Economics & Policy

BBC
The impact of a change in the BBC's licence fee revenue

26th August 2015

pwc

Introduction

This report has been prepared by PricewaterhouseCoopers LLP (PwC) for the BBC. The purpose of the report is to present PwC's findings based on our assessment of the economic impacts of changes in BBC licence fee revenues over the next five years. This allows us to estimate the net effect of the BBC's spending changes on the creative economy, employment and GDP, while allowing for potential 'crowding out' of investment.

We have used a Computable General Equilibrium (CGE) model of the UK economy to do this. CGE models are often used to assess the economic impact of different government or institutional policies, or to investigate the effects of different economic scenarios.

To illustrate the economic impact of changes in BBC's licence fee revenue, we analyse two scenarios for illustrative purposes:

- Scenario 1: A nominal *increase* in licence fee revenue of 15% by 2021/22, implemented gradually over a five year period; and
- Scenario 2: A nominal *decrease* in licence fee revenue of 25% by 2021/22, implemented gradually over a five year period.

In each of these scenarios, we have made different assumptions on how the BBC, other TV providers and households will adjust their spending levels and patterns in response to a change in licence fee revenues. We have used a variety of sources including reports commissioned by the BBC and third-party sources, which are set out in the report. Throughout we have used reasonable, prudent assumptions. We present the sensitivity of our findings to a range of assumptions in Appendix A.

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An additional £1 raised in licence fee revenue leads to a net increase of £0.6 in GDP

Our findings…

In Scenario 1 we estimate that a 15% nominal increase in licence fee revenue over a five year period (equivalent to a £558m increase in 2021/22) would lead to a *net* increase in the level of GDP of £319m in 2021/22. It is 'net' or additional to what we estimate GDP to have been if there had been no change in the BBC's licence fee revenues.

Conversely, in Scenario 2 we estimate that a 25% nominal decrease in licence fee revenue over a five year period (equivalent to £931m decrease in 2021/22) would lead to a *net* decrease in level of GDP of £630m 2021/22 compared to what GDP would have been if there had been no change in BBC's licence fee revenues.

The impact on GDP is driven by two effects:

1. BBC and other TV providers' spend: we assume that the overall level spend in the creative industries (CI) is higher as a result of the BBC increase in spending, despite a reduction in spend by the BBC's competitors. This increase has positive spillover effects to other sectors of the economy that supply either the BBC, other TV providers or the CI. We estimate that this effect increases UK GDP by £346m in Scenario 1 and decreases UK GDP by £683m in Scenario 2 in 2021/22.

2. Households' spend: we assume that an increase in the price of the licence fee (that leads to an increase in revenue) leads to a decrease in household spend across a range of products. We estimate that this reduces UK GDP by £27m in Scenario 1 and increases UK GDP by £53m in Scenario 2 in 2021/22.

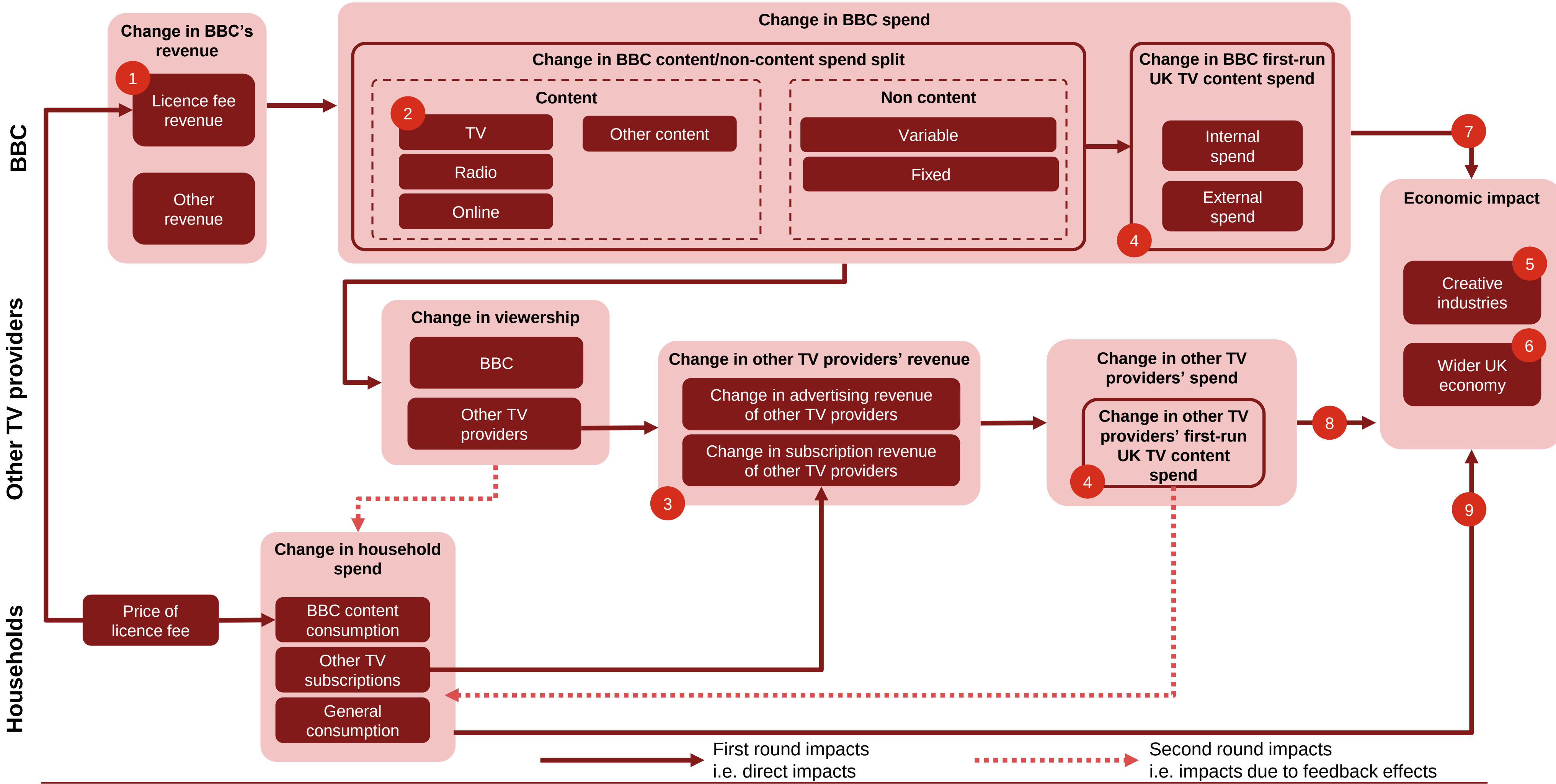
Our analysis shows that the first effect dominates the second effect . Therefore, the *net* GDP impact is 0.6 times the change in licence fee revenues.

The impact on the Gross Value Added (GVA)[1] of the CI is larger than the impact on overall GDP: CI GVA is £435m higher in Scenario 1 and £997m lower in Scenario 2 in 2021/22.

[1] GVA is a measure of a sector's particular contribution to the economy, equivalent to GDP, less taxes on products, plus subsidies on products.

We estimate the net impacts from changes in spending by the BBC, other TV providers and households

The diagram below summarises the relationship between the impact on the BBC, other TV providers and households. We have presented the nine key numbers (highlighted in red circles) on the following page – the first three are changes in revenue, the remaining six the estimated impacts.



We estimate the GDP impact to be a positive £319m in the 15% increase scenario and a negative £630m in the 25% decrease scenario in 2021/22 compared to the counterfactual

The table below summarises the impacts of a 15% increase (Scenario 1) and 25% decrease (Scenario 2) in the BBC's licence fee revenue. We discuss the results and the assumptions underlying our analysis in detail in the following pages.

Summary of impacts in 2021/22 of 15% increase and 25% decrease in licence fee revenue

Changes in revenues and impacts		Change compared to counterfactual scenario in 2021/22	
		Scenario 1	**Scenario 2**
Change in licence fee revenues	1	+£558m	-£931m
Change in BBC licence fee revenues allocated to TV	2	+£347m	-£704m
Change in other TV providers' revenues	3	-£304m	+£540m
Net impact on TV industry revenues		+ £43m	- £164m
Net impact on first-run UK originated TV content spend	4	+ £221m	- £334m
Net impact on Creative Industries GVA	5	+£435m	- £997m
Net impact on rest of UK economy GVA	6	- £116m	+£367m
Net impact on total UK economy GVA		+£319m	-£630m
Impact on total GDP due to changes in BBC expenditure	7	*+£545m*	*- £1076m*
Impact on total GDP due to changes in other TV providers' expenditure	8	*- £199m*	*+£393m*
Impact on total GDP due to changes in household expenditure	9	*- £27m*	*+£53m*
Impact on creative industries employment		+19,600	-44,900

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Context

Our analysis examines the economic impact of a change in the BBC's licence fee revenue over a five year period on the creative industries and the UK economy as a whole

Exploring the economic impact of a change in licence fee revenue

This study examines the economic impact of a change in the BBC's licence fee revenue over a five year period, funded by a change in the unit price of the licence fee. We also analyse the subsequent impact on the creative industries and the UK economy. Specifically, we explore the potential response of the BBC, other TV providers and households to two scenarios: a 15% nominal increase ('Scenario 1') and a 25% nominal decrease ('Scenario 2') in licence fee revenue. We present the net impact on key economic variables: GDP, employment and creative industries' GVA.

