideration. To take some examples, the additional demand for entrant teachers is predicted to stand at between 4,000 and 4,800 per year in Mathematics between 2017/18 and 2028/29, and between 4,200 and 5,100 per annum in all Science subjects over the same period (with some specific peaks in demand in 2017/18)².

Figure 1: Requirement for entrant teachers – forecast



Source: DFE Teacher Supply Model (2018/19)

To address this gap and to deliver the necessary number of entrant teachers, the Department has undertaken a rigorous marketing campaign to attract and recruit trainee teachers. However, given the wider fiscal constraints facing the UK economy, there is a clear requirement to ensure that all marketing and advertising expenditure undertaken by the government has **impact**, but also provides **value-for-money**.

As part of the process of assessing both impact and value for money, in 2015 the Department for Education commissioned London Economics to conduct an evaluation of the *Your Future | Their Future* marketing campaign that captured marketing activities up to January 2016. This study concluded that the campaign had been effective in attracting

¹ According to the most recent Schools Workforce in England publication available at the time of this analysis (November 2016), approximately 12.3 per cent of all schools reported having at least one advertised vacancy or temporarily-filled post on the census day. For primary schools, this vacancy rate rose from 6.9% in 2015 to 8.9% in 2016, and for secondary schools, it rose from 23.0% in 2015 to 27.0% in 2016 ([here](#)).

² DFE Teacher Supply Model (2018/19).

visits and registrations to the ‘Get into Teaching’ website. Moreover, marketing effectiveness has been improving over time since the 2012/13 recruitment cycle, particularly since the website switch-over in the spring of 2015.

Since the initial evaluation was conducted in 2016 (hereafter known as the 2016 study), and in response to the challenging context for recruitment to initial teacher training, the Department has **increased marketing investment** and **intensified marketing activities**, introduced **more frequent bursts** of TV advertising, and introduced and subsequently discontinued **new marketing channels** such as Out-of-Home and Cinema to the marketing mix. In order to continue the culture of accountability, extend the lessons learnt from the previous evaluation, and assess the impact of the new marketing channels, the Department has commissioned London Economics to **update the evaluation** of impact and cost effectiveness of marketing activities with the additional 26 months of data available.

1.1.1 The Department’s teacher recruitment marketing campaign

The Department’s marketing approach considered here includes a mix of the following activities:

- **Above-the-line channels** including broadcast television and video on demand, radio, press, out-of-home and cinema advertising;
- **Digital paid-for channels**, such as digital display, radio, social media and paid search (both for generic and brand search terms);
- **Earned channels** such as PR and wider social media; and
- **Owned channels**, e.g. the *Get Into Teaching* website and social media.

Moreover, additional ‘booster’ activity was commissioned (e.g. paid search, social media and radio), in order to further stimulate response from certain regions and from applicants for Modern Foreign Languages.

1.2 Aims of the study

The key research objectives of this study were:

- to establish the impact of the Department’s marketing campaign on the number of people *considering teaching* – represented by the number of **website sessions** – and registering an interest in teaching – represented by **website registrations**, and how this impact has changed over the most recent recruitment cycles;
- to consider and isolate the impact of the **individual marketing channels** used in the campaign using the econometric analysis, in addition to the ‘aggregate’ analysis;
- to undertake a detailed analysis to understand the relative **cost effectiveness** of the various strands using the results from the econometric analysis and various cost measures associated with the campaign; and

- to shed light on the **potential impact of marketing on UCAS applications** to the extent possible, using already existing conversion rate analysis.

The rest of the report is organised as follows: Chapter 2 outlines the methodology of the econometric analysis used to model website sessions and registrations; Chapter 3 discusses the findings of these models; and Chapter 4 focuses on UCAS applications and how conversion rates were used to gauge the potential impact of marketing on the number of UCAS applicants.

2 Methodology

This section includes a brief description of the data collected and the econometric models developed for analysis. It explains how the estimates of impact from the econometric modelling were then combined with cost data to produce a comparison of cost effectiveness for each marketing channel.

2.1 Data

In order to undertake the econometric analysis, the first stage of the project involved updating all necessary data from the 2016 evaluation study (both officially published data and internal DfE marketing data); and collating it into a clean and consistent dataset covering the full modelling period. Data was collected from a number of sources, including the DfE, their marketing department and their commissioned marketing agencies, as well as publicly available national statistics sources (e.g. the Office for National Statistics (ONS)).

The final dataset compiled covers data for the period from **1st September 2012 to 31st March 2018**, thus covering five full recruitment cycles (the academic years 2012/13 2013/14, 2014/15, 2015/16 and 2016/17) and the first seven months of the 2017/18 recruitment cycle. The data was collected at (or converted into) ‘week commencing Monday’ format. The main reason for this choice was that the majority of variables providing information on marketing activities were available on a weekly basis.

2.1.1 Outcomes of interest

The 2016 evaluation study estimated the impact of marketing on outcomes at every stage of the customer journey, from early engagement (represented by **website sessions** and **website registrations for all secondary subjects**), to mid-term and longer-term outcomes such as **UCAS applications**, acceptances and entries into Initial Teacher Training (ITT) courses.

However, the 2016 study identified that UCAS applications are a highly seasonal outcome and the response to marketing may take a long period of time. For these reasons, the impact of marketing on UCAS applications could not be disentangled reliably using time series econometric modelling at this stage (see Annex 3 for further details). Instead, the present study uses existing evidence on conversion rates **from registrants to UCAS applicants** to provide an estimate of the impact of marketing on application numbers.

Shortage subjects

In addition, the DfE have identified that in certain harder-to-fill subject areas (referred to as ‘shortage’ subject areas), eligible graduates might have a very different **customer journey**, as well as different competing opportunities in the wider graduate labour

market. In addition to considering **website registrations** in relation to **all** secondary subjects, it was also of interest to consider the same outcomes in relation to **shortage ITT subjects** only.

Although the set of subjects considered ‘shortage subjects’ adjusts slightly over time, this analysis focused on the set of subjects that have been classified as shortage subjects consistently over the **entire duration** of the modelling period. Based on this definition, shortage subjects are considered to include **chemistry, mathematics, physics, computer science** and **modern foreign languages**. These are hereafter referred to as ‘**core shortage**’ subjects.

2.1.2 Marketing activities

Multiple marketing activities were undertaken in the period from 1st September 2012 to 31st March 2018 with varying intensity. One of the key challenges of the analysis related to disentangling the impact of each marketing activity given the fact that many of the activities appear (deliberately) in bursts and at similar times. Data on each of the activities undertaken was provided by the DfE marketing team and their contractors, and several alternative measures of the impact of each activity have been tested (when available) to achieve the most appropriate model for each outcome variable.

2.1.3 Contextual factors

There is limited academic evidence that considers the determinants of teacher supply (i.e. the rate of teachers leaving the teaching market; the change in the pool of inactive teachers; and the proportion of graduates entering initial teacher training programmes). These analyses are relatively consistent in their findings (for example, Chung, Dolton and Tremayne, 2004³) and typically indicate that for prospective graduates entering initial teacher training, **unemployment rates** and **relative wages** are important determinants of teacher supply, as is the prevailing teacher-pupil ratio (which is interpreted as a measure of unfilled vacancies and hence career stability).

Therefore, in addition to information on marketing activity, we also incorporate wider **contextual factors** outside of the DfE marketing campaign’s control that can also plausibly impact an individual’s decision to express an interest and apply for a teacher training course, either in the presence or in the absence of marketing activities.

The same set of contextual factors (such as seasonality and holidays, graduate unemployment, and pay levels) were tested as in the previous study in order to maintain a level of comparability of the baselines in both editions of the analysis and only those

³ Chung, T.P., Dolton, P., and Tremayne A. (2004), “The Determinants of Teacher Supply: Time Series Evidence for the UK, 1962-2001”, <http://repec.org/res2004/ChungDoltonTremayne.pdf>

factors that were demonstrated to have a robust and statistically significant relationship with the respective outcome of interest were retained in the models (Table 1). A detailed explanation of how these factors were selected is presented in the 2016 report.

Table 1: List of contextual factors included in each model, by outcome of interest

	Website Sessions	Website registrations - Secondary subjects	Website registrations - Core shortage subjects
Seasonality	√	√	√
Grad. unemployment 21-30yrs (lag 1, smooth)*	√		
Grad unemployment 21-30yrs (lag 2, smooth)*			√
Public sector pay (smooth)*	√		
Teacher Salary under-25s (Moving Avg.)	√		
Scholarships **			√
Dummy for Bank Holidays	√		
Dummy for Christmas	√	√	√
Dummy wk 23rd March 2015*** 	√		

Note: *Several transformations of each contextual factor have been tested into each model, with the most significant transformation included in the final model (if it was statistically significant). Information of the performed transformation is reported in parentheses. **Both scholarships and bursaries have been tested in the model, with the impact of bursaries being statistically non-significant. The correlation between scholarship and bursaries is 0.69. ***This variable refers to the industrial dispute that took place in the week of the 23rd March 2015. All contextual factors have been tested in each model and only statistically significant factors have been included in the final model.

Source: London Economics

2.2 Analysis

As in the previous study, the key methodological challenge involves the assessment of what might have happened in the absence of the marketing campaign (i.e. the **counterfactual**), in order to correctly attribute any potential change in perceptions and behaviours amongst the target group to the marketing campaign. In the absence of individual-level data, the construction of a synthetic counterfactual group was achieved using econometric analysis of weekly time series data.

2.2.1 Econometric analysis

Since the website sessions and the two website registration models produced in the 2016 study were statistically robust, these models were used as a starting point for the current analysis. With new marketing data and insights, further model refinements were implemented to improve and enrich the initial models.

Modelling approach

Figure 2: Econometric modelling approach



1. **Update previously produced models:** The econometric models from the 2016 evaluation study for website sessions, website registrations (all secondary subjects) and website registrations (core shortage secondary subjects) were statistically robust and explained the real levels of interest in ITT subjects very well. Therefore, the first step of the (current) 2018 edition of the analysis was to update these three models with the newly extended time series of data. This approach has ensured comparability and continuity of findings.
2. **Introduce and test new marketing channels:** Once results based on the previous model specifications were obtained, the impact of new marketing channels launched since 2016 (e.g. Out-of-Home and Cinema advertising) were also tested by adding relevant variables.
3. **Improve the robustness of models:** The robustness of the models was tested and improved by testing out alternative variables measuring similar types of activity.

Complementing this method, various transformations of the explanatory variables were tested within the model in order to mimic various **behavioural response** patterns⁴.

Robustness checks necessary as a result of the character of the data accompany the econometric estimation.

⁴ These included the incorporation of **lagged effects** (to account for the fact that marketing activity in one time period might have a delayed impact in the following weeks); **decay functions** (to account for the potential residual impact of previous advertising which wears out over time); and arc-tan transformations (to test various rates of build up and erosion of marketing activities).

Caveats

As with all econometric analysis, some caveats apply to the results presented in this study. The most important ones are:

- The links between the various marketing channels are very important. In particular, a number of marketing activities were undertaken at the same time, as well as using the same call-to-action phrase. This strategy might have strengthened the performance of the overall campaign (which is of primary importance), but has posed an analytical challenge for disentangling and reliably identifying the incremental impact of each individual marketing activity. In particular, as a result of the interlinking nature of the campaign, it is probable that some of the impact of various marketing channels has been attributed to other marketing channels operating in parallel, which will also have a consequential effect on estimates of relative cost effectiveness.
- Multicollinearity⁵ might result in the impact of some channels to be overestimated, and that of others to be underestimated or not captured. Specifically, as a consequence of multicollinearity, the impact of marketing activities that take place with similar timings might not be correctly disentangled, resulting in an overestimation (underestimation) of the impact of the relatively larger (smaller) channel. As such, marketing expenditure planning decisions should not rely solely on the econometric analysis results of this report, but should be made in conjunction with other evaluation data and the Brand Tracker research commissioned by the Department.
- The analysis necessarily relies on observed metrics (e.g. achieved clicks, achieved registrations), which on their own already represent initial response to marketing, and which might be driven by some of the underlying activities.⁶
- The marketing impact is estimated as the difference between the fitted model and the contextual factors. There is potential omitted variables bias which may explain the decreasing effect of contextual factors over time and the significantly poorer fit of the model for shortage subject registrations. As a consequence, these results should be interpreted with caution.

For a wider discussion of caveats, as well as details on the general econometric framework of the study, please refer to the Technical Annex of the 2019 Initial Findings report.

⁵ Multicollinearity is a statistical phenomenon in which two or more explanatory variables in a multivariate regression model are highly correlated. Multicollinearity can result in inaccuracies in the estimation of the impacts of individual marketing activities. Taking an example for illustrative purposes, if Radio appears during periods with TV activity but the levels of Radio activity are relatively small, it is possible that the effect of Radio is subsumed within that of TV, as the two impacts cannot be disentangled due to their similar timings. This would result in an overestimation of the impact of TV and an underestimation of the impact of Radio.

⁶ For example, the number of clicks to the same social media ad might vary depending on how well-targeted the ad was; and whether or not it occurred at a time following a burst of TV advertising.

2.2.2 Cost effectiveness analysis

Using information on the costs associated with each channel and the estimate of the incremental impact of each channel, a cost-effectiveness analysis was performed by comparing the costs (in £) per unit increase in each of the outcomes (e.g. website registrations achieved), for each channel:

$$Return\ On\ Investment_{channel\ X} = \frac{Incremental\ Website\ registrations_{channel\ X}}{Cost\ of\ channel\ X}$$

This measurement allows comparison of effectiveness between channels and across outcomes, which could flag the phase of the customer journey or the type of subject where a particular marketing activity might become more or less effective.

Similarly, an aggregate measurement has been produced for the whole marketing campaign on the basis of the cumulative impact of the campaign (i.e. the sum of incremental impacts of each activity over the whole period) and the total cost of marketing.

Key findings

Overall impact of marketing

The updated analysis has clearly demonstrated that marketing has substantially boosted its contribution to website sessions as well as registrations to both shortage and non-shortage subject areas over the course of 2015/16, 2016/17 and 2017/18 (up to 31st March 2018).

In particular, compared to what might have been expected to occur in the absence of marketing, the analysis found that **marketing activities have brought an additional 5.3 million website sessions (43% of the total website sessions) and 121,600 (57% of the total website registrations for all secondary subjects) website registrations for all secondary subjects between September 2015 and March 2018.**

Amongst shortage subjects however, in contrast to website registrations overall, **improvements in the graduate labour market** appear to have dampedened the growth of registrations. This reflects the fundamentally different labour market opportunities available to this pool of graduates. Moreover, modelling this subset has been more challenging meaning estimates should be viewed more cautiously. Despite this, **marketing activities** may have driven the increased volume of shortage subject registrations over the last two and a half academic cycles, contributing up to **35,100 (50% of the total website registrations for shortage subjects) website registrations** for shortage subjects.

Marketing mix and cost effectiveness

TV, Social Media and paid **Search** have been the strongest drivers of **website sessions** in the latest period; and **Search** and **Social Media** have been the most cost effective marketing drivers. In terms of website registrations for all secondary subjects, **Social Media** has been the most successful channel.

Digital Display is also relatively more successful in driving registrations than website sessions, and it has been particularly cost effective in driving **shortage subject registrations**. The diminished **Social Media conversion rate** appears to be the primary **contributor to a lower January-March registrations burst** in 2017/18, followed by the lower levels of Digital Display activity.