- The GDP impact measures the:
  - **Direct impact:** impact of a change in the BBC's and other TV providers' spend.
  - **Indirect impact:** impact on the BBC's and other TV providers' suppliers (both in and outside the creative industries).
  - **Induced impact:** impact of changes in spending by employees of companies throughout the whole supply chain, which results from changes in earnings throughout the supply chain.

The impact of the two scenarios is measured against a counterfactual scenario, hence why we refer to a 'net' impact. The counterfactual scenario is based on projections of the performance of the creative industries and the UK economy. The counterfactual also includes projections of TV industry revenues and first-run UK originated TV content spend in the absence of a change in licence fee revenue. We provide more detail in the 'Results' section of this report.

Scope

We estimate the impact of a change in licence fee revenue as a result of a change in the unit price of the licence fee, and not due to changes in the payment base.

Our focus is on the economic impact, and so we present the results in terms of important economic variables (i.e. GDP, GVA[1] and employment). We do not attempt to analyse or quantify the impact of the BBC on culture, society, consumer welfare (or consumer surplus), inequality, creativity, or at a regional level.

[1] GVA is a measure of a sector's particular contribution to the economy, equivalent to GDP, less taxes on products, plus subsidies on products.

Report structure

1 The next section provides context around the BBC and the TV industry, and its link to the creative industries.

2 Section 2 provides a summary of our conceptual framework for the counterfactual scenario and the two scenarios. It then outlines our approach to the analysis, mapping the flow of impacts from a change in the BBC's licence fee revenue to:

- a change in the BBC's expenditure;
- a change in other TV providers' expenditure; and
- a change in household expenditure.

We explain the assumptions we have made for each of these elements, and how we have developed these to guide our modelling inputs. We summarise the relationship between the impact on the BBC, other TV providers and households.

3 In Section 3, we present our modelling results in terms of the impact on the creative industries and the UK economy. We also explain our counterfactual scenario in more detail.

A In the appendices, we present results of sensitivity tests relating to our assumptions on: the impact of a change in the BBC's licence fee revenue on other TV providers' advertising and subscription revenues; more detail on our CGE model; and a discussion of the literature reviewed to inform our assumptions on 'crowding out'.

The BBC invested almost 60% of its licence fee in the creative industries in 2013/14

The BBC and the creative industries

The Budget has set the BBC's future public funding framework subject to the Charter Review process. The 2010 licence fee settlement froze the price of the licence fee at £145.50 until the end of the current Charter period on 31 December 2016. In 2013/14, sixty-six per cent of the BBC's licence fee revenue was spent on delivering the BBC's 10 television channels.[1] Within this, TV content spend included investment in many areas of the "creative industries", defined by the UK Government as: *"those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property."*[2]

The creative industries cover nine sub-groups, including 'Film, TV, Video, Radio and Photography', and others such as 'Publishing', and 'Advertising and Marketing'. "Creative industries" in our analysis includes those working inside the creative industries, irrespective of occupation (for example, we include people working in all parts of the creative industries, whether in content production jobs or in support functions).

The Frontier report[3] identifies the main channels by which the BBC contributes to the growth of the creative economy. It considers the 'first round impacts', relating to the BBCs' direct investments in content and technology; 'second round impacts', covering investments and output in creative and related industries that are generated by the BBC's direct investments; and 'spillover impacts', capturing the wider benefits that result from the BBC's investments, such as productivity gains. Frontier calculate that the BBC spent approximately £2.2bn of its £3.7bn licence fee income directly in the creative industries in 2013/14. Fifty-five per cent of this £2.2bn was spent externally, as opposed to internally on employment of BBC staff (such as those working on in-house productions). The remaining £1.5bn was spent externally in the UK economy on products and services supporting the BBC's core activities such as IT equipment, property and telecommunications.

The creative industries have grown faster than most other sectors of the UK economy. The compound annual growth rate between 2008 and 2013 was 4.7%, compared to 2.2% for the UK economy.[4] The creative industries accounted for 5.8% of UK jobs in 2014.[5] Therefore, a transfer from households to the BBC (in the form of licence fee revenue) which is spent in the creative industries is likely to benefit the economy. This is because raising licence fee revenues channels money into one of the most productive sectors, in terms of generating further economic activity.

[1] BBC, Annual Report Overview (2013/14); [2] DCMS, 'Creative Industries Mapping Document' (2001); [3] Frontier Economics, 'The contribution of the BBC to the UK creative industries' (2015); [4] DCMS, 'Creative Industries Economic Estimates - January 2015'; [5] DCMS, 'Creative Industries 2015: Focus on Employment' (June 2015)

The BBC accounts for 40% of first-run UK TV content spend

TV industry revenues

TV industry revenues rose in nominal terms between 2008 and 2013 from £11.2bn to £12.9bn.[1] Subscription revenues saw the fastest growth, with just over 6% compound annual growth between 2008 and 2013, amounting to 50% of total industry revenues in 2013. TV advertising saw consistent but modest nominal compound annual growth of 1.17% between 2008 and 2013. During this period, the BBC's licence fee income allocated to TV has remained relatively flat in nominal terms.

We have also seen an increases in video-on-demand (VOD) services: in the second half of 2013 50% of adults were using VOD services, compared to 27% in the second half of 2010.[2]

Ofcom has reported that online TV revenues are a small proportion of total TV revenues; however, they grew rapidly between 2008 and 2013, from £50m to £364m.[3] Free-to-view online TV (primarily the Public Service Broadcasters' – PSBs – catch-up services) funded by advertising accounted for 51% of the total in 2013. Online subscriptions revenues (including services such as Netflix) accounted for 31% and experienced 76% revenue growth.

First-run UK originated TV content spend

First-run UK originated TV content spend refers to spend on programmes commissioned by TV providers with a view to their first showing on television in the UK. The BBC accounted for just under half of total PSB first-run UK TV content spend in 2013, and 27% of total first-run UK spend.[4] Total UK investment in first-run TV content including sport remained relatively flat in real terms between 2008 and 2013 (i.e. an increase of approximately 3% p.a. in nominal terms).

However, when sport is excluded, total UK first-run TV content spend fell by 9% in real terms, from £2.6bn to £2.4bn between 2008 and 2013. This was driven by a 15% fall in PSB first-run spend excluding sport, which outweighs the 31% increase by the non-PSBs. This is because PSBs currently spend more of their revenue on original UK TV content than non-PSBs; in 2013, the PSBs accounted for 85% of total first-run UK TV content spend. In this context, the BBC accounted for around 40%[5] of total UK first-run TV content spend in 2013, despite representing a fifth of TV industry revenues.

[1] Ofcom, 'The Communications Market Report' (August 2014); [2],[3] ibid. ; [4] Ofcom, 'PSB Annual Report' (2014); [5] PwC analysis based on Ofcom data and assumptions regarding the proportion of sport content spend by the BBC vs other PSBs.

Our modelling approach

Our analysis assesses the potential response of the BBC, other TV providers and households to a change in licence fee revenue

Our conceptual framework and modelling approach

We have developed a counterfactual scenario and two licence fee revenue change scenarios:

- Scenario 1: A nominal *increase* in the BBC's licence fee revenue of 15% by 2021/22, implemented gradually over a five year period; and
- Scenario 2: A nominal *decrease* in the BBC's licence fee revenue of 25% by 2021/22, implemented gradually over a five year period.

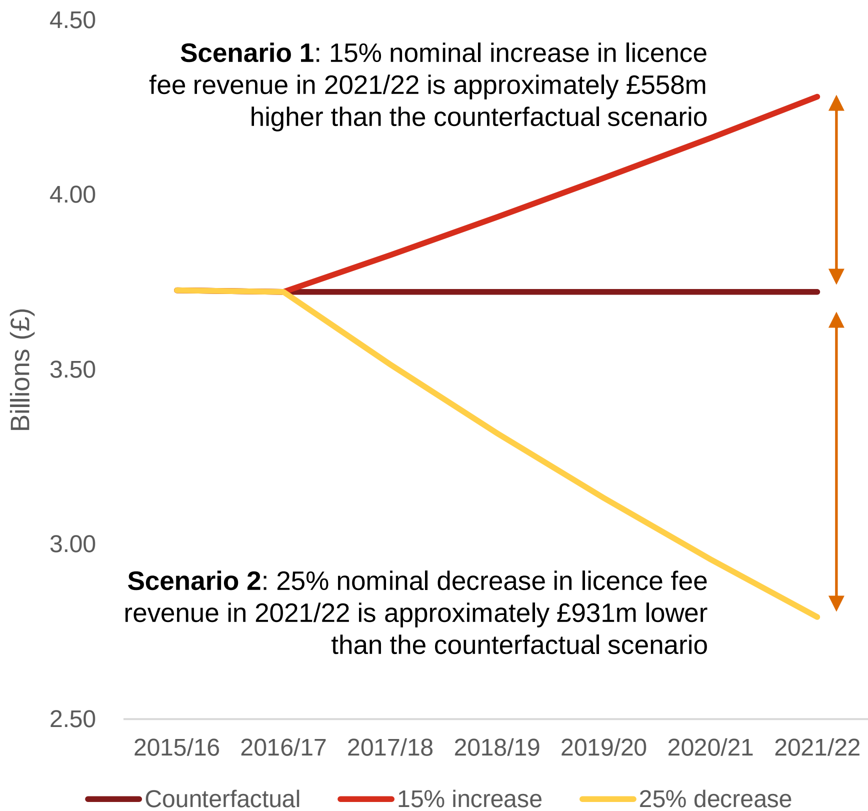
This section describes these scenarios before outlining the framework we use to map the flow of impacts from a change in the BBC's licence fee revenue to:

- A change in the BBC's expenditure;
- A change in other TV providers' expenditure; and
- A change in household expenditure.

We set out each of these three elements separately, detailing the assumptions we have made to estimate each impact. We summarise the relationship between the impact on the BBC, other TV providers and households at the end of this section.

Our scenarios assume a 15% increase and 25% decrease in the BBC's licence fee revenue in 2021/22 compared to a counterfactual scenario of no change

Scenarios relating to a change in the BBC's licence fee revenue, £ billions



Source: BBC, PwC analysis

The counterfactual scenario: no change

- The BBC forecasts its nominal licence fee revenue in 2016/17 (the year before our scenarios are implemented) to be £3.7bn.
- Our counterfactual scenario assumes that there is no change in the BBC's licence fee revenue from the 2016/17 forecast (i.e. it remains at £3.7bn per annum until 2021/22).
- This means that licence fee revenue is expected to fall in real terms in the counterfactual scenario.

The scenarios

- The 15% nominal increase in licence fee revenue is equivalent to £558m in 2021/22.
- The 25% nominal decrease in licence fee revenue is equivalent to £931m in 2021/22.
- The changes are assumed to be implemented gradually over a five year period (i.e. in Scenario 1, an increase of 3% per year in licence fee revenue, from 2017/18 to 2021/22).
- Assuming inflation (e.g. growth in the Consumer Price Index, or CPI) is approximately 2% per year, the increase in licence fee revenue is equivalent to approximately CPI growth + 1% in Scenario 1 and CPI growth - 8% in Scenario 2.

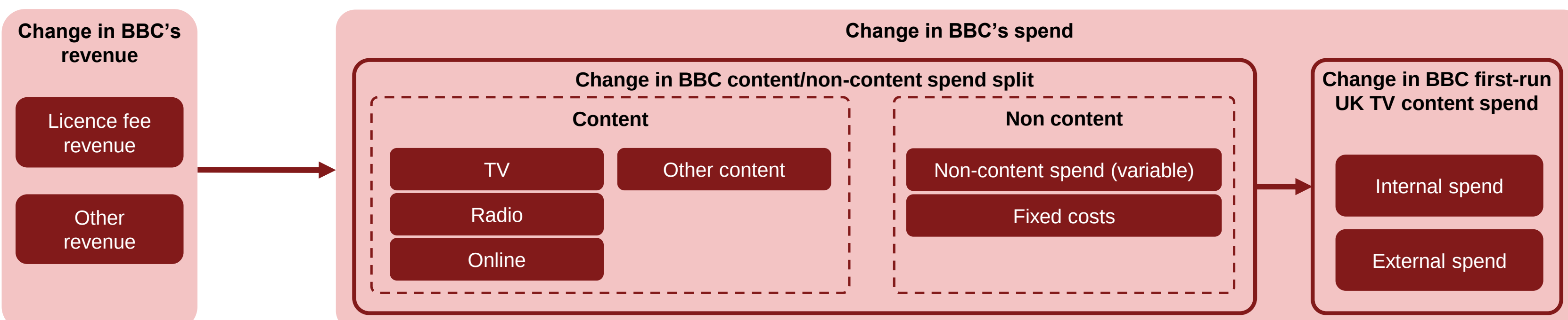
A change in the BBC's licence fee revenue will affect its spending on the creative industries

The impact on the BBC's expenditure

An increase in the BBC's licence fee revenue will affect the BBC's operations and expenditure. The BBC's expenditure relates to either content or non-content related costs. Content spend is split between spend on the BBC's Service Licences – TV, Radio and Online – and other content spend, such as development spend and S4C. Non-content spend relates to fixed costs that are unlikely to change over a five year period (e.g. long-term distribution contacts and existing property contracts) and variable costs relating to distribution or infrastructure and support activities.

We are interested in how any change in licence fee revenue will affect the BBC's expenditure on content spending on first-run UK originated TV content. As discussed previously, much of this expenditure flows to the creative industries (e.g. on writers, producers, actors etc.). Content may be purchased internally or externally; a 2015 Frontier Economics report calculated that 55% of the BBC's £2.2bn creative industries spend was external[1].

We make assumptions about the proportion of BBC licence fee revenue spent on UK first-run TV content in both the counterfactual scenario and our two scenarios. These assumptions are used as inputs to our modelling.



[1] Frontier Economics, 'The contribution of the BBC to the UK creative industries' (2015)

We assume that the BBC continues to spend the same proportions of its revenue on first-run TV content as it did in 2013/14

To understand the impacts of a change in BBC licence fee revenue on first-run UK TV content spend, we need to consider how the BBC will spend its income in:

- The counterfactual scenario: no change in BBC's licence fee revenue in nominal terms;
- Scenario 1: a 15% nominal increase in licence fee revenue; and
- Scenario 2: a 25% nominal decrease in licence fee revenue.

The table below outlines the basis of our assumptions. They are based on the premise that the BBC continues to spend the same proportions on first-run TV content as it did in 2013/14.

Assumption	Explanation	Data source
Licence fee revenue	We assume that a change in licence fee revenue by 2021/22 is achieved through a change in the unit price of the licence fee (rather than through a change in the payment base or evasion rates) for both scenarios. We also assume that this is achieved cumulatively over a five year period, from 2017/18 i.e. approximately a 3% increase per annum in Scenario 1 or 6% decrease per annum in Scenario 2.	BBC
First run TV content spend	For the purposes of our modelling, we assume that the BBC continues to spend the same proportion of its revenue on first run TV content as it did in 2013/14.	BBC

In addition to spend on TV content, we also look at the impact due to changes in spend in other content (radio and other online services) and non-content spend.

For the purposes of this analysis, we have made a number of other simplifying assumptions about the BBC's allocation of expenditure in the counterfactual scenario and in our two scenarios. For example, regarding the allocation of spend for content and non-content, and the allocation of spend across service licences. We assume that these remain the same as in 2013/14.

A change in the BBC's licence fee revenue will also affect other TV providers' revenue and expenditure

Crowding out

It is difficult to predict how other TV providers would change their spending in response to a change in the BBC's spending. Investment decisions by TV providers are complex and depend on a range of factors, including market conditions external to the BBC. In general, the BBC's competitors, or other TV providers, might react to a change in licence fee revenue in one of two ways:

(a) **Crowding out**: If the BBC increases its TV content spend, other TV providers may be "crowded out" of the market i.e. the higher BBC investment replaces commercial TV provider investment.

(b) **Crowding in**: An increase in BBC spend could lead to increase in other TV providers' spend if the BBC's spending boosts demand and stimulates competition for quality.

In order to adopt a level of prudence in this analysis, we assume the former: a degree of crowding out by the BBC. Our assumptions imply a degree of crowding out which we believe is reasonable, and close to the median of the assumptions used in other studies.