The **contribution of Press has decreased drastically**, and **Radio** is still a relatively **low contributor** (although there are heavy caveats around capturing its impact).

3 Findings

3.1 Impact of marketing on website sessions

Impact of marketing and contextual factors

The econometric model of website sessions decomposes the total number of website sessions into **website sessions attributable to marketing activities** and those **attributable to contextual factors**. Thus, the website sessions attributable to contextual factors can be interpreted as the ‘baseline’ level of website sessions, namely the website sessions that would have occurred in the absence of any marketing activities.

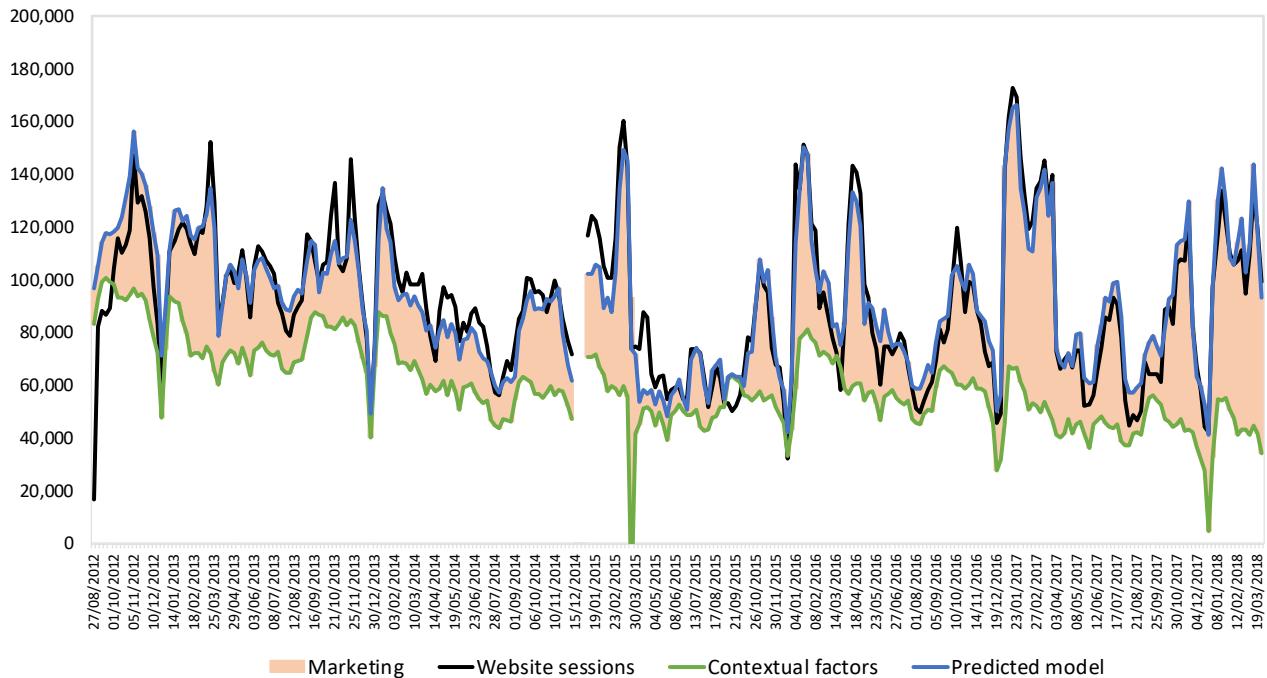
Figure 3 below demonstrates the break-down of website registrations produced by the analysis. The **black line** provides the actual number of website sessions that occurred over the period. The **green line** represents the baseline level of website sessions, i.e. the estimated number of website sessions explained by contextual factors outside of marketing activities, while the **blue line** provides the estimated number of website sessions explained by the combination of contextual factors and marketing variables.⁷ As such, the gap between the **blue line** and the **green line** represents the estimated incremental impact of marketing activities on website sessions, which is shaded in **orange**.

The nature of the recruitment process for initial teacher training courses is seasonal, with peaks of interest from potential applicants occurring naturally during certain times of the academic year. This is the case for the overall level of website sessions, but also for the estimated baseline level of website sessions that would have occurred in the absence of marketing.

The periods of the academic cycle when the number of website sessions induced both by marketing and by seasonality (i.e. baseline interest) reach their highest level are typically January - April, followed by September - December. This seasonal pattern implies that the marketing campaign has capitalised on the naturally occurring booms of interest and consideration in applying for ITT courses in winter and autumn time.

⁷ The econometric model represents the real level of website sessions very well, which is indicated by the R-squared goodness of fit measure. An adjusted R-squared value of 0.97 indicates that the marketing activities and contextual factors included in the model explain 97% of the variation in website sessions. Peaks and troughs in the predicted model (**blue line**) generally match well to actual website sessions (**black line**), particularly so in the latest two years and a half of marketing activity.

Figure 3: Estimated impact of marketing and contextual factors on website sessions



Sample size = 287; adjusted R-squared = 0.97.

Note: Gaps in series are due to data loss caused by technical issues at the source. The deep troughs are associated with Holidays (Christmas and Bank Holidays) and with the industrial dispute that took place in the week of the 23rd March 2015.

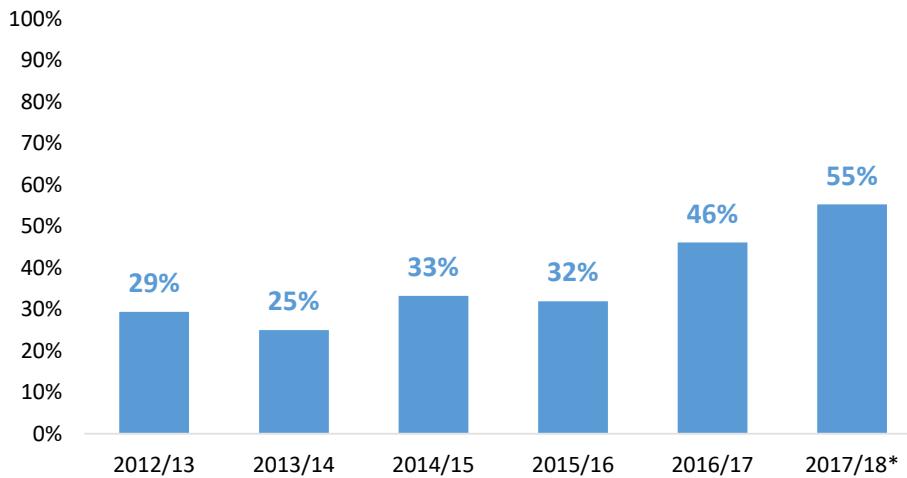
Source: London Economics' analysis of DfE data

In addition to seasonality and holidays, other contextual factors that are strongly linked with website sessions are the wider graduate unemployment rate amongst 21 to 30-year-olds; the level of salary for teachers under the age of 25; and the average level of public-sector pay⁸. Altogether, contextual factors explain around **65%** of website sessions over the full modelling period from August 2012 to March 2018.

Since January 2016, when the previous wave of the study concluded, the number of website sessions induced by marketing has continued to grow, potentially due to an increased and more targeted investment in marketing. This has led the share of website sessions attributable to contextual factors to decline and that attributable to marketing activities – to increase, as shown in Figure 4. In particular, **marketing activities have brought an additional 3.9 million website sessions between September 2016 and March 2018, which corresponds to approximately 50% of all website sessions over this period.**

⁸ Note that the same contextual factors that were found to be statistically significant in the previous wave of the study were included in this wave of the study. No constant has been included in the model this time, as it was not statistically significant.

Figure 4: Estimated contribution of all marketing as a proportion of all website sessions



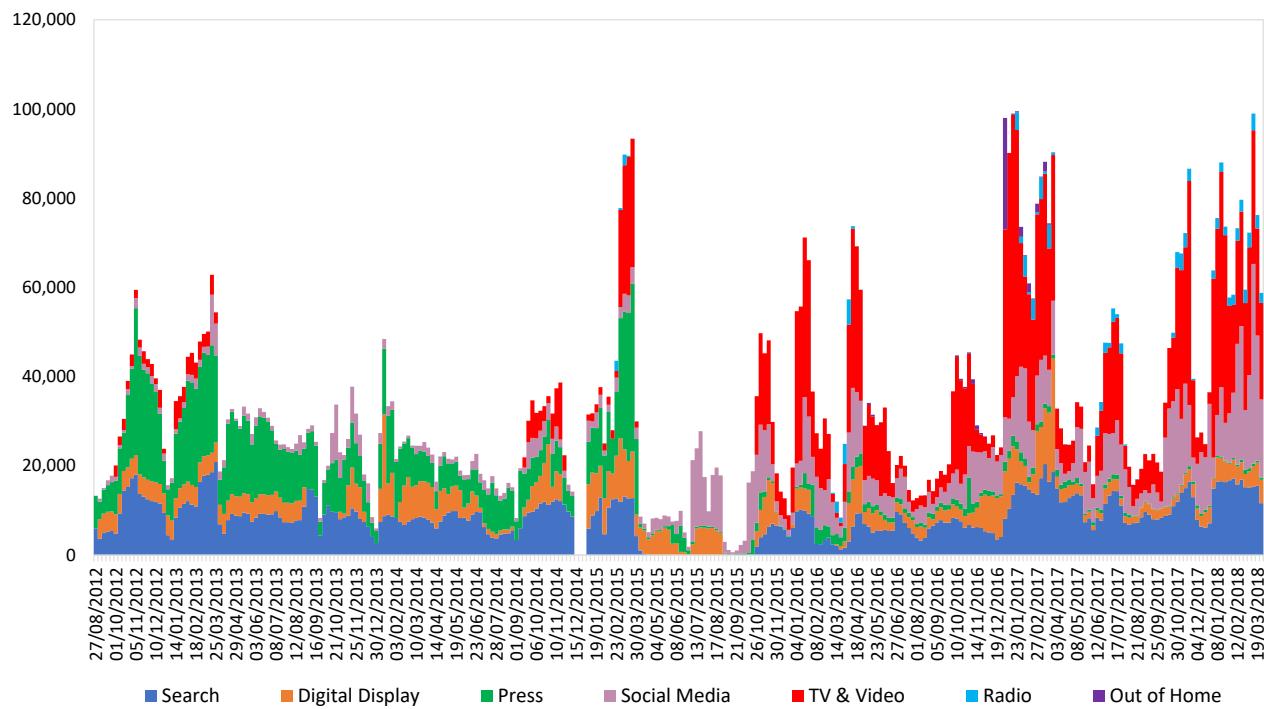
Note: * 2017/18 only captures data until 31st March 2018

Source: London Economics' analysis of DfE data

Incremental impact by marketing activity

Figure 5 illustrates which channels have contributed to the additional website sessions induced by marketing, and to what extent. The larger the area that is taken up by a particular channel, the larger the total contribution of the respective channel over time.

Figure 5: Incremental impact of marketing activities on website sessions



Note: Some marketing channels, e.g. TV and Video, have been grouped together both for presentational purpose and because a disaggregated impact could not be reliably identified.

Source: London Economics' analysis of DfE data

The results for the additional impact of each separate marketing activity (presented in detail in Annex 1) show that the contribution of **TV and Video** accounts for **39%** of all

marketing-driven web sessions in the 2017/18 academic year (up until the end of March). The contribution of TV and Video has been growing over time, potentially as a result of the more frequent bursts of TV activity (with estimated **639,200** website sessions in the first 6 months of the 2017/18 cycle and **860,500** in the full 2016/17 cycle compared to **567,200** in the 2015/16 cycle).

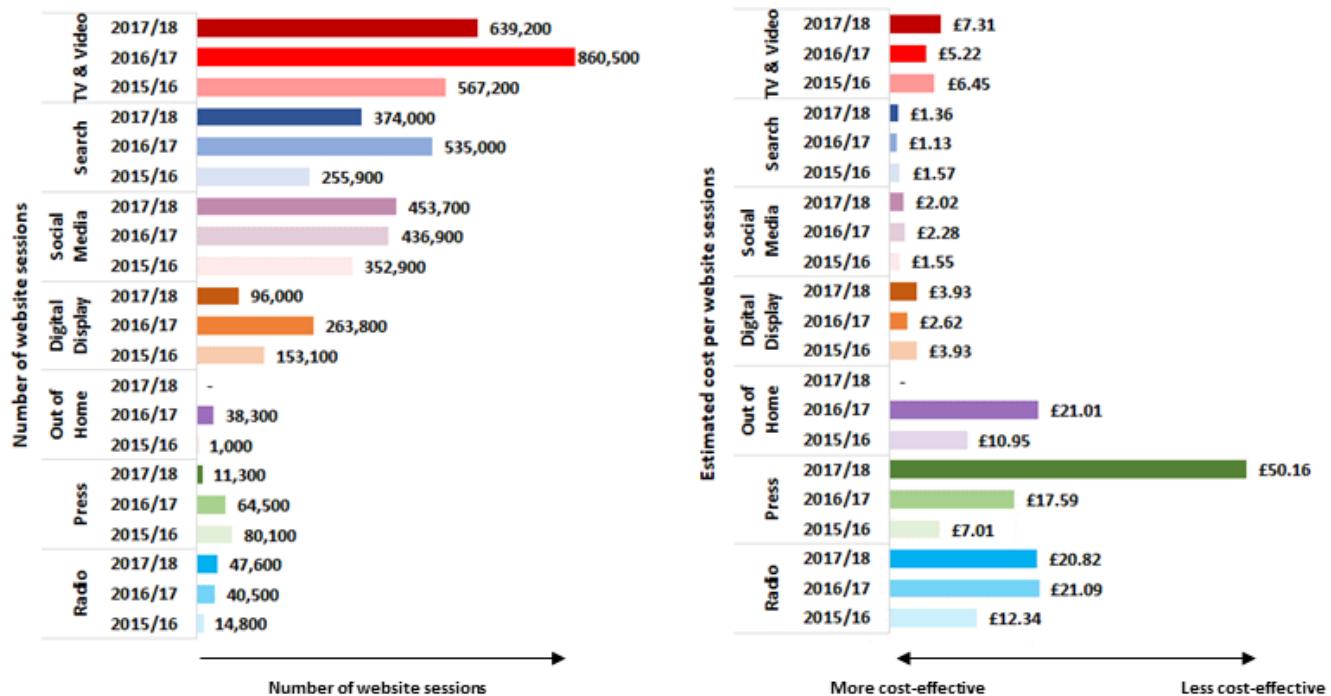
Social media has also supported the campaign well (**28%** of all marketing impact in the 2017/18 academic year) and the impact of **generic paid Search⁹** remains substantial and stable compared to previous cycles. The contribution of **Digital Display**, on the other hand, appears slightly diminished compared to previous cycles of the campaign. Despite the high levels of **Radio** activity, its contribution to website sessions appears relatively small, yet already higher in the first 7 months of 2017/18 than in the entire previous cycle. It should also be noted that any potential effectiveness of channels such as **Out-of-Home** (OOH) and **Cinema** might be underrepresented due to multicollinearity or the shared use of Call-to-Action (CTA) between channels in the more recent periods.

Cost effectiveness by channel

Acknowledging the caveats presented in the previous section in relation to common Call-to-Action terms and the possible mis-attribution of impacts by channel, the analysis of website visits indicates **paid Search** was the most cost effective marketing strategy, with a cost per website session of approximately £1.13 in 2016/17 and approximately £1.36 per website session in 2017/18 (up to 31st March). **Social media** was also relatively cost effective with an estimated £2.02 cost per website session in the latest modelling period, followed by **Digital Display** at an estimated £3.93 cost per website session.

⁹ The ‘paid search’ results discussed throughout the report refer to ‘generic paid search’ activity, and not ‘branded’ paid search. Branded paid search has been assumed to transmit the response to channels which carry the Call-to-Action phrase and therefore branded paid search activity has been attributed to those channels, to the extent possible.

Figure 6: Impact and cost-effectiveness of marketing activities on website sessions



Note: The information in the left hand side panel represents the number of website sessions attributable to the different marketing channels in each academic cycle; while the information presented in the right hand side panel presents an estimate of the cost per website session associated with each marketing channel, which is based on full costs to DfE of each marketing channel, excluding administrative and creative costs. 2017/18 figures only represent the 7 months of data available (September 2017 – March 2018).

Search includes Paid Search and generic search activity. The impacts of Press (pre-2013/14) and TV & Video (since the launch of TV) are based on the variation of branded search as well as TV and video activity. Since October 2016, other channels have also used the brand Call-to-Action phrase, which means that some of their impact might be attributed to TV/Video and the impact and cost-effectiveness of Radio/Digital radio, Press, OOH and Cinema might be underestimated. Digital press was only run in 2015/16 and not in 2016/17, but its contribution is small compared to Press.

Source: London Economics' analysis of DfE data

Despite the significant number of website sessions attributable to **TV and Video**, and the consistent share of the total impact of marketing these channels represent, the cost effectiveness of these channels has slightly diminished between the last two years: the cost per session associated with TV and Video was estimated to be approximately £5.22 in 2016/17, compared to £7.31 in 2017/18 so far.

At the other end of the spectrum, as a result of a decrease in the impact of Press¹⁰, the cost effectiveness associated with this channel has significantly worsened. Specifically, the estimated cost of achieving a website session from this channel has increased from an estimated £17.59 in 2016/17 to over £50 in 2017/18 (though acknowledging that

¹⁰ Part of the decrease in the impact of press might be explained by the fact that starting from the 2015/2016 academic year, the 'Call-to-Action' phrase used in Press was placed in the TV/Video advertisement and the Press campaign started using user-friendly URLs instead. Given that people might not search for the exact URL in the same way as a 'Call-to-Action' phrase, this reduced the ability to measure the effectiveness of the Press campaign.

Press may be more targeted at recruitment activities in particular subject areas, and may have had an additional brand-building function).

3.2 Impact of marketing on website registrations for all secondary subjects

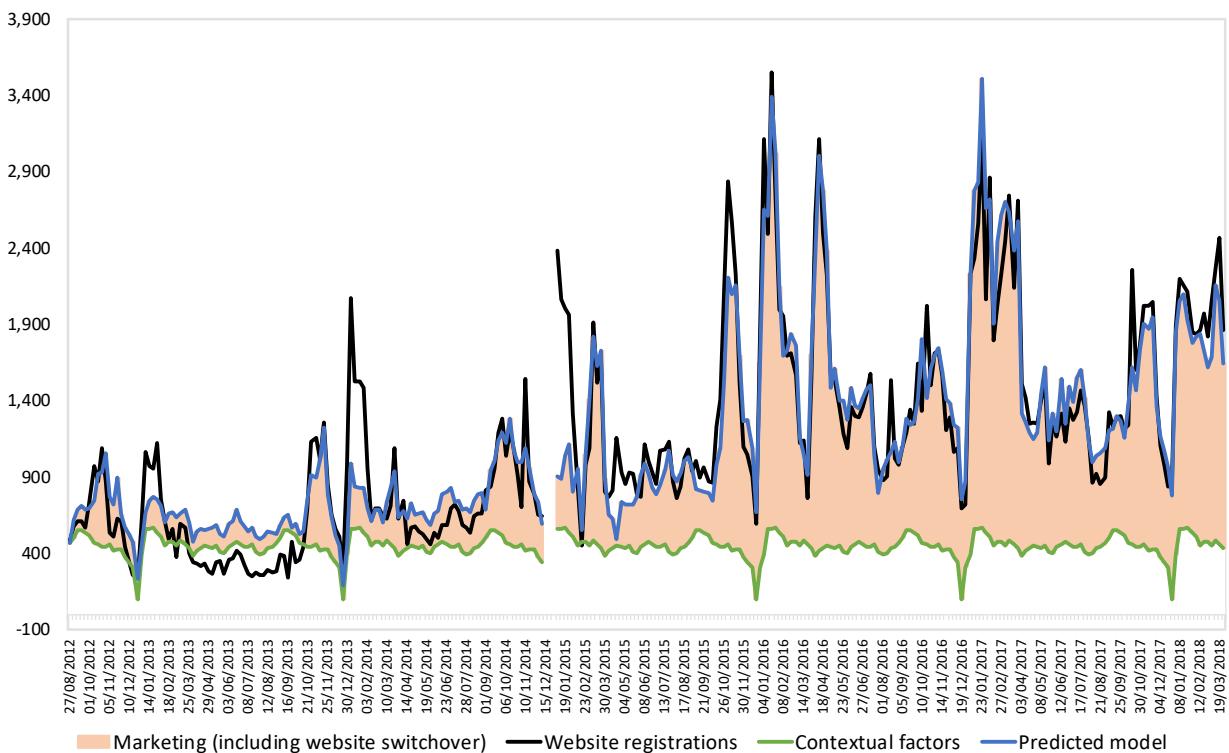
Impact of marketing and contextual factors

Registrations of interest in Initial Teacher Training courses for secondary school subjects on the 'Get into Teaching' website have been generally increasing over time, and at a faster rate than website sessions. This suggests the **conversion rate from website sessions to registrations has improved** compared to earlier academic year recruitment cycles. This is likely due to a mix of website optimisations and the more sophisticated targeting of digital marketing channels.

The **contextual factors** which have been found to impact registrations - seasonality and holidays - explain a relatively smaller proportion of registrations. The contribution of contextual factors to registrations was around 40% over the full modelling period (August 2012 to March 2018), meaning that in the absence of marketing, the level of website registrations would have been substantially lower.

As with website sessions, the periods when both marketing and seasonality reach their highest impact are January - April, followed by September - December. However, this trend is much **less pronounced in the 2017/18 cycle**, and the **January - April peak did not reach that of 2016/17**. Moreover, during the Christmas period, there is a significant decrease in activity.

Figure 7: Estimated impact of marketing and contextual factors on website registrations (all secondary subjects)



Sample size = 287; Adjusted R-squared = 0.896

Note: Gaps in series are due to data loss caused by technical issues at the source. The data collection has changed since the previous analysis, and the database is updated live; hence perfect comparability of the series cannot be guaranteed.

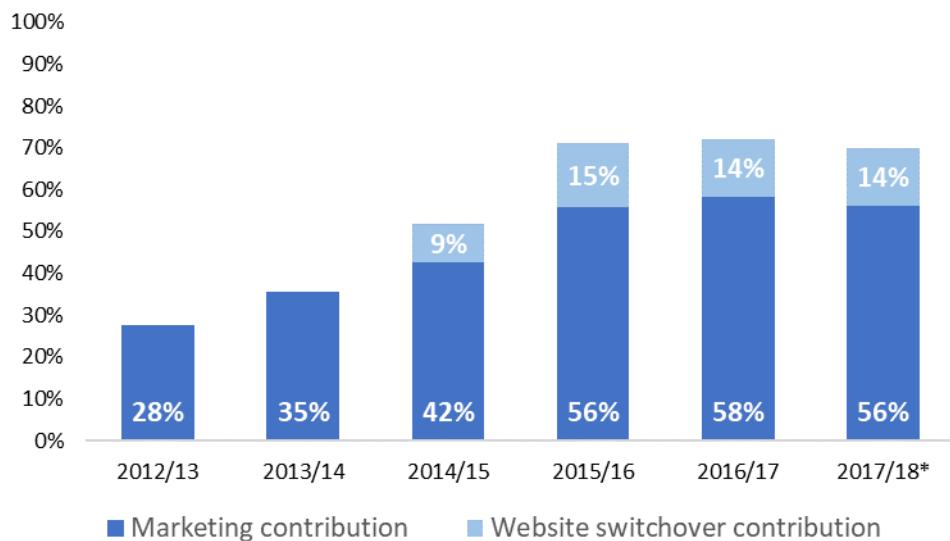
Source: London Economics' analysis of DfE data

As shown in Figure 8, **marketing** has been driving the majority of website registrations over the 2016/17 and 2017/18 academic cycles (estimated at 58% of all secondary subject registrations in 2016/17 and 56% in 2017/18), increasing sharply between 2013/14 and 2015/16 and remaining broadly constant between 2015/16 and March 2018. This increase in the contribution of marketing to website registrations is broadly in line with the timing of increased marketing expenditure.

However, in absolute terms, the impact of marketing activities has declined compared to the previous cycle: in the first 7 months of 2017/18, marketing activities alone have brought an additional 26,800 website registrations, compared to 36,100 for the same period in 2016/17.

It should be noted that the econometric model (as evidenced in Figure 7) does not fit the actual data as well in the earlier periods (2012/13 in particular) as it does in the later periods. For this reason, the low contribution of marketing as a proportion of all website registrations in the early years compared to the later years should be treated with caution.

Figure 8: Estimated contribution of all marketing as a proportion of website registrations (all secondary subjects)



Note: *2017/18 only captures data until 31st March 2018.

Source: London Economics' analysis of DfE data

Incremental impact by marketing activity

Considering the specific impact of different elements of the marketing strategy, the website switchover in Spring 2015 has resulted in a higher conversion rate from sessions to registrations, bringing in approximately **240 registrations more per week** compared to the previous website.

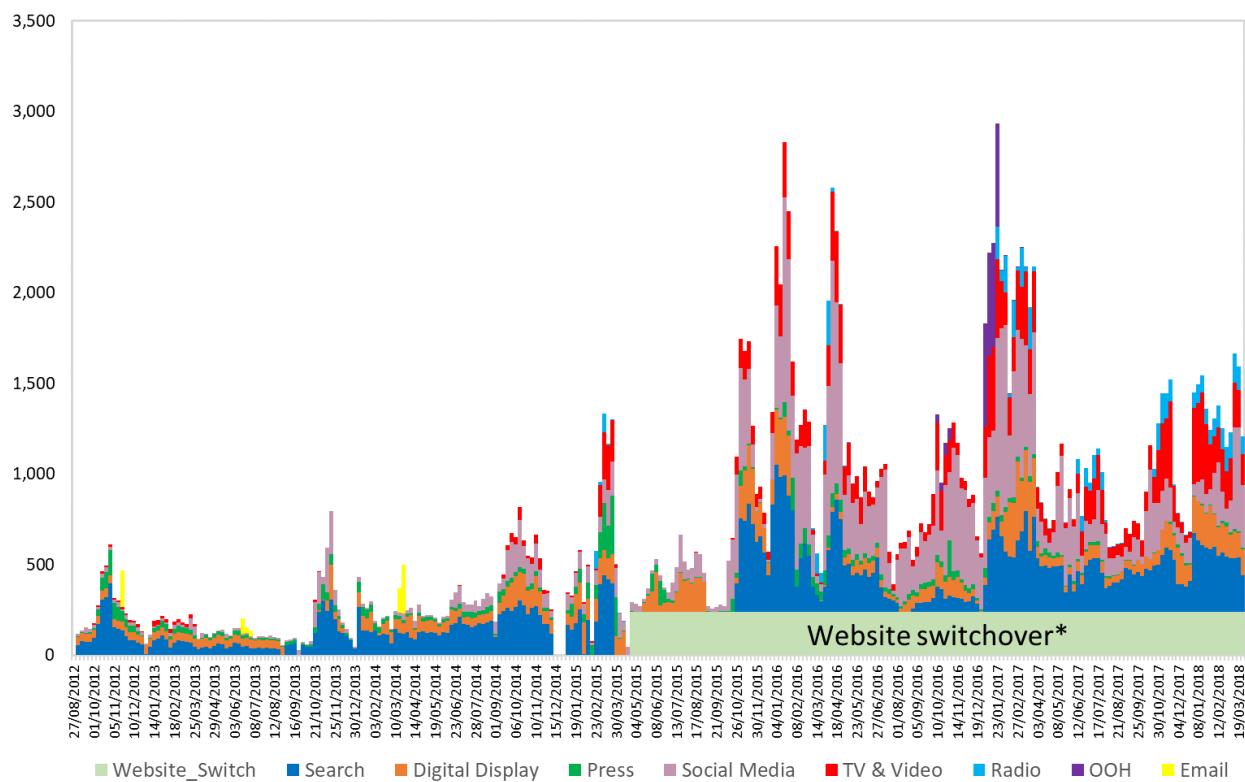
Broken down by individual marketing channels (presented in Figure 9 and in detail in Annex 1), the results demonstrate that in 2017/18 so far, **TV and Video** have contributed **24%** of the overall marketing impact (**6,400** registrations). The impact of generic paid **Search** is significant and amounts to approximately **31%** (**8,300** registrations) of the overall marketing impact in 2017/18.

Whilst **Social Media** was the largest contributor to website registrations for all secondary subjects (accounting for **39%** of the marketing-driven registrations) in 2016/17, it has only been the third-best performing channel in the first 7 months of 2017/18, having generated approximately **22%** of the marketing induced secondary subject registrations. **Digital Display** was more effective at driving website registrations than website sessions, accounting for **15%** of the marketing-driven registrations in 2017/18.

In relation to other marketing channels, the contribution of **Radio** to website registrations is larger compared to that for web sessions. It remains relatively small however, which may be explained by the CTA it uses being shared with other channels. It should also be acknowledged that Radio is typically a channel for which the impact is difficult to measure. The target audience is less aware that they are exposed to advertising via Radio and usually its impact is realised by enhancing the effectiveness of other

marketing channels (which cannot be captured in this type of modelling), commonly referred to as the “halo” effect.¹¹

Figure 9: Incremental impact of marketing activities on website registrations (all secondary subjects)



Note: The data collection has changed since previous analysis, and database is updated live; hence perfect comparability of the series cannot be guaranteed. The impact of the website switchover is constant from May 2015 onwards.