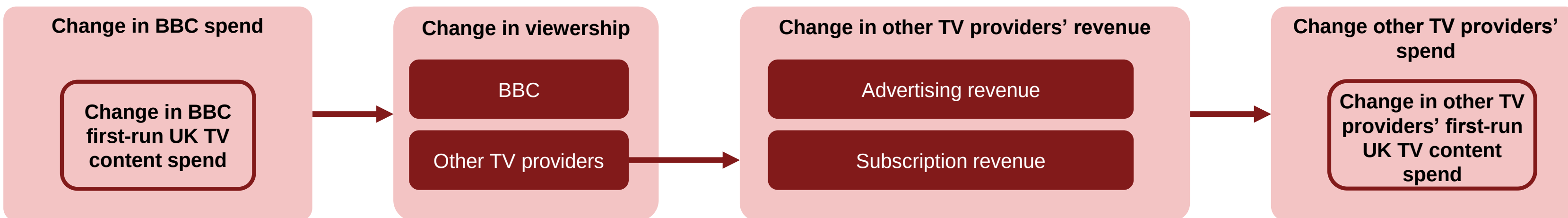
Our analysis focuses on crowding-out in the TV sector. However, for the purposes of our analysis, we do not assume any crowding out of radio or other online content. We estimate the economic impact due to changes in BBC's spend on radio and other online services but do not assume any change in other providers' spend in response. We recognize that other providers of radio and other online content may also change their spend in response to a change in BBC spend. But we have not found any quantitative evidence of such crowding out in the literature we have reviewed; and any such crowding out is unlikely to have an substantial impact on our findings.

The evidence

A 2014 Mediatique study[1] noted that the decision to commission or produce a programme within a certain genre is driven by both profitability *and* other factors, such as the channel's policy remit/corporate objectives, subject to budgetary constraints and commercial realities. A BBC study[2] on the linkages between public and private broadcasters concludes that countries with strong, well-funded public service broadcasting, such as the UK, Australia and the Nordic countries, tend to have commercial channels which generate stronger revenues and levels of investment, better choice and high quality in the eyes of audiences. This might occur because other TV providers need to invest more in order to "compete on quality". This is demonstrated by BBC One and ITV's spending patterns on first-run UK originations between 2008 and 2013, which show that the level of BBC One investment appears to be a contributory factor in stimulating ITV to spend more through competition.

[1] Mediatique, 'PSB review: Investment in TV genres' (2014); [2] BBC, 'Public And Private Broadcasters Across The World – The Race To The Top' (2013)

A change in the BBC's licence fee revenue will affect other TV providers' revenues and spending



The impacts on other TV providers' revenue and UK first-run TV content spend are inputs to our model. The assumptions underpinning these inputs are outlined in the table on the next page.

Because we assume a degree of crowding out, if the BBC's first-run UK TV content expenditure increases, other TV providers' revenue falls. This is because the BBC's increased spending on first-run TV content could negatively affect the viewing of other channels, and vice versa. We also assume that the proportion of other TV providers' revenue spent on UK first-run TV content remains relatively constant as their revenue changes. Therefore, other TV providers' absolute spend on first-run TV content also falls if first-run TV content spend by the BBC increases.

Our assumptions are informed by the available industry and academic evidence on the issue of crowding out in the UK media sector. We also reviewed studies in other sectors, such as charities, R&D and health, which investigated how public spending affects private investment in the sector. Some of these findings, particularly those where the public sector and private sector operate in the same markets, were used to sense check our assumptions.

We draw on the methodology adopted in the Reuters Institute study[1] (which considers a scenario with no BBC), adjusting for the latest available data, the literature reviewed and the scale of our scenario, to inform our assumptions around advertising and subscription revenues. Where there is a lack of empirical evidence to support our assumptions, we test the sensitivity of our results to them to understand their impact in Appendix A.

[1] Reuters Institute, ' What if there were no BBC Television?' (2014)

Our assumptions on changes in advertising revenue imply a degree of crowding-out of the commercial sector by the BBC

As the BBC changes its level of spending, viewing of commercial channels is likely to change. This then affects the level of advertising revenue – it is an empirical question as to whether the price of advertising changes by more or less than the change in viewership. There are two assumptions that underpin the net effect on advertising revenues: the commercial impact ratio and the advertising elasticity.

The commercial impact ratio

The commercial impact ratio is the ratio of the change in viewership of other TV providers' channels associated with a change in BBC viewership. We assume that viewership changes at the same rate as spending. In line with the Reuters methodology[1], we assume a commercial impact ratio of 50%, e.g. an increase in BBC viewership of 10% is associated with a decrease in other TV providers' viewership by 5%. This is also within the range implicit in the Communication Chambers (2015) [2] study, which assumes that a 2.7% loss of viewing hours for the BBC is associated with gains in viewership of 1.3% – 1.6% for each of the commercial broadcasters in 2017, i.e. the commercial impact ratio is 48% to 59%.

Advertising elasticity

The advertising elasticity (formally, the 'own-price elasticity of demand') is the responsiveness of the volume of demand to a small change in price. This is the ratio of a small percentage increase (or decrease) in commercial impacts to the associated percentage decrease (or increase) in price.

We take a mid-range value from the literature we reviewed of 1.2 for Scenario 1 (corresponding to a decrease in advertising revenues of -1.3%). In Scenario 1, we do not expect a strong impact on advertising revenues, and therefore pick an advertising elasticity close to the median of the estimates used in the literature. For Scenario 2, we choose a value of 2.4 which allows us to illustrate the impact of a large positive change in advertising revenues, i.e. of +7.7%.

The implicit price elasticity estimate used as the central case in Ofcom's Market Impact Assessment (2015) is 2, which is higher (in magnitude) than most other estimates. Ofcom confirms that the number of econometric studies of the price elasticity of demand for TV advertising in the UK is limited e.g. Hendry (1992)[3], PwC (2004)[4] and Analysys Mason, Brandscience and Crawford (2010)[5], and that these studies do not present consistent findings.

[1] Reuters Institute, ' What if there were no BBC Television?' (2014); [2] Communications Chambers, 'Forecast consumption and preliminary market impact assessment of revised BBC services' (2015); [3] Hendry, David F., 'An Econometric Analysis of TV Advertising Expenditure in the UK', Journal of Policy Analysis 14(3): 281-311 (1992); [4] PwC, 'Economic Analysis of the TV advertising market' (2004); [5] Analysys Mason, Brandscience and Crawford, 'An econometric analysis of the TV advertising market: final report' (2010)

Similarly, our assumptions on changes in commercial impact of advertising viewership, subscription revenue and TV content spend imply a degree of crowding-out by the BBC

Advertising elasticity cont.

The Communication Chambers (2015)[1] study uses a range of elasticities which is intended to cover the spectrum of opinion. To reflect the uncertainty around the elasticity assumption, they consider three possible price elasticities: 0.75, 1.00 and 1.25, but the study does not take a view on what the 'right' estimate is.

We have tested the sensitivity of our findings to different assumptions on advertising revenues. The results are presented in Appendix A

Subscription revenues

The Reuters study[2] assumes that subscription revenue increase by 0% or 51% if there were no BBC in its pessimistic and optimistic scenarios respectively. However, there is little empirical evidence in the literature we reviewed to inform our assumptions. We use the mid-point of the range used in the Reuters Study, i.e. 25%, but scaled down by the average absolute magnitudes of the change in licence fee. We assume that subscription revenues *decreases* by 2.5% in Scenario 1 and *increases* by 2.5% in Scenario 2. Our assumption is prudent, within the range used in the Reuters Institute study, and assumes a degree of crowding out by the BBC.

The assumption on subscription revenues is one of the main drivers of the impact on other TV providers. Ofcom's Market Impact Assessment[3] (2015) indicates that the impact of BBC's service proposals, considered in isolation, are not likely to affect subscription revenues. The scenarios considered in our study are much larger compared to the proposals considered in the Ofcom study. Similarly, a Mediatique study[4] (2014) finds that in the absence of the BBC, money spent on the licence fee would be available for subscription services, but would not support a HBO-style channel in the UK.