Source: London Economics' analysis of DfE data

Cost effectiveness by channel

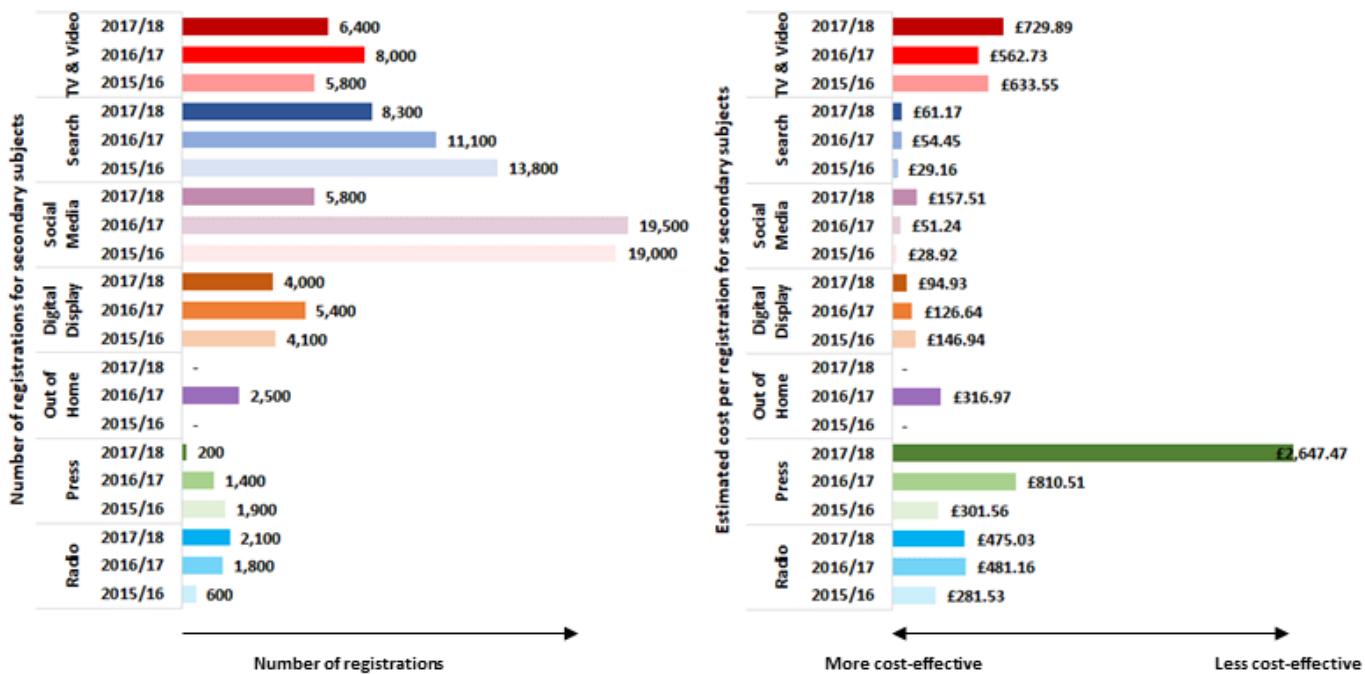
Figure 10 below presents a comparison of the cost effectiveness of each channel in generating additional website registration, over the past two academic cycles.

Again, recognising the caveats presented in the previous sections, the analysis of website registrations indicates the **Social Media** channel was the most cost effective marketing strategies with a cost per website registration of approximately £28.92 in 2015/16 and approximately £51.24 per website registration in 2016/17. However, the cost effectiveness of Social Media has worsened in 2017/18 (up to 31st March), with a registration costing £157.51. It has been overtaken by generic paid **Search** being the most cost-effective channel for the latest cycle so far, at £61.17 per registration.

¹¹ Binet, L. and Field, P. (2008). 'Overview of marketing in the era of accountability'.

The cost effectiveness of TV and Video has also worsened marginally between the two years: the cost per website registration associated with **TV and Video** has increased from approximately £562.73 to £729.89 between the two years. At the other end of the spectrum (again), the cost effectiveness associated with **Press** have worsened. Specifically, the estimated cost of achieving a website registration has increased from approximately £810.51 to approximately £2,647.47 per registration in 2017/18 (up to 31st March),

Figure 10: Impact and cost-effectiveness of marketing activities on website registrations (all secondary subjects)



Note: The information in left hand side panel represents the number of website registrations attributable to the different marketing channels in each academic cycle, while the information presented in the right hand side panel presents an estimate of the cost per website registrations associated with each marketing channel, which is based on full costs to DfE of each marketing channel, excluding administrative and creative costs.

2017/18 figures only represent the 7 months of data available (September 2017 – March 2018). Digital press was only run in 2015/16 and not in 2016/17, but its contribution is small compared to Press. The impact of Paid Search is based on generic search activity only. The impacts of Press (pre-2013/14) and TV & Video (since the launch of TV) are based on the variation of branded search as well as TV and video activity. Since October 2016, other channels have also used the brand Call-To-Action phrase, which means that some of their impact might be attributed to TV/Video and the impact and cost-effectiveness of Radio/Digital radio, Press, OOH and Cinema might be underestimated.

Source: London Economics' analysis of DfE data

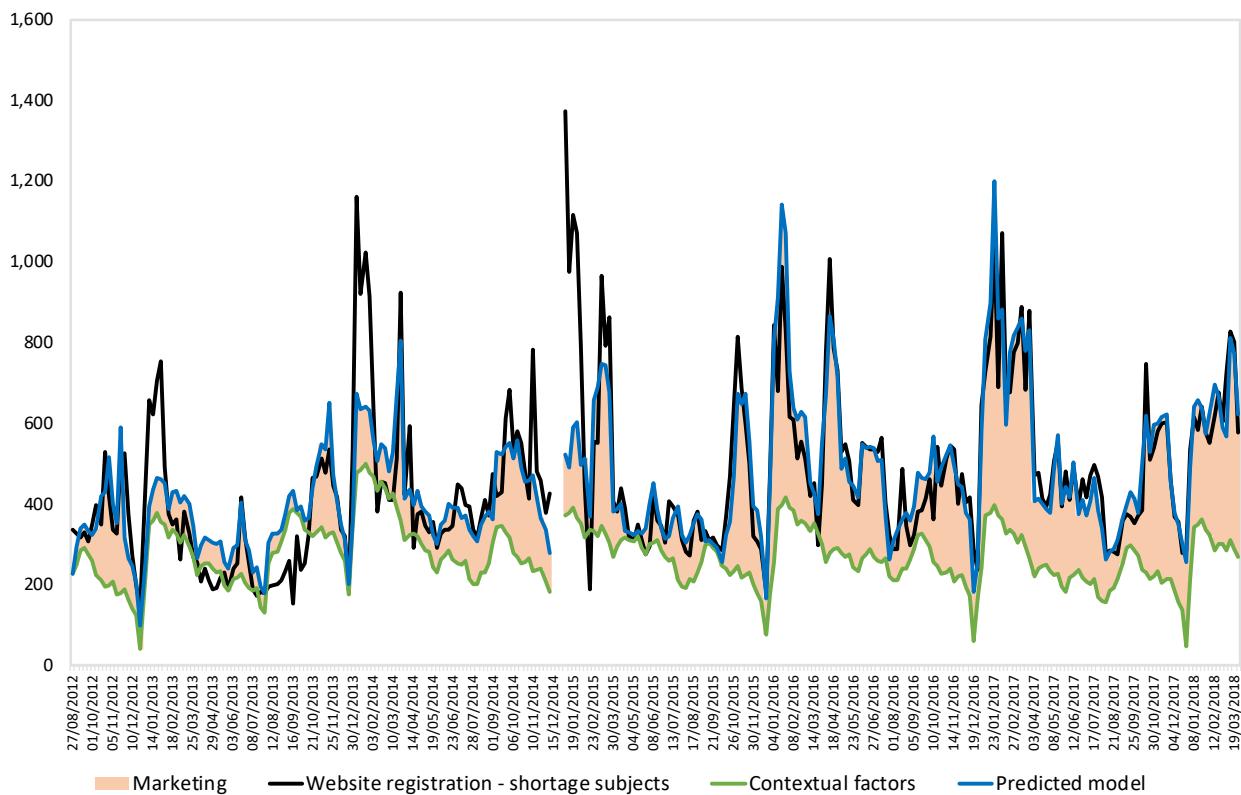
However, it is again important to note that the interaction of some marketing channels (especially with the same Call-to-Action terms) with TV and Video might result in an overly negative measure of cost effectiveness of smaller channels such as Radio and Press than is actually the case. Conversely, the potential "halo" effect that TV and Video might have on social media marketing might result in an overly positive estimate of cost-effectiveness associated with social media.

3.3 Impact of marketing on website registrations for shortage subjects

Impact of marketing and contextual factors

Registrations in shortage subjects started to increase in the 2015/16 and 2016/17 academic cycles. However, the website switchover has not been found to impact registrations for core shortage subjects, which indirectly implies that the conversion rate from website sessions to registrations has not improved to the same extent for shortage subject candidates as for all other subjects.

Figure 11: Estimated impact of marketing and contextual factors on website registrations (core shortage subjects)



Sample size = 287; Adjusted R-squared = 0.576.

Note: Gaps in series are due to data loss caused by technical issues at the source.

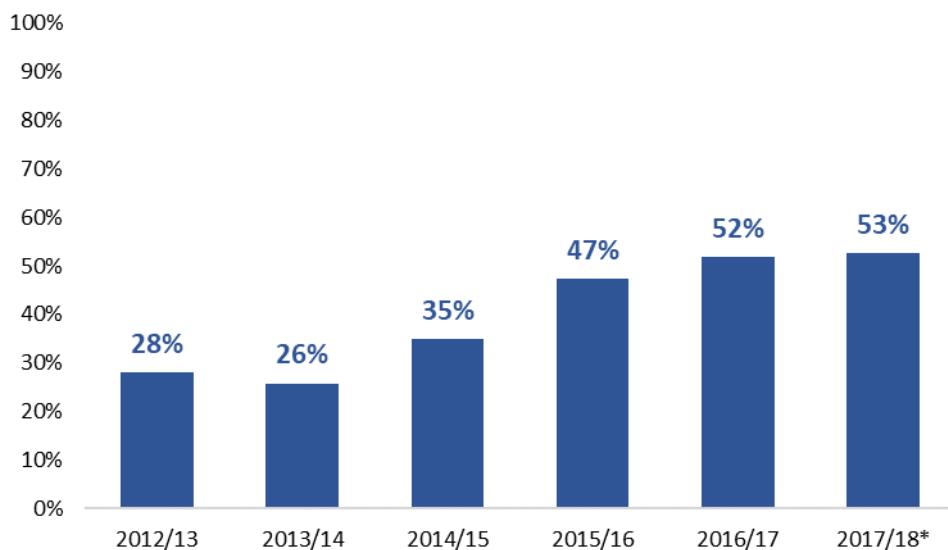
Source: London Economics' analysis of DfE data

Contextual factors account for around **60%** of all shortage subject registrations over the full modelling period (August 2012 until March 2018). Unlike (all subject) website registrations, **improvements in the graduate labour market**, represented by the decline in unemployment of 21 to 30 year old graduates, appears to have dampened the growth

of shortage subject registrations¹². In particular, identifying a strong and negative relationship between improved wider labour market conditions faced by graduates in core shortage subjects and the number of website registrations for these subjects, our analysis suggests that registrations for shortage subjects are negatively affected by the increased availability of job opportunities to these graduates. Hence, as a consequence of a recovery in the labour market for these graduates, registrations for shortage subjects decreased compared to previous academic cycles characterised by a weaker graduate labour market. However, this effect is partially offset by the increased value of scholarships¹³.

Despite this, the **proportion** of registrations for shortage subjects driven by marketing activities has continually **increased since 2013/14**. Furthermore, **marketing activities** have driven the increased volume of shortage subject registrations over the last few academic cycles, contributing over 26,600 (50% of the total website registrations for shortage subjects) website registrations for shortage subjects in total in 2015/16 and 2016/17 and more than 8,500 (53% of the total website registrations for shortage subjects) registrations in 2017/18 (up to 31st March). In comparison, the contribution of marketing to shortage registrations over the whole period of the previous three academic cycles (2012/13-2014/15) was approximately 18,500 (30% of the total website registrations for shortage subjects) registrations in total.

Figure 12: Estimated contribution of all marketing as a proportion of website registrations (core shortage subjects)



Note: * 2017/18 only captures data until 31st March 2018.

Source: London Economics' analysis of DfE data

¹² This variable was tested in the model for registrations for all secondary subjects, but its coefficient was not statistically significant, thus indicating that variations in the unemployment rate for graduates don't contribute to explain variations in registrations for secondary subjects.

¹³ We also tested the impact of bursaries on registrations for shortage subjects, but its coefficient was not statistically significant.

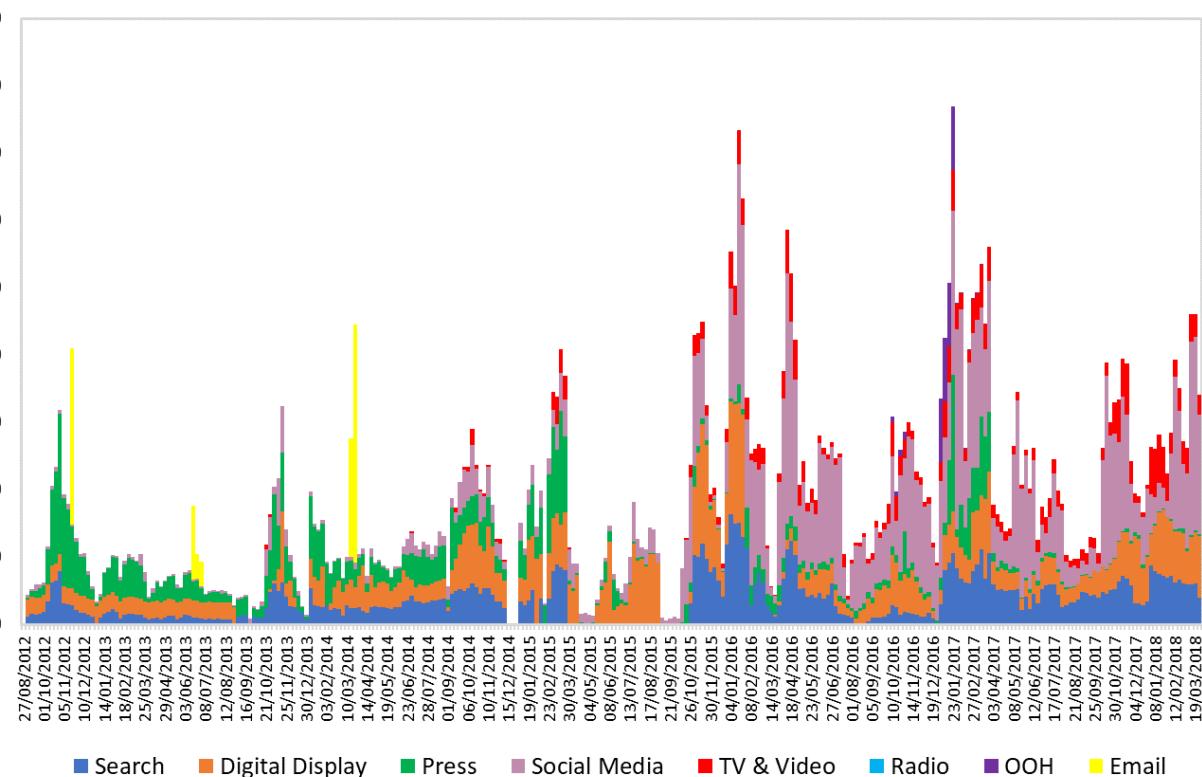
However, the number of **marketing-driven shortage registrations** between September and March has **remained constant** between 2016/17 and 2017/18, which may suggest that the growth of shortage subject registrations is coming to a halt.