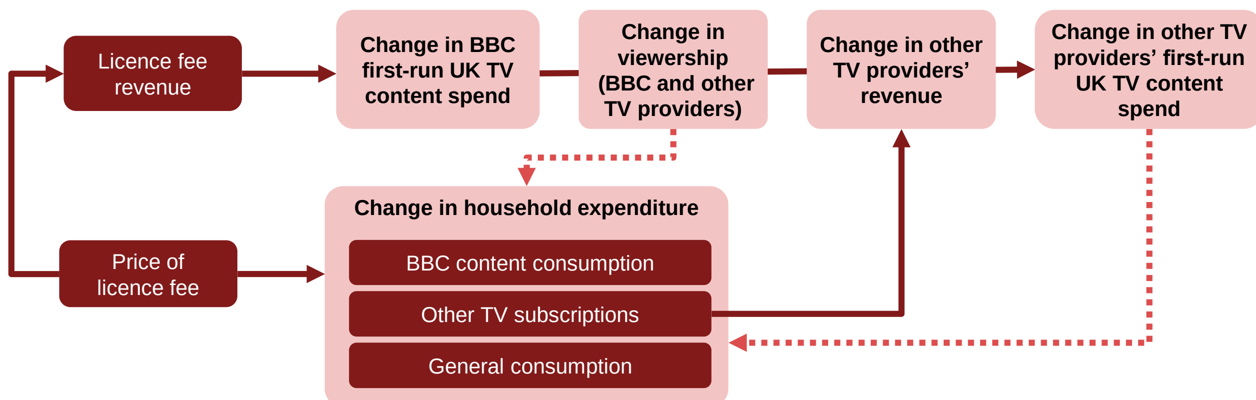
First-run UK TV content spend

It is difficult to predict how other TV providers will change their spend on first-run UK TV content. We assume that the share of revenues spent by other TV providers on first-run UK TV content decreases as the BBC increases its spend on first-run TV content to allow for a degree of crowding out, but is limited by the range of variation in the share over the last 5 years. Based on this, we assume that the share of the change in revenue spent by other TV providers on UK first-run TV content is 20% in Scenario 1 and 25% in Scenario 2 throughout the time period.

[1] Communications Chambers, 'Forecast consumption and preliminary market impact assessment of revised BBC services' (2015); [2] Reuters Institute, ' What if there were no BBC Television?' (2014); [3] Ofcom, 'Proposed changes to BBC Three, BBC iPlayer, BBC One and CBBC: Market Impact Assessment' (2015); [4] Mediatique, 'PSB review: Investment in TV genres' (2014)

A change in the BBC's licence fee revenue will also affect household expenditure

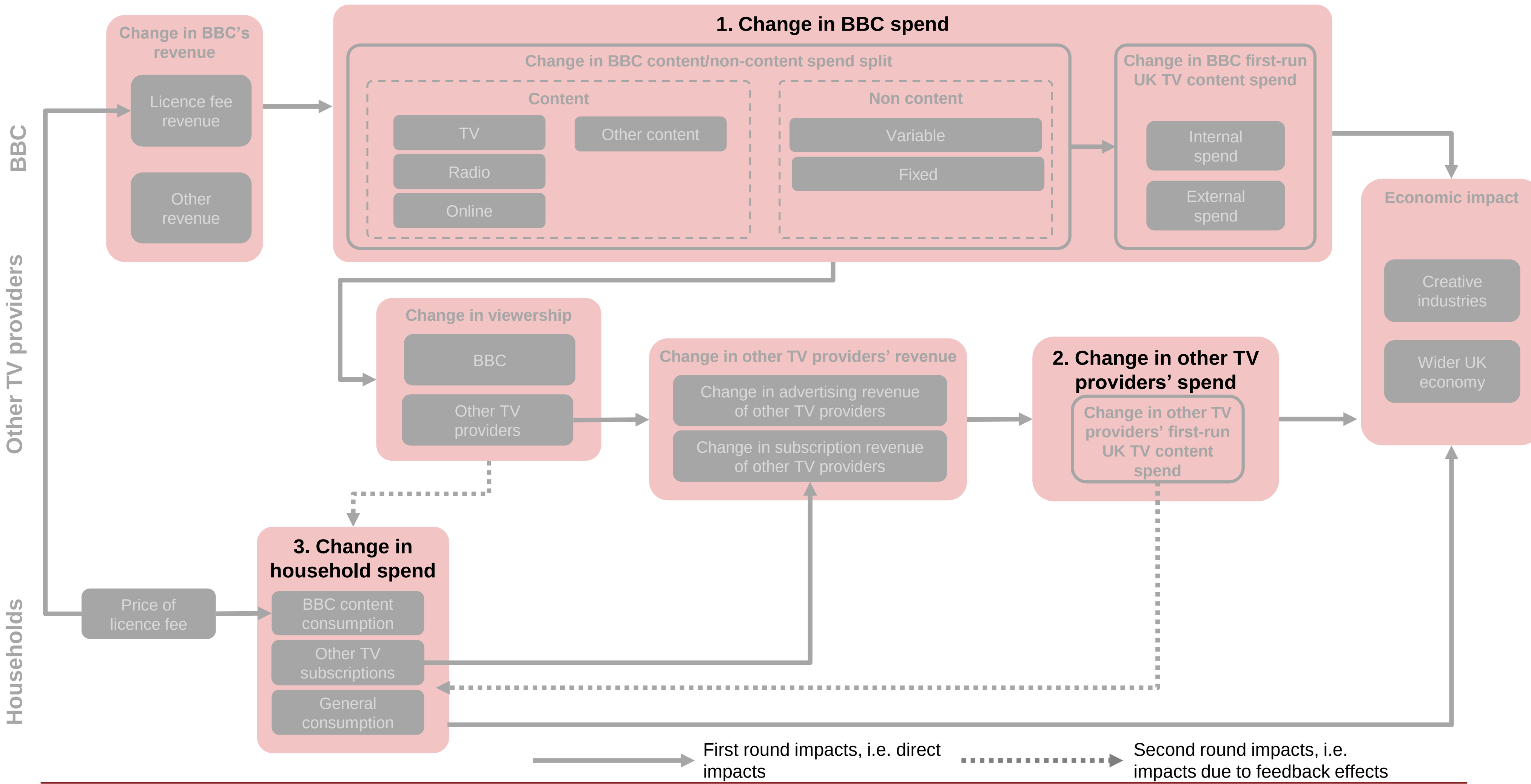
We assume that the change in licence fee revenue is the result of a change in the price of the licence fee, as opposed to any change in the payment base. Licence fee-paying households may change their spending patterns in response to a change in the price of the licence fee. If the price of the licence fee increases, households have less to spend on other TV subscriptions or on general consumption. Further, if the increase in BBC licence fee revenue (and, subsequently, TV content spend) increases viewership of the BBC, households may substitute spending away from TV subscriptions. The change in household subscription payments affects other providers' subscription revenues (discussed on page 20). In this study, we have linked our assumption on household subscription spend to the assumptions on other providers' subscription revenues (hence there is no double-counting).



Assumption	Explanation	Data source
Household licence fee spend	We assume that the change in the price of the licence fee is cumulative over the five year period.	BBC
TV Subscription spend	Households' change in TV subscription spend relates to our assumptions regarding subscription revenues (see assumptions on 'other TV providers') in both scenarios. The change in subscription revenue is distributed across households.	See assumptions on page 20.
Allocation of the change in spend (based on above assumptions) in other sectors	Households' change in spend on BBC and other subscription services is matched by a change in spending in the UK economy.	PwC assumption

Our analysis estimates the net effect of these three impacts combined

The diagram below summarises the relationship between the impact on the BBC, other TV providers and households.



Results

We use a multi-sector general equilibrium economic model of the UK to estimate the impact of changes in the BBC's licence fee revenue

We use a dynamic economic model to examine the impact on the BBC, other TV providers and households

We have examined how the BBC, other TV providers (the BBC's competitors – commercial PSBs, their portfolio channels and non-PSBs) and households might respond to a change in licence fee revenue. We model the impact of these responses on the creative industries and the UK economy, based on the framework and assumptions set out earlier in this section.

Our modelling approach estimates the *wider* economic impacts of a change in licence fee revenue using a Computable General Equilibrium (CGE) model. The term "wider" is used to denote that the scope of the economic impacts evaluated in our analysis extends beyond those directly impacted by the BBC's and other TV providers' spending changes, to include those who are indirectly impacted due to the linkages between the TV/film sub-sector of the creative industries and the rest of the economy.

CGE models are dynamic, multi-sector economic models, and have been used by HM Treasury to appraise tax policy. They capture the relationships between sectors of the economy, households and the government as well as the interaction with factor markets, such as the labour market. It allows us to capture the dynamic effects of a change in licence fee revenue and provides a consistent economic framework across which we can analyse the impact of the three components – the BBC, other TV providers and households - over a five year period.

Our CGE modelling approach captures a wider range of impacts than would normally be captured using other techniques as well as their interactions and feedback to the wider economy beyond the creative industries.

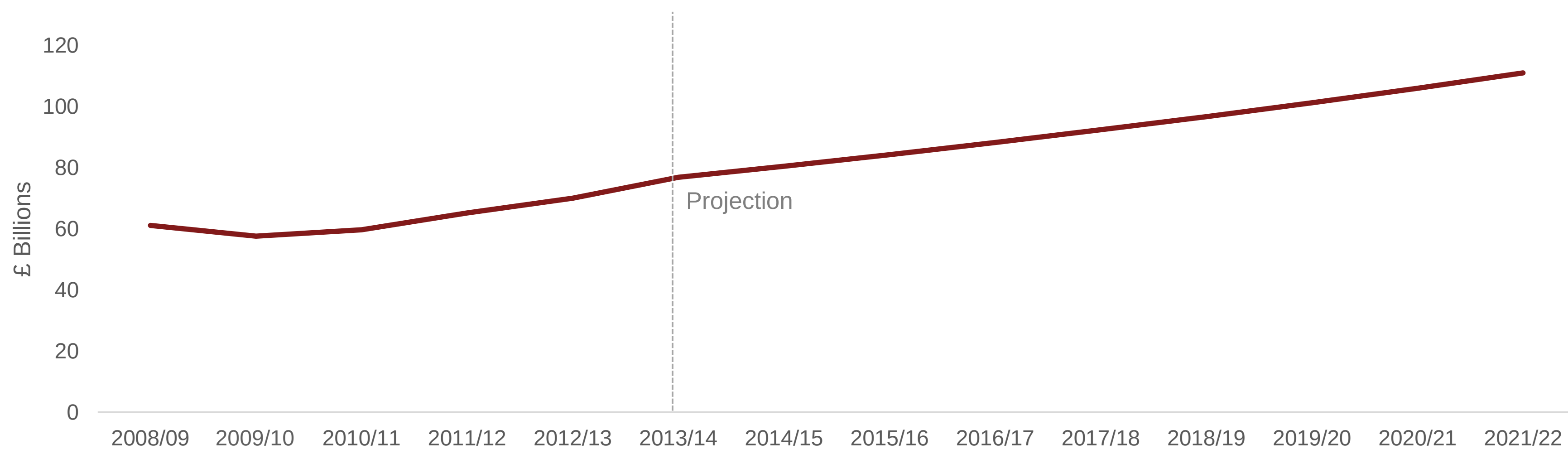
The overall economic impact results presented in this report are net impacts, i.e. they also account for the negative impacts due to changes in spending on other sectors of the economy (for example, due to diversion of spending or investment to the creative industries from other sectors). Because of the associated displacement effects, the magnitudes of the impact and the associated multipliers are smaller than those observed in other studies which typically consider gross effects only. This finding is consistent with the wide-ranging academic and institutional literature on dynamic impact multipliers. More details are provided in Appendix B.

Our results are presented compared to a counterfactual scenario in which the creative industries grows at 4.7% per annum

The impact of the two scenarios is measured against a counterfactual scenario in which we assume that the BBC's licence fee revenue remains constant at the projected 2016/17 level (approximately £3.7bn) until 2021/22.

In order to estimate the impact on the creative industries and the wider UK economy, we develop a counterfactual scenario in which we project the future performance of both. The counterfactual scenario is, therefore, also based on projections of the performance of the creative industries and the wider UK economy. The creative industries have grown faster than other sectors of the UK economy; the compound annual growth rate of the creative industries between 2008 and 2013 was 4.7%, compared to 2.2% for the wider UK economy.[1] We have used this growth rate to project the creative industries GVA in the counterfactual scenario. We assume that UK GDP in the counterfactual scenario grows at 2.5% p.a., based on the OBR's forecasts.[2]

Creative industries GVA – Counterfactual scenario



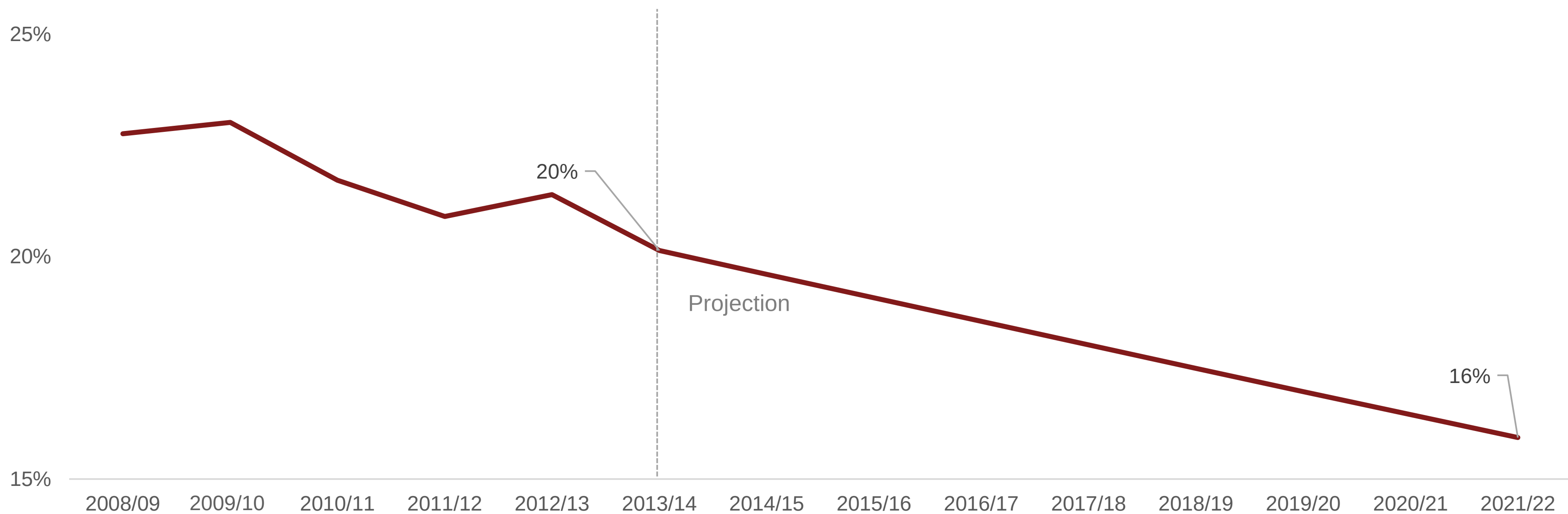
[1] DCMS 'Creative Industries Economic Estimates' (January 2015); [2] OBR, 'Economic and fiscal outlook' (2014)

In the counterfactual scenario, the BBC's revenue as a percentage of industry revenue declines

The counterfactual scenario also includes projections of TV industry revenues in the absence of a change in the BBC's licence fee revenue.

In nominal terms, TV industry revenues increased between 2008 and 2013, at 2.85% per year[1], driven by an increase in subscription revenues of 34% during the time period. Net advertising revenues and BBC income allocated to TV saw modest growth, whereas 'Other' revenues fell. Based on these trends, we project TV industry revenues up until 2021/22. BBC income allocated to TV increased by just 2% between 2008 and 2013. Therefore, in our counterfactual scenario we assume that BBC TV-related revenue continues to fall as a proportion of total industry revenues, from 20% in 2013/14 to 16% in 2021/22.

BBC revenue as a % of total TV industry revenue – Counterfactual scenario



[1] Ofcom (2014) 'The Communications Market Report

GDP impact is estimated to be a positive £319m in Scenario 1 and a negative £630m in Scenario 2 in 2021/22 compared to the counterfactual scenario

The table below summarises the impacts of a 15% increase (Scenario 1) and 25% decrease (Scenario 2) in the BBC's licence fee revenue. These figures are based on the assumptions discussed in the previous section. We discuss the results in detail in the following pages.

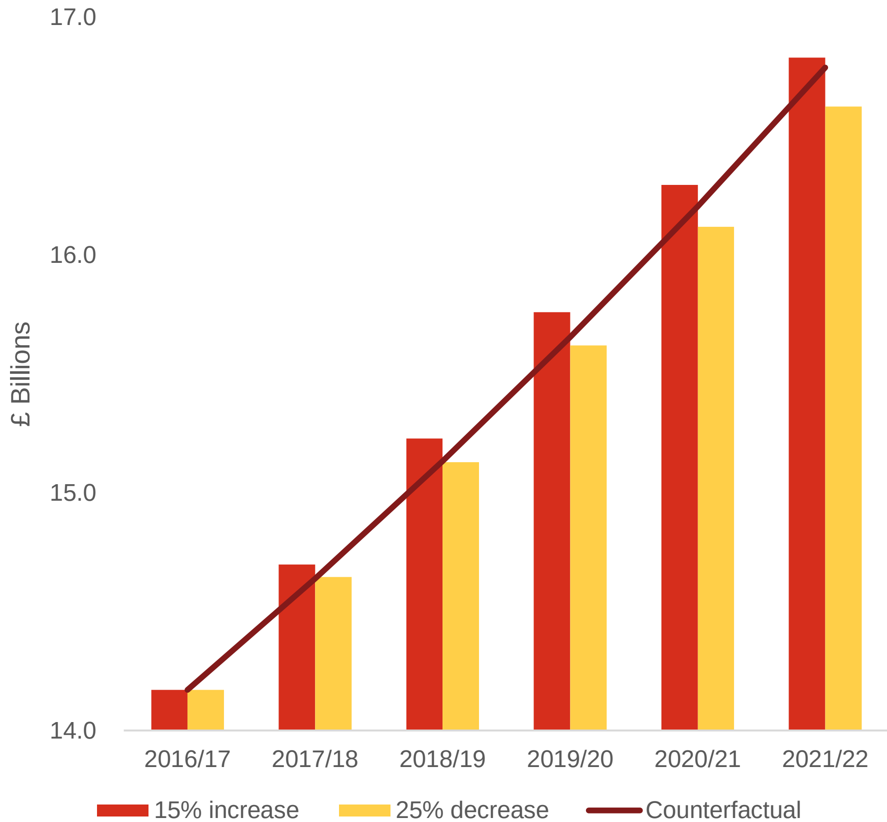
Summary of impacts in 2021/22 of 15% increase and 25% decrease in licence fee revenue