Incremental impact by marketing activity

Looking at the contribution of individual marketing activities to core shortage subject registrations (presented in Figure 13 and in detail in Table 18 in Annex 1), the following can be observed:

- **Social Media** is the channel with the highest contribution to registrations in shortage subjects (approximately 41% in 2017/18 so far), despite a decrease in the relative estimated impact compared to 2016/17.
- **Display** has contributed 22% of the shortage subject registrations driven by marketing in 2017/18 so far; and **Search** has contributed 20%.
- **Press** only accounted for a very small share of shortage subject registrations in 2017/18, whereas in 2012/13 and 2014/15, this was the channel with the highest contribution to shortage subject registrations.

Figure 13: Incremental impact of marketing activities on website registrations (core shortage subjects)



Source: London Economics' analysis of DfE data

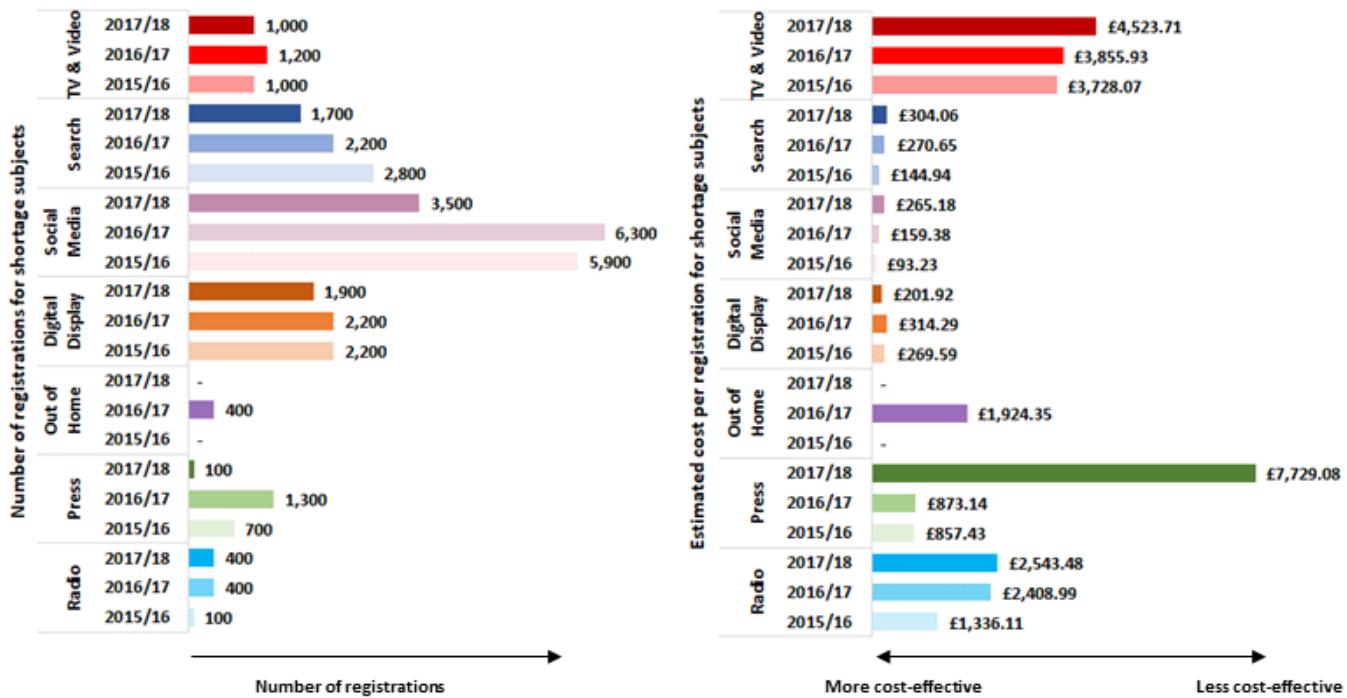
Cost effectiveness by channel

Figure 14 presents a comparison of the cost effectiveness of each channel in generating additional website registrations in shortage subjects, over the past two academic cycles.

The analysis of website registrations in shortage subjects indicates the **Social Media** and **Digital Display** were jointly the most cost effective of the marketing strategies over the past couple of cycles, with a cost per website registration of approximately £159.38 and £314.29 respectively in 2016/17, and approximately £265.18 and £201.92 per website registration respectively in 2017/18 (up to 31st March).

The cost effectiveness of **TV and Video** has worsened between the two years: the cost per website registration associated with the TV and Video channel has increased from approximately £3,855.93 to £4,523.71 between the two years.

Figure 14: Impact and cost-effectiveness of marketing activities on website registrations (core shortage subjects)



Note: The information in left hand side panel represents the number of website registrations in core shortage subjects attributable to the different marketing channels in each academic cycle, while the information presented in the right hand side panel presents an estimate of the cost per website registrations in core shortage subjects associated with each marketing channel, which is based on full costs to DfE of each marketing channel, excluding administrative and creative costs.

2017/18 figures only represent the 7 months of data available (September 2017 – March 2018).

Digital press was only run in 2015/16 and not in 2016/17, but its contribution is small compared to Press.

The impact of Paid Search is based on generic search activity only. The impacts of Press (pre-2013/14) and TV & Video (since launch of TV) are based on the variation of branded search as well as TV and video activity. Since October 2016, other channels have also used the brand Call-to-Action phrase, which means that some of their impact might be attributed to TV/Video and the impact and cost-effectiveness of Radio/Digital radio, Press, OOH and Cinema might be underestimated.

Source: London Economics' analysis of DfE data

4 Impact of marketing on UCAS applications

The Initial Findings study conducted in 2016 identified that UCAS applications are a highly seasonal outcome and that there is a potentially long lag between exposure to marketing and submitting a UCAS application. For these reasons, at the time, the impact of marketing on UCAS applications could not be disentangled reliably using time series econometric modelling.

4.1 Methodology

In this study, to overcome the limitations of the econometric modelling approach encountered during the 2016 analysis, the impact of marketing on UCAS applications is assessed using DfE data on the aggregated proportion of Get Into Teaching (GiT) website registrants who converted into UCAS applicants (henceforth known as conversion rates).

Specifically, the study makes use of two sets of conversion rates: the ‘in-year’ and the ‘year-after’ conversion rates. The ‘in-year’ conversion rates provide the proportion of registrants who registered with GiT and submitted a UCAS application in the same recruitment cycle; and the ‘year-after’ conversion rates capture GiT registrants who registered in one year and applied to UCAS the year after. All conversion rates exclude registrants who expressed an interest in applying in different years¹⁴.

It should be noted that this approach does not establish a causal relationship between marketing activities and the number of UCAS applicants for Initial Teacher Training (ITT) courses, but rather uses the ‘best available evidence’ to suggest what the relationship between the two might be, using some assumptions on how the marketing impact works. These assumptions are discussed further in this section and should be kept in mind throughout the discussion of results in this chapter.

Therefore, under a set of assumptions discussed later in this chapter, the ‘in-year’ and ‘year-after’ conversion rates can be used to estimate the proportion of marketing-driven GiT registrants who have subsequently applied to UCAS, thus providing a measure of the estimated impact of marketing activities on this longer-term outcome. In particular, the use of the ‘year-after’ conversion rates alongside with the ‘in-year’ conversion rates allows us to account for the typically delayed response of UCAS applications to marketing that can otherwise not be captured using time series econometric modelling.

¹⁴ To this regard, it must also be noted that TPUK’s GiT registrant database is live, so people who registered last year (or in any year) can go back and change their year preference.

The analysis of the estimated impact of marketing on the number of UCAS applicants follows a two-stage approach:

- 1. Generate the ‘in-year’ and the ‘year-after’ weekly conversion rates for all secondary subjects and core shortage subjects from the conversion rates provided by the DfE:** For both the ‘in-year’ and the ‘year-after’ conversion rates, we received data from the DfE on:

- **Aggregated annual conversion rate and annual conversion rates by subject¹⁵:** The proportion of GiT registrants who applied through UCAS - both aggregated and by subject of preference at the point of registration - for applicants in the 2016/17 and the 2017/18 recruitment cycles; and
- **Aggregated weekly conversion rates¹⁶:** The aggregated proportion of GiT registrants who applied through UCAS by week of registration, for the same period.

Making use of the above data, and under the assumption that *the ratio of the annual aggregate conversion rate to the annual subject conversion rate across the entire recruitment cycle is the same as the corresponding ratio for each week within the same recruitment cycle*, we constructed a series of weekly conversion rates by subject for those recruitment cycles for which data were available¹⁷.

Weekly conversion rates for secondary and core shortage subjects were then generated averaging the subject-specific weekly conversion rates across the relevant subjects.

- 2. Estimate the impact of marketing on UCAS applicants by applying the ‘in-year’ and the ‘year-after’ weekly conversion rates for all secondary and core shortage subjects to the estimated additional GiT registrations attributed to each marketing channel.** Under the assumption that the *conversion rates are constant across all marketing channels¹⁸ (and contextual factors)*, we identified the estimated

¹⁵ The conversion rates provided by the DfE were computed on the basis of those who agreed to data sharing and then scaled up to account for those who did not agree to data sharing.

¹⁶ The conversion rates provided by the DfE were computed on the basis of those who agreed to data sharing and then scaled up to account for those who did not agree to data sharing.

¹⁷ Specifically, the conversion rate for subject x and week t in the recruitment cycle z has been computed as:

$$\text{conversion rate}_{x,t,z} = \frac{\text{yearly conversion rate}_{x,z}}{\text{yearly conversion rate}_{\text{all subjects},z}} \text{conversion rate}_{\text{all subjects},t,z}$$

¹⁸ This assumption was necessary here due to the availability of data and it might potentially be revisited in future versions of the analysis, leading to an improvement in the accuracy of findings.

number of UCAS applicants driven by each marketing channel by converting marketing-driven registrations by channel into UCAS applicants¹⁹.

In addition, to overcome the potential discrepancy between the definition of GiT registrants and registrations, the analysis is based on the assumption that *GiT website registrants have only registered once*, thus assuming a perfect coincidence between registrants and registrations.

Further, it is important to note that in making use of registrants-to-applicants conversion rates, this analysis only identifies the impact of marketing on those UCAS applicants that followed a GiT website registration. Since registering on *Get Into Teaching* is not required in order to submit a UCAS application (indeed in the 2017/18 recruitment cycle only about 48% of UCAS applicants had registered on GiT in-year or the year before 2 years), it is probable that some of these direct applications are driven by the marketing campaign as well. This study does not assess the impact of marketing on those UCAS applications that were not associated with a GiT registration and, hence, it is possible that the estimate of the impact of marketing on UCAS applicants provided here is a conservative estimate.

¹⁹ It should be noted that the time series for registrations for secondary subjects and shortage subjects includes all registrations regardless of the intention to apply to UCAS in a specified year. However, the conversion rates are based on registrants who expressed an interest in applying in a specified year. To overcome this issue, we applied the conversion rates to all registrations, thus obtaining an estimate of the number of all UCAS applicants through the GiT and marketing-driven UCAS applicants through the GiT if all registrations were by registrants interested in applying in the specified year (upper-bound estimates). These estimates are then scaled down using the *upper-bound estimated number of UCAS applicants through the GiT to actual number of UCAS applicants through the GiT ratio* by recruitment cycle, type of impact (in-year or year-after) and set of subjects. This approach is equivalent to assuming that the share of registrations by registrants who intend to apply in a specified year is constant across weeks in the same recruitment cycle and equals to the annual share.

Assumptions

In addition to the assumptions made by the Department for Education for the calculations of the conversion rates, this part of the analysis relies on the following assumptions:

A0: Baseline estimates of conversion rates have been used in the analysis. For each conversion rate, the DfE provided both a baseline (lower-bound) estimate and an upper-bound estimate. The analysis presented here is based on the conservative baseline estimates.

A1: The ratio between the aggregated conversion rate and the conversion rate by subject is constant across weeks in the same recruitment cycle and equals the yearly ratio. Specifically, the conversion rate for subject x and week t in the recruitment cycle z has been computed as:

$$\text{conversion rate}_{x,t,z} = \frac{\text{yearly conversion rate}_{x,z}}{\text{yearly conversion rate}_{\text{all subjects},z}} * \text{conversion rate}_{\text{all subjects},t,z}$$

This assumption implies that all potential subject specific time-patterns in the number of UCAS applicants are not captured in the analysis. As a consequence, we cannot exploit the different timings of the various marketing activities to identify whether UCAS applicants for different subjects are impacted differently by each marketing channel.

A2: Conversion rates are constant across all routes to registrations. In other words, in any given week, registrants on the GiT website are equally likely to apply to UCAS regardless of whether they have registered due to marketing or whether they would have registered regardless of marketing. However, it is possible to argue that someone nudged into registering is presumably less likely to apply than someone who did this regardless of marketing, and therefore this assumption is likely to over-estimate the impact of marketing on UCAS applicants.

A3: Conversion rates are constant across all marketing channels, i.e. in any given week, each marketing channel has converted the same percentage of website registrants into UCAS applicants. This is a strong assumption, however, due to data limitations, we are unable to link direct marketing response to individual UCAS applicants.

A4: The share of registrations by registrants who intend to apply in a specified year is constant across weeks in the same recruitment cycle and equals to the annual share. This assumption allows us to apply the conversion rates to all registrations and to subsequently scale down all estimates to adjust for registrations by registrants who didn't express an interest in applying in a given year. A limitation of this assumption is that time-trends in the number of UCAS applicants for a specific year are not captured in the analysis.

A5: Website registrations used for the modelling of the impact of marketing on registrations contain unique registrations, i.e. do not include multiple registrations of the same individual. As it is possible to register more than once to the GiT, it is possible that the number of actual GiT registrants is lower than the number of GiT registrations. Therefore, assuming a one-to-one mapping between registrations and registrants might result in an over-estimation of the impact of marketing on UCAS applicants.

4.2 Main findings

Considering that the response to marketing may take a long period of time, the analysis distinguishes between two strands of impact:

- 'In-year' impact of marketing on UCAS applications, assessed by estimating the number of applications driven by marketing activities performed in the same academic year (of the application); and
- 'Delayed' impact of marketing on UCAS applications, assessed by estimating the number of applications driven by marketing activities performed in the previous academic year.

The two strands are then combined to produce:

1. An estimate of the total impact of the marketing activities undertaken in the 2016/17 academic year on UCAS applications²⁰; and
2. An estimate of the percentage of UCAS applications through GiT submitted in the 2016/17 and in the first seven months of the 2017/18 recruitment cycle, that are attributable to some form of marketing (irrespective on the timing of the activity).

In-year impact of marketing on the number of GiT registered UCAS applicants

The analysis suggests that the DfE marketing campaign is effective in driving UCAS applications in the same recruitment cycle for both secondary and shortage subjects. Out of the total of 10,630²¹ in-year UCAS applicants for all secondary subjects in the 2016/17 recruitment cycle and the first seven months of the 2017/18 recruitment cycle who also registered on the GiT website, over 5,900 (or 56%) are estimated to be ascribable to some marketing activity. Analogously, for core shortage subjects in the same period, marketing-driven 'in-year' UCAS applicants through the GiT are estimated to amount to over 2,020, accounting for about 50% of all these applicants.

²⁰ The 2016/17 is the only academic year for which both the 'in-year' and 'year-after' conversion rates were provided by the DfE.

²¹ This estimate is produced by applying the 'in-year' weekly conversion rate to the predicted number of website registration by week and then summing across weeks in the same recruitment year. For the 2017/18 recruitment cycle, data on registrations are available only up to the end of March 2018, thus limiting the analysis of UCAS applicants to the first seven months of that academic year.

Table 2: Estimated number of marketing-driven ‘in-year’ UCAS applicants linked to GiT registrations, by year of marketing activity and subject

	All secondary subjects		Core shortage subjects	
	2016/17	2017/18*	2016/17	2017/18*
Total number of ‘in-year’ UCAS applicants linked to GiT registrants	7,450	3,180	3,090	970
Attributed to:				
Contextual factors	2,150 (29%)	960 (30%)	1,560 (51%)	480 (49%)
Website switchover	1,120 (15%)	500 (16%)	-	-
Marketing	4,180 (56%)	1,720 (54%)	1,530 (49%)	490(51%)

Note: *Registrations data used in the registrants-applicants conversion were only available up to the 31st of March 2018; consequently, 2017/18 figures only represent the 7 months of data available (September 2017 – March 2018). All figures have been rounded to the nearest 10.

Source: London Economics’ analysis using DfE data

Table 3 presents the estimated number of marketing-driven ‘in-year’ UCAS applicants through GiT registrations, by year of marketing activity and marketing channel, for secondary and core shortage subjects separately. For both non-shortage and shortage subjects, the relative impact of each marketing channel on ‘in-year’ applicants is analogous to the estimated impact on registrants, under the assumption that conversion rates are constant across all marketing channels.

Specifically, with regards to secondary subjects, our study indicates that the most effective marketing channel in 2017/18 is generic paid Search, which accounts for around 32% (550 applicants) of the total number of additional applicants attributable to marketing (1,720). Whilst Social Media was the largest contributor in the 2016/17 recruitment cycle, bringing 42% of the marketing-driven applicants, its impact has declined to 22% in the first seven months of 2017/18.

Table 3: Estimated number of marketing-driven ‘in-year’ UCAS applicants linked to GiT registrations, by year of marketing activity, marketing channel and subject

	All secondary subjects		Core shortage subjects	
	2016/17	2017/18*	2016/17	2017/18*
All marketing	4,180	1,720	1,530	490
By marketing channel:				
Press	150 (4%)	10 (1%)	130 (8%)	0 (0%)
Radio	110 (3%)	120 (7%)	30 (2%)	20 (4%)
TV & Video	680 (16%)	400 (23%)	130 (8%)	60 (12%)
Social Media	1,740	380	710	200

	All secondary subjects		Core shortage subjects	
	2016/17	2017/18*	2016/17	2017/18*
	(42%)	(22%)	(46%)	(41%)
<i>Digital Display</i>	460 (11%)	250 (14%)	260 (17%)	110 (22%)
<i>Out of Home</i>	220 (5%)	0 (0%)	50 (3%)	0 (0%)
<i>Search</i>	820 (20%)	550 (32%)	210 (14%)	100 (20%)

Note: *Registrations data used in the registrants-applicants conversion were only available up to the 31st of March 2018; consequently, 2017/18 figures only represent the 7 months of data available (September 2017 – March 2018). All figures have been rounded to the nearest 10.

Source: London Economics' analysis using DfE data

In terms of the estimated impact of marketing on UCAS applicants for core shortage subjects, Social Media accounted for the largest fractions of marketing-driven applicants (46% in 2016/17 and 41% in 2017/18) followed by Digital Display (17% and 22%) and generic paid Search (14% and 20%) in both the 2016/17 and the first seven months of the 2017/18 recruitment cycle.

Delayed impact of marketing on the number of GiT-registered UCAS applicants

The 2016 evaluation study pointed out that the impact of marketing on applicants may be delayed and take a long period of time before arising. An evaluation of the impact of marketing on UCAS applicants would ideally account for this delayed impact, which is captured in this study by looking at the number of marketing-driven registrants in a specific year that submitted a UCAS application the year after. Table 4 presents figures for the estimated marketing-driven 'year-after' UCAS applicants through GiT registrations, by year of marketing activity and by subject.

Overall, the analysis indicates a delayed impact of marketing on UCAS applicants for both secondary and core shortage subjects, with about 3,980 marketing-driven GiT registrants for all secondary subjects in 2016/17 applying to UCAS in the 2017/18 recruitment cycle (the figure stands at 1,450 for core shortage subjects). For both shortage and non-shortage subjects, we observe an increase in the estimated number of marketing-driven 'year-after' UCAS applicants between the two recruitment cycles for which data are available. This potentially suggests that marketing activities undertaken between in the 2016/17 recruitment cycle had a more long-lasting effect than those undertaken in the 2015/16 recruitment cycle.

Table 4: Estimated number of marketing-driven ‘year-after’ UCAS applicants linked to GiT registrations, by year of marketing activity and subject

	All secondary subjects		Core shortage subjects	
	2015/16	2016/17	2015/16	2016/17
Total number of ‘year-after’ UCAS applicants linked to GiT registrants	6,890	7,100	2,790	2,880
Attributed to:				
Contextual factors	2,070 (30%)	2,040 (29%)	1,520 (55%)	1,430 (50%)
Website switchover	1,120 (16%)	1,090 (15%)	-	-
Marketing	3,690 (54%)	3,980 (56%)	1,270 (45%)	1,450 (50%)

Note: All figures have been rounded to the nearest 10.

Source: London Economics’ analysis using DfE data

As with the analysis of ‘in-year’ impact, the delayed impact of each marketing channel on applications for shortage and non-shortage subjects reflects the estimated impact of each activity on registrations, with Social Media and generic paid Search driving most marketing-driven applicants in 2016/17 and the first seven months of 2017/18, for both sets of subjects.

Table 5: Estimated number of marketing-driven ‘year-after’ UCAS applicants through GiT registrations, by year of marketing activity, marketing channel and subject

	All secondary subjects		Core shortage subjects	
	2015/16	2016/17	2015/16	2016/17
All marketing	3,690	3,980	1,270	1,450
By marketing channel:				
Press	160 (4%)	120 (3%)	70 (6%)	120 (8%)
Radio	50 (2%)	140 (3%)	10 (1%)	40 (3%)
TV & Video	460 (12%)	640 (16%)	90 (7%)	120 (8%)
Social Media	1,550 (42%)	1,550 (39%)	590 (46%)	660 (46%)
Digital Display	350 (9%)	440 (11%)	230 (18%)	240 (17%)
Out of Home	0 (0%)	180 (5%)	0 (0%)	40 (3%)
Search	1,120 (30%)	900 (23%)	270 (21%)	230 (16%)

Note: All figures have been rounded to the nearest 10.

Source: London Economics’ analysis using DfE data

Total impact of marketing undertaken in the 2016/17 academic year on the number of UCAS applicants

The analysis of the ‘in-year’ and ‘delayed’ impact of marketing undertaken in the 2016/17 academic year can be combined to produce an estimate of the total impact of the marketing activity performed in that academic year on the number of UCAS applicants linked to GiT registrations.

Table 6: Estimated total number of UCAS applications linked to 2016/17 GiT registrations

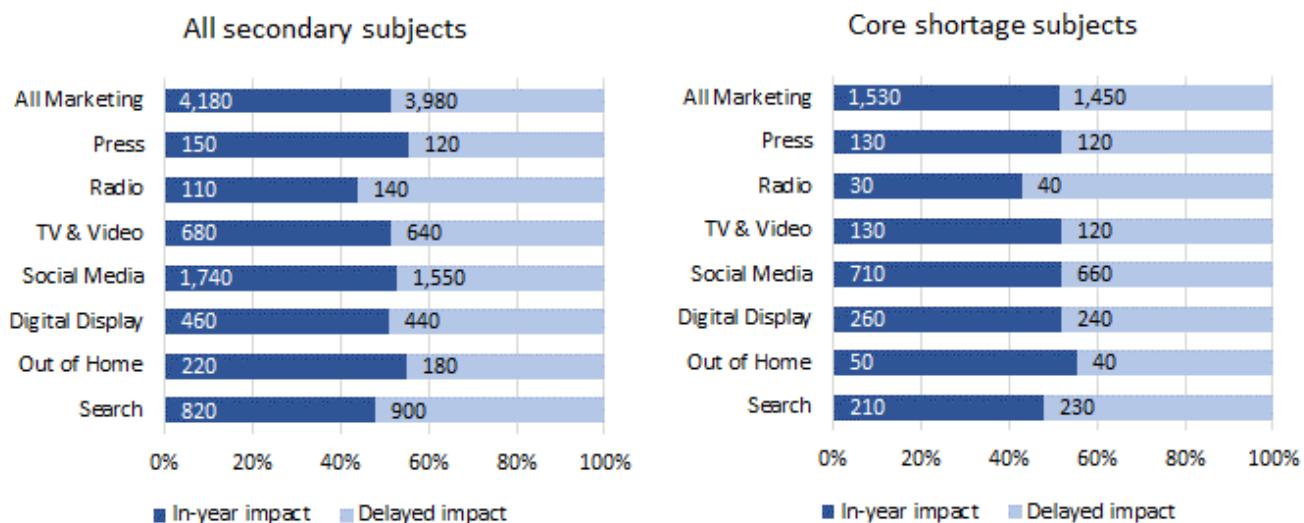
	All secondary subjects			Core shortage subjects		
	Application submitted in 2016/17	Application submitted in 2017/18	Total	Application submitted in 2016/17	Application submitted in 2017/18	Total
Total number of UCAS applicants linked to GiT registrations	7,450 (51%)	7,100 (49%)	14,550 (100%)	3,090 (52%)	2,880 (48%)	5,970 (100%)
Attributed to:						
Contextual factors	2,150 (51%)	2,040 (49%)	4,180 (100%)	1,560 (52%)	1,430 (48%)	2,990 (100%)
Website switchover	1,120 (51%)	1,090 (49%)	2,210 (100%)	-	-	-
Marketing	4,180 (51%)	3,980 (49%)	8,150 (100%)	1,530 (51%)	1,450 (49%)	2,980 (100%)

Note: All figures have been rounded to the nearest 10.

Source: London Economics’ analysis using DfE data

Overall, the study indicates a long-lasting impact of marketing, with approximately 49% (for both set of subjects) of the impact of the marketing activity undertaken by the DfE arising in the next year after the marketing activity takes place. It is likely that the impact of marketing lasts more than a year; however, the currently available data does not allow the assessment of the impact of marketing on UCAS applicants two or more years after the activity takes place. In terms of marketing channels, the results suggest that Radio and generic paid Search are associated with a larger delayed relative impact compared to the other activities (Figure 15). However, it should be noted that due to limitations in the available data, the attribution of the impact to each marketing channel relies on the necessary assumption that the conversion rate is constant across all channels. This assumption may not be completely accurate and therefore results presented in Figure 15 should be viewed cautiously.

Figure 15: Total estimated impact of the 2016/17 marketing activity on the number of UCAS applicants linked to the GiT, by marketing channel and set of subjects



Note: All figures have been rounded to the nearest 10. Due to limitations in the available data, the attribution of the impact to each marketing channel relies on the assumption that the conversion rate is constant across all marketing channels.

Source: London Economics' analysis using DfE data

Marketing-driven number of UCAS applicants linked to the Get Into Teaching website registrants

Whereas previous sections of this chapter discuss the impact of marketing on UCAS applicants from the perspective of the marketing expenditure year, here we discuss the impact that historic marketing has had on UCAS applicants in a given UCAS application cycle²². To put the numbers in the present section into context, it must be noticed that the overall number of UCAS applicants for the 2016/17 and the first seven months of the 2017/18 recruitment cycles were 42,590 and 21,775 respectively²³. The long-term purpose of the marketing activity undertaken by the DfE is to stimulate graduates to apply to UCAS, thus delivering a number of entrant teachers to meet the needs of the sector. Though limited to applications submitted by GiT registrants, our analysis indicates that the marketing activity undertaken by the DfE has successfully boosted the number of UCAS applicants in the 2016/17 and in the first seven months of the 2017/18 recruitment cycle.

With respect to all secondary subjects specifically, the results indicate that an estimated additional 5,700 applicants in the first seven months of the 2017/18 recruitment cycle

²² Note that the results presented in Table 20 and Table 22 are not directly comparable. For example, Table 22 shows that in the 2016/17 recruitment cycle, around 22,860 applicants are linked to GiT registrations. However, Table 20 shows this number to be 10,680. This is because Table 22 also includes UCAS applications that occurred as a result of registrations either in the 2015/16 or 2016/17 cycle, whereas Table 20 only considers registrations in the 2016/17 cycle in order to make the results within the table comparable.

²³ Figures are rounded to the nearest 5.

were attributable to marketing undertaken in the same or in the previous recruitment cycle, accounting for 55% of the overall UCAS applicants who are linked to GiT registrants in the period. A relatively lower impact of marketing on UCAS applications is estimated for shortage subjects, as the proportion of marketing-driven applicants stands at 51% in the 2017//18 recruitment cycle.

Table 7: Estimated number of UCAS applicants linked to GiT, by UCAS recruitment cycle

	All secondary subjects		Core shortage subjects	
	2016/17	2017/18*	2016/17	2017/18*
Total number of UCAS applicants linked to GiT registrations	14,340	10,280	5,880	3,850
Attributed to:				
Contextual factors	4,220 (29%)	2,990 (29%)	3,080 (52%)	1,900 (49%)
Website switchover	2,250 (16%)	1,580(15%)	-	-
Marketing	7,870 (55%)	5,700 (55%)	2,790 (47%)	1,940 (51%)

Note: *Registrations data used in the registrants-applicants conversion were only available up to the 31st of March 2018; consequently, 2017/18 figures only represent the 7 months of data available (September 2017 – March 2018). All figures have been rounded to the nearest 10. Percentages may not sum to 100 due to rounding.

Source: London Economics' analysis using DfE data

5 Conclusions

This updated analysis of Get-into-Teaching marketing up to 31st March 2018 has clearly demonstrated that marketing has substantially boosted its contribution to website sessions the course of 2015/16, 2016/17 and 2017/18. In addition, marketing activities have driven over 50% of all registrations for shortage and non-shortage subjects in the 2016/17 and 2017/18 academic years. The analysis indicates that in the face of increasing shortages, continuing marketing activity is clearly necessary to secure consistent engagement with potential Initial Teacher Training applicants.

The results clearly suggest that DfE's marketing campaign has become more effective compared to its early periods, albeit a slight stall in the 2017/18 academic cycle (up to 31st March). In the **absence of marketing** activities, all outcomes would have been at the baseline levels which are **substantially lower**; and if the **graduate labour market** remains stable, DfE's task will become even more challenging.

- The number of website sessions induced by marketing has continued to grow from approximately 25% of **website visits** in 2013/14 to approximately **55%** in 2017/18 (up to 31st March). In particular, **marketing activities may have brought an additional 5.3 million website sessions between September 2015 and March 2018.**
- **Marketing** has been driving the majority of **website registrations** over the 2015/16, 2016/17 and 2017/18 academic cycles (estimated at **56%, 58%** and **56%** of all secondary subject registrations, respectively), increasing sharply between 2013/14 and 2015/16 and then remaining relatively constant until March 2018. The impact of marketing activities has increased compared to previous cycles. Specifically, marketing activities have brought an additional **121,600 website registrations for all secondary subjects** over the past two and a half academic cycles, compared to 42,500 for the total duration of the previous three cycles (2012/13-2014/15).
- Contextual factors account for around 60% of all shortage subject registrations over the full modelling period (August 2012 until March 2018). **Improvements in the graduate labour market** appear to have dampened the growth of shortage subject website registrations, in contrast to those for all subjects. This reflects the fundamentally different labour market opportunities available to this pool of graduates and has made modelling this sub-group more challenging. Despite this, **marketing activities** may have driven the increased volume of shortage subject registrations over the last two and a half academic cycles, contributing approximately **35,100** website registrations for shortage subjects. In comparison, the contribution of marketing to shortage registrations in the previous three academic cycles (2012/13-2014/15) was approximately 18,600 registrations for the three academic cycles in total.