Changes in revenues and impacts	Change compared to counterfactual scenario in 2021/22	
	Scenario 1	**Scenario 2**
Change in licence fee revenues	+£558m	-£931m
Change in BBC licence fee revenues allocated to TV	+£347m	-£704m
Change in other TV providers' revenues	-£304m	+£540m
Net impact on TV industry revenues	+ £43m	- £164m
Net impact on first-run UK originated TV content spend	+ £221m	- £334m
Net impact on Creative Industries GVA[1]	+£435m	- £997m
Net impact on rest of UK economy GVA	- £116m	+£367m
Net impact on total UK economy GVA	+£319m	-£630m
Impact on total GDP due to changes in BBC expenditure	*+£545m*	*- £1076m*
Impact on total GDP due to changes in other TV providers' expenditure	*- £199m*	*+£393m*
Impact on total GDP due to changes in household expenditure	*- £27m*	*+£53m*
Impact on creative industries employment	+19,600	-44,900

[1] GVA is a measure of a sector's particular contribution to the economy, equivalent to GDP, less taxes on products, plus subsidies on products.

Total TV industry revenue in the UK is estimated to be £43m higher in Scenario 1 and £164m lower in Scenario 2 in 2021/22 than in the counterfactual…

TV industry revenue in the counterfactual scenario and the two scenarios, £ billions

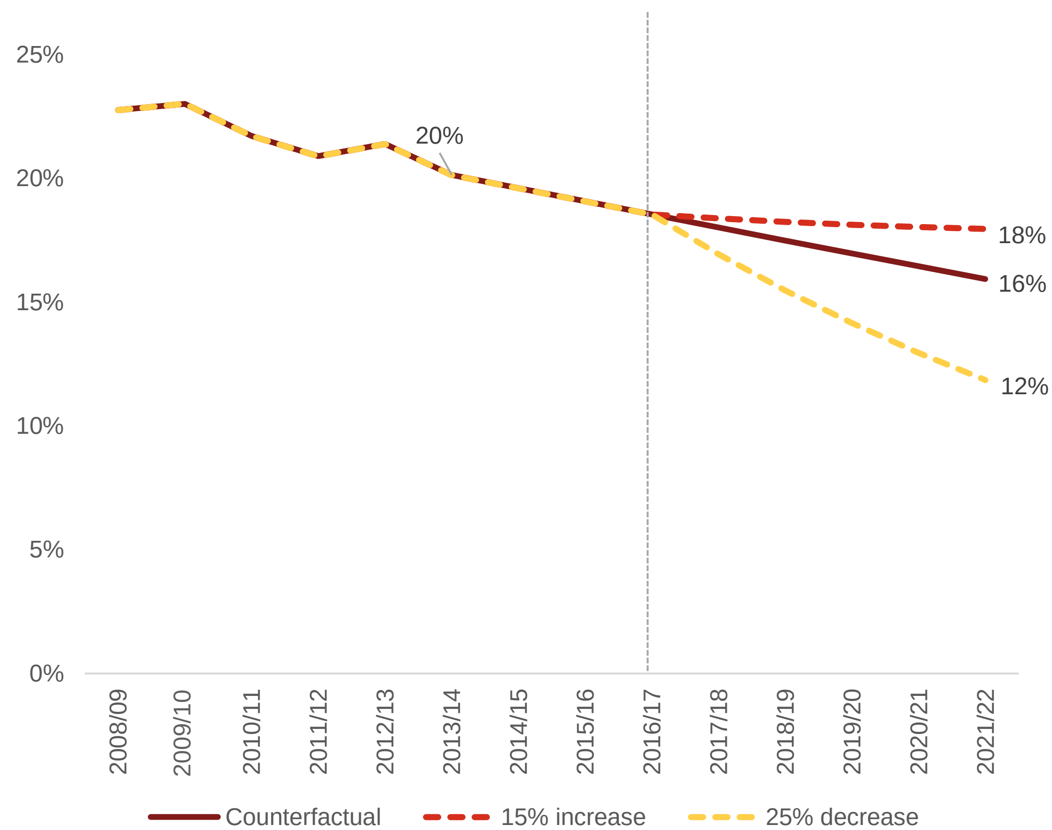


Source: Ofcom, PwC analysis

- In the counterfactual scenario, nominal TV industry revenues are estimated to increase to around £16.79 bn in 2021/22.
- In Scenario 1, TV industry revenues are estimated to be £16.83 bn in 2021/22. This is £43m higher compared to the counterfactual scenario.
- In Scenario 2, TV industry revenues are expected to be £16.62bn in 2021/22. This is £164m lower higher compared to the counterfactual scenario.
- Our assumptions around "crowding out" mean that as the BBC's licence fee income increases, other TV providers' revenues fall.
- Therefore, the net effect on TV industry revenues is significantly lesser than the change in the BBC's licence fee revenues.
- In addition, not all of the BBC's licence fee revenue is allocated to TV (66% was allocated in 2013/14) and so not all of the increase is classified as TV industry revenue.
- Our analysis focuses on crowding-out in the TV sector. For the purposes of our analysis, we do not assume any crowding out of radio or other online content. We recognize that other providers of radio and other online content may also change their spend in response to a change in BBC expenditure, and this is unlikely to have a substantial impact on our findings.

...but the BBC's share of total TV industry revenue is still expected to decline from 20% to 18% in Scenario 1, and to 12% in Scenario 2

BBC revenue as a % of total TV industry revenue

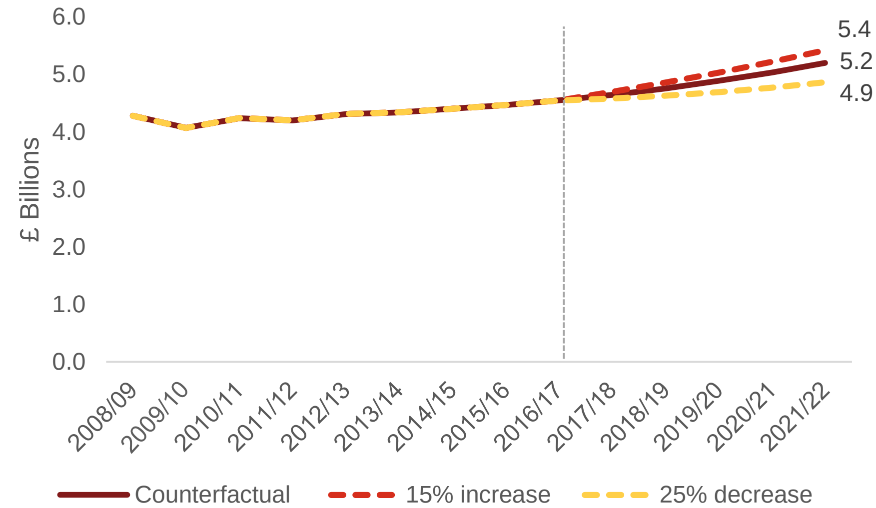


Source: Ofcom, PwC analysis

- In the counterfactual scenario the proportion of the BBC licence fee income allocated to TV is expected to decline as a percentage of total TV industry revenue from **20%** in 2013/14 to **16%** in 2021/22.
- In Scenario 1, the BBC's TV-allocated income is still expected to decline as a percentage of total TV industry revenue, to **18%** by 2021/22.
- This is two percentage points higher than in the counterfactual scenario.
- However, in Scenario 2 the BBC's TV-allocated income is expected to decline as a percentage of total TV industry revenue, to **12%** by 2021/22.
- This is four percentage points lower than the counterfactual scenario.