In terms of the **impact and cost effectiveness of individual marketing channels**:

- **TV, Social Media** and paid **Search** have been the strongest drivers of **website sessions** in the latest period; and **Search** and **Social Media** have been the most cost-effective marketing drivers.
- Unlike 2016/17 when Social Media was the most successful channel in driving **website registrations**, **TV has fared better with registrations for all secondary subjects in 2017/18 so far**.
- **Digital Display** is also relatively more successful in driving registrations than website sessions, and it has been particularly cost effective in driving **shortage subject registrations**.
- The **diminished Social Media conversion rate** appears to be the primary **contributor to a lower January-March registrations burst** in 2017/18, followed by the lower levels of Digital Display activity.
- The **contribution of Press has decreased drastically**.

The analysis has also produced a number of key observations. Specifically,

- Continuing marketing activities is clearly **necessary to secure consistent engagement** with potential Initial Teacher Training applicants.
- Higher investment in marketing during **January-April** compared to September-December seems beneficial, since this is the period in the academic cycle with highest volumes of engagement.
- **TV investment** is still of key importance, but it is also vital to support it with an **effective digital strategy** to boost registrations. It seems that the Social Media + Digital Display strategy in 2016/17 produced better results overall. On the other hand, bringing back paid Search into the channel mix appears to have been beneficial.

There have been significant improvements in the reliability of the modelling as a result of the increased timeframe for analysis. However, if this research is to be updated in the future, it would be beneficial to conduct a thorough data review in collaboration with the individual teams within DfE's marketing team as well as with DfE's media buying agency, in order to establish which sources of data best serve the econometric modelling.

Using external analysis on conversion rates conducted by the Department and under a set of assumptions, it is estimated that about 4,200 (10% of the total UCAS applicants in the 2016/17 recruitment cycle) of the secondary subject UCAS applicants who applied in 2016/17 applied due to marketing in 2016/17, followed by a further 4,000 (18% of the total UCAS applicants in the first seven months of the 2017/18 recruitment cycle) of applicants in the 2017/18 cycle.

Annex 1 Detailed incremental impact and cost per impact figures by recruitment cycle

Table 8: Incremental impact of marketing activities on website sessions

	2012/2013		2013/2014		2014/2015		2015/2016		2016/2017		04/09/2017 to 31/03/2018 only		Overall	
Channel	Estimated additional web sessions (000s)	Cost per additional web session	Estimated additional web sessions (000s)	Cost per additional web session	Estimated additional web sessions (000s)	Cost per additional web session	Estimated additional web sessions (000s)	Cost per additional web session	Estimated additional web sessions (000s)	Cost per additional web session	Estimated additional web sessions (000s)	Cost per additional web session	Estimated additional web sessions (000s)	Cost per additional web session
Display	227.5 (13%)	£2.86	214.0 (18%)	£2.25	267.8. (20%)	£2.49	153.1 (11%)	£3.93	263.8 (12%)	£2.62	96.0 (6%)	£3.93	1,222.2 (13%)	£2.84
OOH	-	-	-	-	-	-	1.0 (0%)	£10.95	38.3 (2%)	£21.01	-	-	39.4 (0%)	£45.99
Press	803.2 (46%)	£1.39	420.0 (36%)	£0.50	352.4 (27%)	£2.75	80.1 (6%)	£7.01	64.5 (3%)	£17.59	11.3 (1%)	£50.16	1,731.4 (18%)	£2.64
Radio	-	-	-	-	5.3 (0%)	£14.99	14.8 (1%)	£12.34	40.5 (2%)	£21.09	47.6 (3%)	£20.82	108.3 (1%)	£19.47
Search	538.4 (31%)	£0.55	417.2 (36%)	£0.61	283.7 (22%)	£0.88	255.9 (18%)	£1.57	535.0 (24%)	£1.13	374.0 (23%)	£1.36	2,404.2 (25%)	£0.96
Social media	85.4 (5%)	£0.30	109.4 (9%)	£1.61	213.7 (16%)	£2.00	352.9 (25%)	£1.55	436.9 (20%)	£2.28	453.7 (28%)	£2.02	1,652.0 (17%)	£1.87
TV & Video	73.2 (4%)	£4.94	-	-	186.4 (14%)	£7.63	567.2 (40%)	£6.45	860.5 (38%)	£5.22	639.2 (39%)	£7.31	2,326.6 (25%)	£6.28
All marketing	1,727.7	£1.92	1,160.5	£0.97	1,309.4	£2.92	1,425.0	£4.19	2,239.5	£4.48	1,621.8	£5.11	9,484.0	£3.43

Note: Totals do not always sum exactly across rows or columns due to rounding. Percentages reflect the percentage contribution of respective channel to all marketing contribution. In some cases, impact of a channel has not been captured from all of the channel's activities (e.g. regional OOH), but in the cost effectiveness calculation, the full cost of the channel has been considered. The cost effectiveness figure of 'All marketing' also takes into account the full marketing expenditure.

Source: London Economics' analysis of DfE data

Table 9: Incremental impact of marketing activities on website registrations (all secondary subjects)

	2012/2013		2013/2014		2014/2015		2015/2016		2016/2017		04/09/2017 to 31/03/2018 only		Overall	
Channel	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg
Digital display	2.4 (26%)	£274.10	2.5 (19%)	£193.78	5.5 (27%)	£121.47	4.1 (9%)	£146.94	5.4 (11%)	£126.64	4.0 (15%)	£94.93	23.9 (15%)	£145.30
OOH	-	-	-	-	-	-	-	-	2.5 (5%)	£316.97	-	-	2.5 (2%)	£712.37
Press	1.3 (15%)	£833.91	1.3 (10%)	£165.33	2.4 (12%)	£398.46	1.9 (4%)	£301.56	1.4 (3%)	£810.51	0.2 (1%)	£2,647.47	8.5 (5%)	£534.59
Radio	-	-	-	-	0.2 (1%)	£341.96	0.6 (1%)	£281.53	1.8 (4%)	£481.16	2.1 (8%)	£475.03	4.7 (3%)	£444.33
Search	4.3 (47%)	£68.48	7.1 (55%)	£35.52	6.1 (30%)	£40.77	13.8 (31%)	£29.16	11.1 (22%)	£54.45	8.3 (31%)	£61.17	50.7 (31%)	£45.55
Social media	0.8 (9%)	£32.68	2.1 (16%)	£83.51	4.6 (23%)	£93.10	19.0 (42%)	£28.92	19.5 (39%)	£51.24	5.8 (22%)	£157.51	51.7 (32%)	£59.76
TV & Video	0.4 (4%)	£990.23	0.03 (0%)	£0.00	1.4 (7%)	£988.72	5.8 (13%)	£633.55	8.0 (16%)	£562.73	6.4 (24%)	£729.89	22.0 (13%)	£664.26
All marketing	9.2	£362.39	13.0	£86.18	20.3	£187.74	45.1	£132.18	49.7	£201.92	26.8	£309.62	164.1	£198.34

Note: Totals do not always sum exactly across rows or columns due to rounding. Percentages reflect the percentage contribution of respective channel to all marketing contribution. In some cases, impact of a channel has not been captured from all of the channel's activities (e.g. regional OOH), but in the cost effectiveness calculation, the full cost of the channel has been considered. The cost effectiveness figure of 'All marketing' also takes into account the full marketing expenditure.

Source: London Economics' analysis of DfE data

Table 10: Incremental impact of marketing activities on website registrations (core shortage subjects)

	2012/2013		2013/2014		2014/2015		2015/2016		2016/2017		04/09/2017 to 31/03/2018 only		Overall	
Channel	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg	Estimated additional web reg (000s)	Cost per additional web reg
Digital display	1.3 (26%)	£497.91	1.4 (23%)	£351.99	3.0 (39%)	£220.65	2.2 (18%)	£269.59	2.2 (16%)	£314.29	1.9 (22%)	£201.92	12.0 (22%)	£289.17
OOH	-	-	-	-	-	-	-	-	0.4 (3%)	£1,924.35	-	-	0.4 (1%)	£4,324.85
Press	2.1 (43%)	£530.69	1.9 (33%)	£109.13	1.7 (23%)	£557.09	0.7 (5%)	£857.43	1.3 (9%)	£873.14	0.1 (1%)	£7,729.08	7.8 (15%)	£583.38
Radio	-	-	-	-	0.2 (2%)	£450.01	0.1 (1%)	£1,336.11	0.4 (3%)	£2,408.99	0.4 (5%)	£2,543.48	1.1 (2%)	£1,991.99
Search	0.9 (17%)	£340.40	1.4 (24%)	£176.58	1.2 (16%)	£202.65	2.8 (22%)	£144.94	2.2 (16%)	£270.65	1.7 (20%)	£304.06	10.2 (19%)	£226.41
Social media	0.2 (5%)	£113.26	0.7 (10%)	£289.40	1.3 (17%)	£322.66	5.9 (46%)	£93.23	6.3 (45%)	£159.38	3.5 (41%)	£265.18	17.8 (33%)	£174.13
TV & Video	-	-	0.01 (0%)	£0.00	0.2 (3%)	£6,725.59	1.0 (8%)	£3,728.07	1.2 (8%)	£3,855.93	1.0 (12%)	£4,523.71	3.4 (6%)	£4,290.73
All marketing	5.0	£670.52	5.9	£190.39	7.7	£495.08	12.7	£471.12	13.9	£720.82	8.5	£977.12	53.6	£607.03

Note: Totals do not always sum exactly across rows or columns due to rounding. Percentages reflect the percentage contribution of respective channel to all marketing contribution. In some cases, impact of a channel has not been captured from all of the channel's activities (e.g. regional OOH), but in the cost effectiveness calculation, the full cost of the channel has been considered. The cost effectiveness figure of 'All marketing' also takes into account the full marketing expenditure.

Source: London Economics' analysis of DfE data

Annex 2 Regression results

Table 11: Regression results for website sessions

Variable	Coefficient	Std. Error	t	P> t
Grad. unemployment 21-30yrs (lag 1, smooth)	731,627.7	135,518.5	5.40	0.000
Public sector pay (smooth)	-484.878	119.507	-4.06	0.000
Teacher Salary under-25s (Moving Avg.)	9.083	2.575	3.53	0.000
Seasonality variable	1,388.26	190.227	7.30	0.000
Dummy for Bank Holidays	-4,398.431	1,073.543	-4.10	0.000
Dummy for Christmas	-13,757.46	1,963.988	-7.00	0.000
Dummy wk 23rd March 2015	-71,835.48	5,798.572	-12.39	0.000
TVRs (Dec90 ATAN300)	88,733.63	31,315.24	2.83	0.005
TV (branded search website clicks)	2.649	0.426	6.22	0.000
Search (Dec75, clicks)	0.860	0.187	4.59	0.000
Social Media (clicks)	1.068	0.127	8.40	0.000
Display (impressions)	0.001	0.000	3.91	0.000
Press (branded search website sessions)	5.123	1.138	4.50	0.000
Press (URLs)	0.990	0.465	2.13	0.034
Video (clicks)	0.538	0.100	5.40	0.000
Press (lag 1, national URLs)	1.270	0.578	2.20	0.029
Out of Home (regional impacts)	0.000	0.000	5.69	0.000
Radio (Dec90, impacts)	0.000	0.000	2.29	0.023
Press (regional URLs)	15.988	6.082	2.63	0.009
Display (regional impressions)	0.003	0.000	5.35	0.000
Adjusted R-squared	0.97	N		287

Source: London Economics' analysis of DfE data

Table 12: Regression results for website registrations (all secondary subjects)

Variable	Coefficient	Std. Error	t	P> t
Seasonality	12.396	1.348	9.19	0.000
Website Switchover	239.497	59.792	4.01	0.000
Christmas dummy	-208.302	64.164	-3.25	0.001
TV (branded search clicks)	0.035	0.014	2.56	0.011
Display (registrations)	0.534	0.204	2.61	0.009
Social Media (registrations)	1.082	0.127	8.53	0.000
Email (registrations)	0.417	0.172	2.43	0.016
Press (registrations)	0.000	0.000	0.52	0.602
Video (clicks)	0.003	0.004	0.76	0.445
Radio (Dec90, impact)	0.000	0.000	2.69	0.008
Press (regional URLs)	0.444	0.215	2.07	0.040
Out of Home (impact)	0.000	0.000	2.53	0.012
Display (MFL registrations)	4.613	2.932	1.57	0.117
Video (registrations)	6.734	22.590	0.30	0.766

Variable	Coefficient	Std. Error	t	P> t
Search (registrations)*	0.524	0.132	3.97	0.000
Press (lag 1, national URLs)	0.017	0.010	1.61	0.108
Adjusted R-squared	0.896	N		287

Note: The data for search registrations is incomplete.

Source: London Economics' analysis of DfE data

Table 13: Regression results for website registrations (core shortage subjects)

Variable	Coefficient	Std. Error	t	P> t
Dummy for Christmas	-93.352	32.285	-2.89	0.004
Scholarships	0.007	0.002	2.99	0.003
Grad unemp 21-30yrs (lag 2, smooth)	5,890.166	1,618.315	3.64	0.000
Seasonality	9.604	2.681	3.58	0.000
TV (branded search clicks)	0.006	0.005	1.21	0.226
Specialist press (lag 1, circulation)	0.000	0.000	0.21	0.835
Specialist press (shortage registrations)	0.000	0.000	1.49	0.136
Email (registrations)	0.543	0.167	3.26	0.001
Display (registrations)	0.294	0.090	3.24	0.001
Social Media (registrations)	0.312	0.042	7.46	0.000
Radio (registrations)	3.662	5.718	0.64	0.522
Display (MFL impressions)	0.000	0.000	1.45	0.148
Out of Home (impact)	0.000	0.000	1.19	0.234
Social Media (shortage registrations)	0.448	0.166	2.70	0.007
Digital press (MFL registrations)	27.444	14.174	1.94	0.054
Radio (impact)	0.000	0.000	0.87	0.385
You Tube (registrations)	3.410	7.883	0.43	0.666
Social Media (Dec75, Facebook shortage clicks)	0.004	0.002	2.36	0.019
Press (national URLs)	0.009	0.004	1.99	0.048
Search (registrations)*	0.105	0.047	2.23	0.026
Press (regional URLs)	0.138	0.074	1.87	0.062
Constant	-526.777	184.313	-2.86	0.005
Adjusted R-squared	0.576	N		287

Note: The data for search registrations is incomplete.

Source: London Economics analysis of DfE data

Annex 3 Econometric modelling of UCAS applications

The 2016 study identified that UCAS applications are a highly seasonal outcome and the response to marketing may take a long period of time. An additional hurdle in the modelling of UCAS applications was the short time series – only just over two academic cycles of UCAS applications data was available for use. Since then, DfE has managed to acquire a longer time series of UCAS applications data. As a result, about three and a half academic cycles of data were available for the present edition of the project, including data previously available for the 2016 study and new data obtained from UCAS.

This annex presents the results of the econometric models that were constructed for UCAS applications. However, it should be noted that even with the slightly longer time series of UCAS applications, the impact of marketing on UCAS applications could not be disentangled reliably using time series econometric modelling due to the large time lag in response. For this reason, it is not advisable to use the results of this Annex to draw conclusions on the impact of marketing on Initial Teacher Training.

Despite this, we do still present the findings of the analysis, as well as the associated caveats.

Challenges

The primary challenges associated with measuring the impact of marketing on applications include that the fact that there is strong seasonality in the applications process, as well as the time delay between the marketing activity and the resulting application.

- Seasonality: The applications data series has a high degree of seasonality, in that applications spike as soon as the applications process opens and then experience a decay until the applications process closes. A similar pattern tends to repeat every year. As the data series was too short (two and a half years of data) to calculate reliable seasonal indices, it was necessary to find an alternative approach to identify and remove the seasonality and isolate the impact of marketing.
- Delayed response: There is often a delay between the marketing activity and the resulting application, which presents an additional obstacle when using a time series econometric model. Since this type of modelling relies on being able to capture the relationship between the timing of the activity and the timing of the outcome, lagged marketing variables have been incorporated into the model to allow for some delay in response. However, this can add to the multicollinearity, which in turn makes it more difficult to disentangle effects. Moreover, external analysis on conversion rates shows that this delay can be over a year or longer, which would make the weekly time series econometric modelling unfeasible.

Approach to identifying seasonality

A number of variables with different rates of decay starting from the week of the peak of UCAS applications onwards were generated and tested in the absence of a marketing variable in the model. The decay variable that best fit the shape of the UCAS applications outcome variable was chosen as the ‘seasonality’ variable²⁴. Once we accounted for the seasonal pattern, we tested and added to the model marketing variables²⁵, following the same methodological procedure as for other outcome variables, to capture any additional movement in applications that might be due to marketing. A shortcoming of this approach is that the seasonality pattern is constructed artificially from the data which may have the result that the impact of marketing activities is misrepresented.

Marketing and UCAS applications to all secondary subjects

The R-squared value of the model is 65% meaning that the econometric model explains 65% of the variation in UCAS applications over time. However, looking at the predicted number of applications (**blue line**) in Figure 16, the model does not seem to capture many of the finer variations in applications.

Moreover, the gap between the estimated impact of seasonality (**green line**) and the actual number of applications is rather large at 80%, suggesting that around 80% of UCAS applications are due to marketing. Given the results for the other outcome models presented in Chapter 3 of the report, this result seems unlikely.

Figure 17 presents the estimated impact of the marketing activities on UCAS applications for all secondary subjects. Note that not many of the marketing channels can be captured, and of those that are, many are represented by long-lasting transformation variables (Digital Display in particular). This is likely due to spurious correlation rather than causality.

²⁴ The goodness of fit was judged based on a combination of correlation analysis and graphic examination.

²⁵ Marketing variables were added to the model if they had a positive sign and realistic size of estimated coefficient.

Figure 16: Estimated impact of marketing and contextual factors on UCAS applications

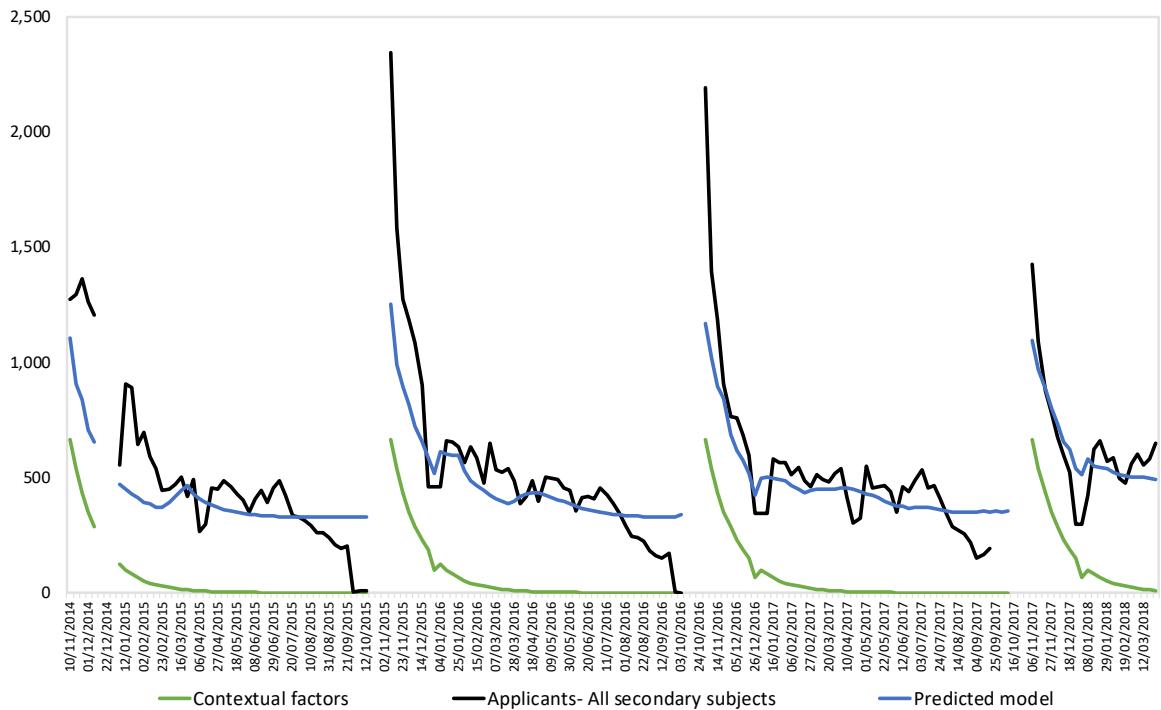
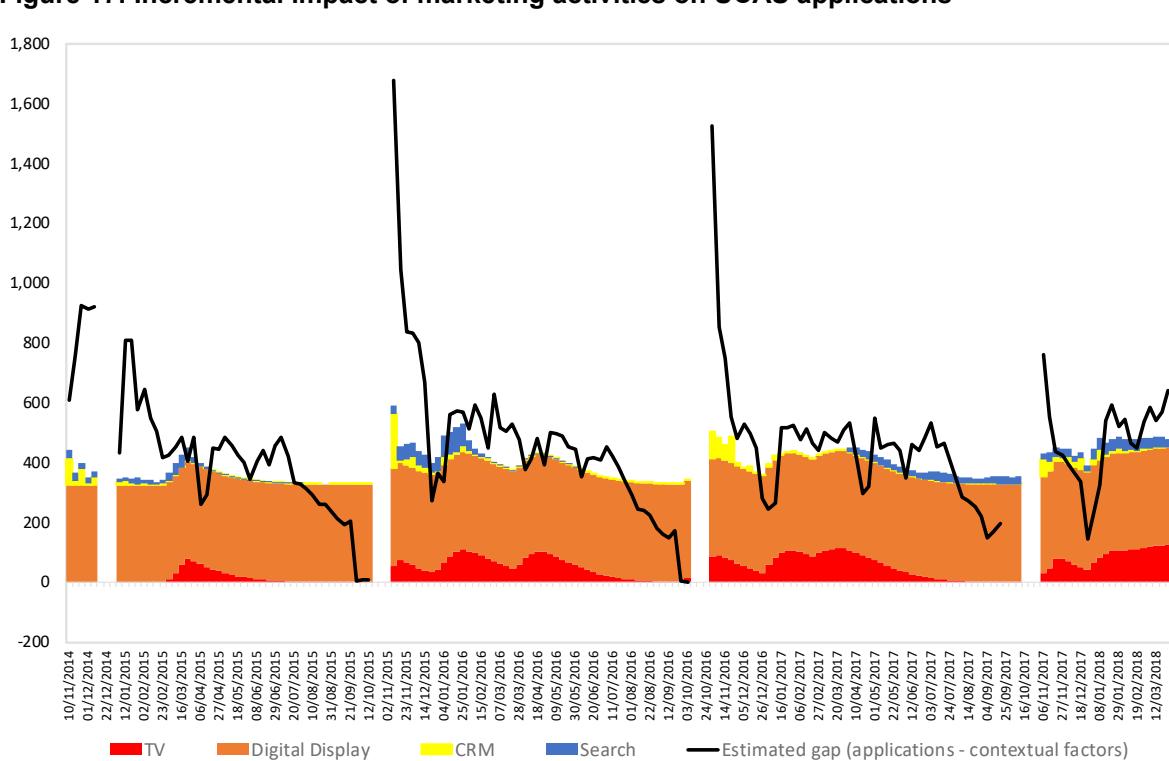


Figure 17: Incremental impact of marketing activities on UCAS applications

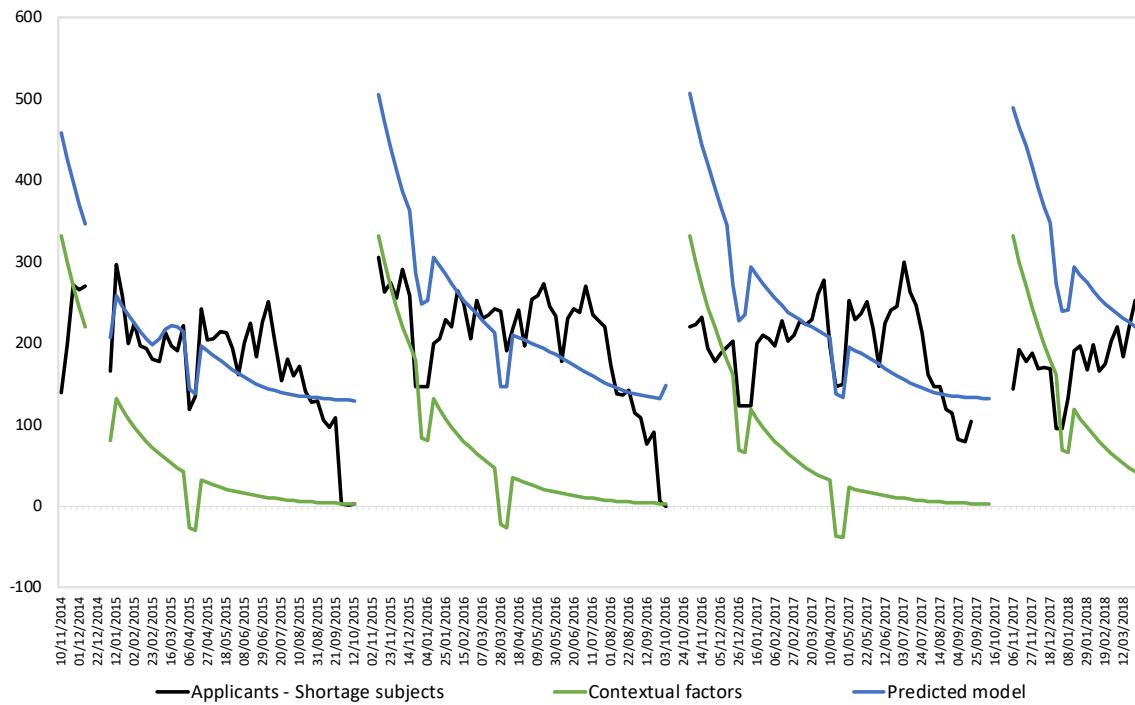


Marketing and UCAS applications to core shortage subjects

The seasonal pattern of UCAS applications for shortage subjects appears to be less pronounced compared to that of all secondary subjects; and also appears to have changed over time. The number of applications for shortage subjects dropped off more quickly in the 2014/15 and 2015/16 academic cycles but remained at a higher level after the initial drop in 2016/17 and 2017/18.

As with the 'all secondary subjects' model, it seems like the vast majority of applications has been induced by marketing, which is unlikely given the pre-existing research and the results for other outcomes.

Figure 18: Estimated impact of marketing and contextual factors on UCAS core shortage subject applications



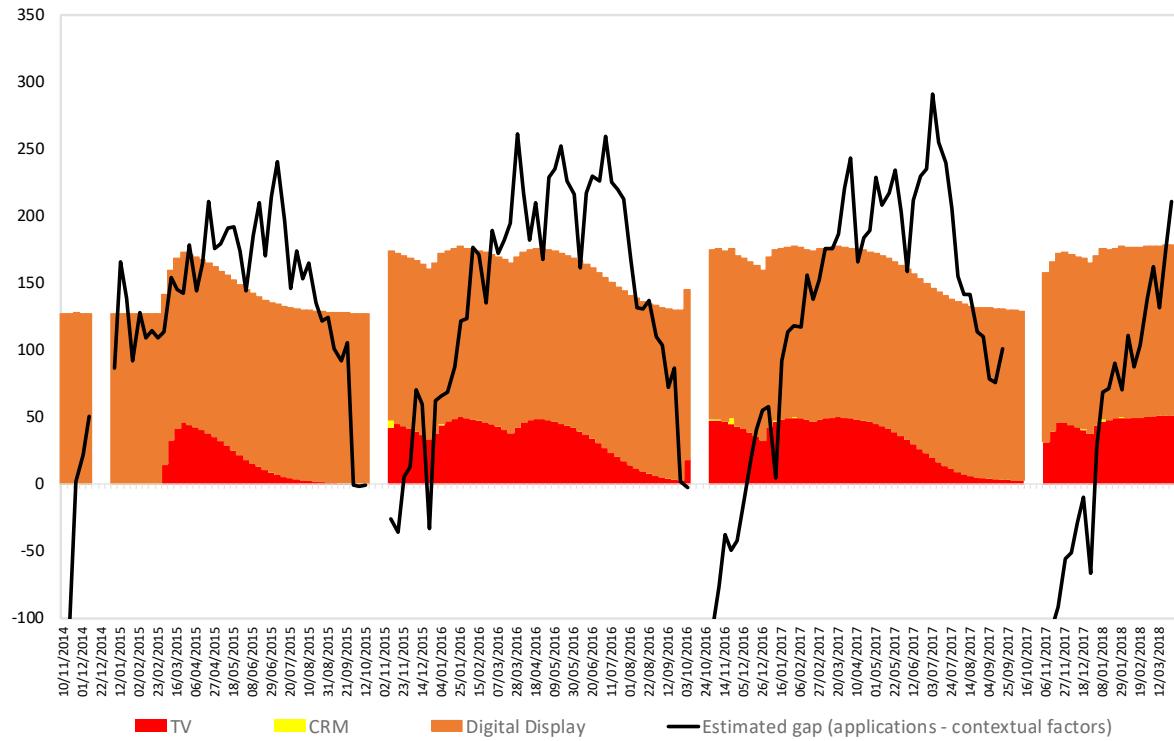
Sample size = 157; R-squared = 0.52

Note: Gaps in series in autumn 2014 are due to data loss caused by technical issues at the source; Annual gaps in the series reflect the period when applications are closed.

Source: London Economics' analysis of DfE data

The impact of marketing channels estimated by this model is illustrated in Figure 19 and suffers from the same issues as the 'all secondary subjects' model.

Figure 19: Incremental impact of marketing activities on UCAS core shortage subject applications



Source: London Economics' analysis of DfE data

The results from the 'best achievable' econometric models of UCAS applications demonstrate that econometric modelling is not the most reliable source of evidence for the impact of marketing in the case of UCAS applications.



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