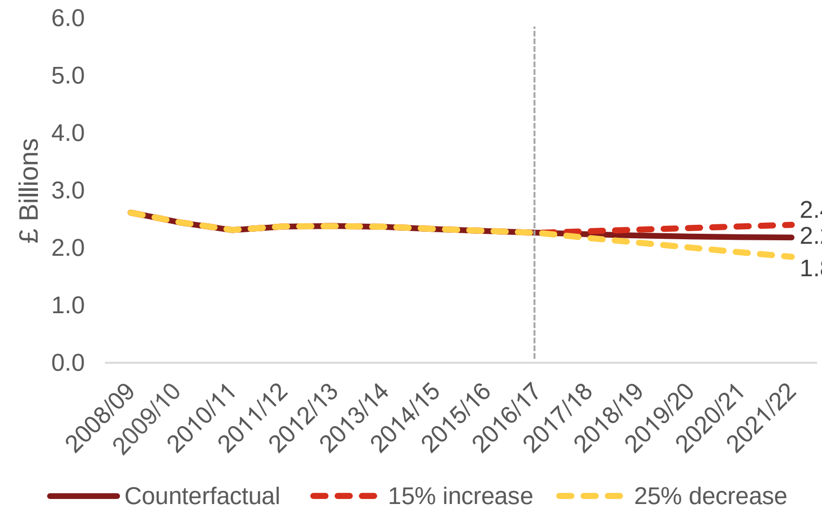
We estimate that total UK first-run TV content spend would be £221m higher in Scenario 1 and £334m lower in Scenario 2 compared to the counterfactual scenario in 2021/22

UK first-run TV content spend including sport, £ billions



Source: Ofcom, PwC analysis

UK first-run TV content spend excluding sport, £ billions

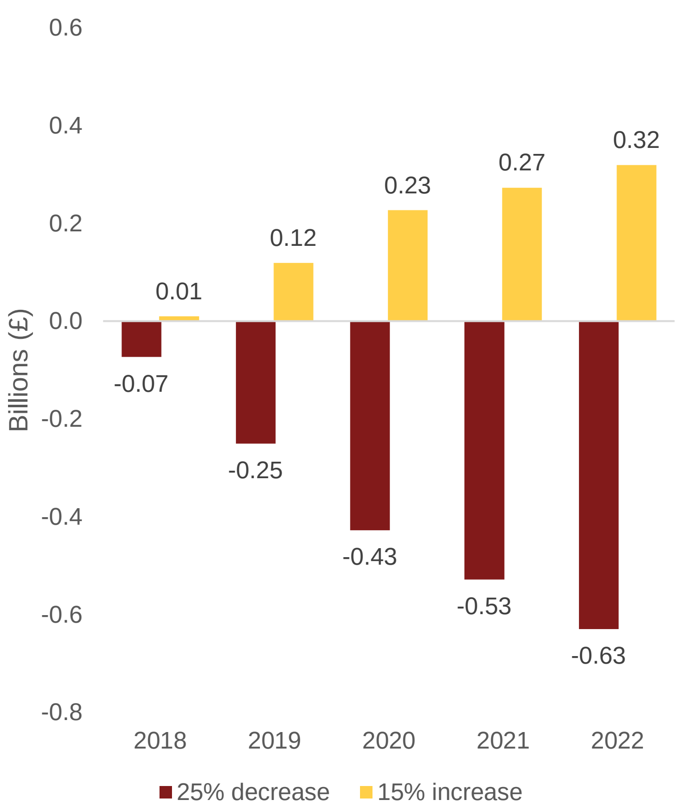


Source: Ofcom, PwC analysis

- As discussed on page 25, based on trends in real spend, in the counterfactual total UK spend on first-run content (including sport) is expected to increase to £5.2bn by 2021/22.
- In Scenario 1, total UK first-run content spend is estimated to be £221m higher than the, counterfactual scenario totalling £5.4bn.
- In Scenario 2, total UK first-run content spend is estimated to be £334m lower than the counterfactual, totalling £4.9bn.
- If sport is excluded, total UK first-run spend is expected to decline to £2.2bn in 2021/22 in the counterfactual scenario.
- In Scenario 1, it is estimated to increase slightly to around £2.4bn in 2021/22, whereas in Scenario 2, it is estimated to fall to around £1.8bn in 2021/22.

We estimate that GDP will be £319m higher in Scenario 1 and £630m lower in Scenario 2 compared to the counterfactual scenario in 2021/22

Change in the level of GDP compared to the counterfactual scenario, £ billions



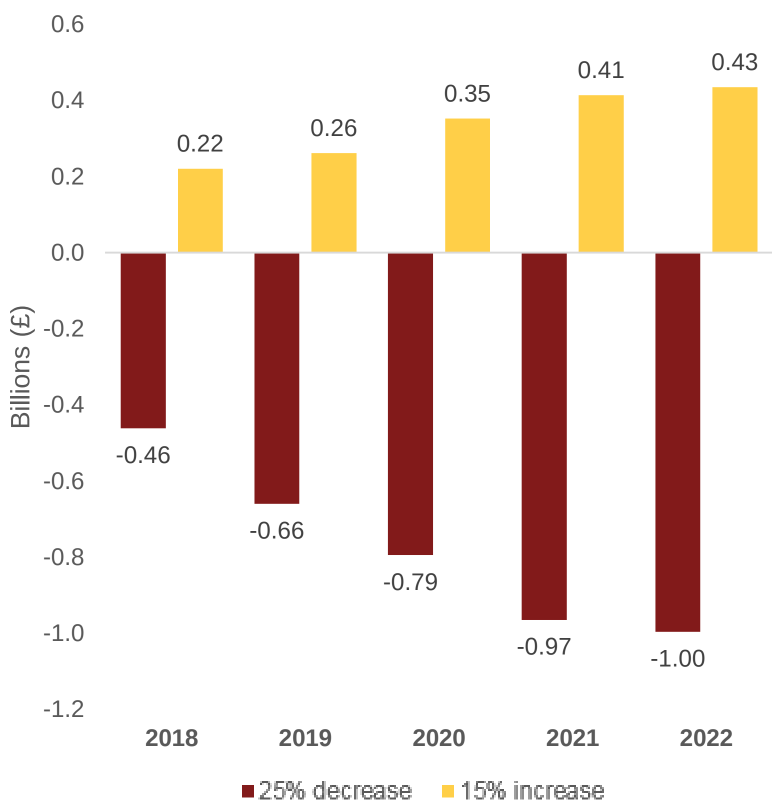
Source: PwC analysis

- The GDP impact measures the:
  - **Direct impact:** impact of a change in the BBC's and other TV providers' spend;
  - **Indirect impact:** impacts on the BBC's and other TV providers' suppliers (both in and outside the creative industries); and
  - **Induced impact:** effects of changes in spending by employees of companies throughout the whole supply chain, which results from changes in earnings throughout the supply chain.

  The results present an overall net picture, taking account of offsetting effects in other parts of the economy.
- In Scenario 1, a 15% nominal increase in licence fee revenue is projected to have a positive impact on GDP of £319m compared to the counterfactual scenario. This is due to the increase in output of the BBC, the effect of the associated change in spend by other TV providers and the subsequent indirect impacts on suppliers (both within and outside the creative industries).
- In Scenario 2, a 25% nominal decrease in licence fee revenue is projected to have a negative impact on GDP; GDP is £630m lower in 2021/22 compared to the counterfactual scenario.
- We estimate the impact due to changes in the BBC's and other TV providers' spending is a positive £346m in Scenario 1 and a negative £683m in Scenario 2, whereas the impact due to household expenditure is an offsetting negative £27m in Scenario 1 and a positive £53m in Scenario 2.
- In both scenarios, the estimated GDP impact is about 0.6 times the change in licence fee revenue, e.g. a 15% nominal increase in licence fee revenue of £558 leads to an increase in GDP of £319m in 2021/22.

The GVA of the creative industries sector is estimated to be £430m higher in Scenario 1 and £997m lower in Scenario 2 compared to the counterfactual scenario in 2021/22

Change in creative industries sector GVA compared to the counterfactual scenario, £ billions



Source: PwC analysis

- The main impact of an increase in licence fee revenue is expected to be felt in the creative industries. This is because, as discussed earlier, the BBC spends a large proportion of its licence fee revenue on producing TV content and, therefore, purchasing goods and services from the creative industries.
- We estimate that an increase in licence fee revenue will have a positive impact on the GVA of the UK's creative industries whereas a decrease in licence fee revenue will have a negative impact on GVA of the UK creative industries.
- A crucial issue is whether (and how far) an increase in the BBC's spending in the creative industries would displace investment from other sources (i.e. would the BBC crowd out spending by other providers?). In our scenarios, we assume a degree of crowding out.
- In both scenarios, the impact on the creative industries sector GVA is larger than the impact on total GDP, implying that the rest of the economy experiences an offsetting impact. This is due to our assumptions around crowding out, and the impact on other TV providers.
- The estimated creative industries GVA impact is about 0.8 times the change in licence fee revenue, e.g. a 15% nominal increase in licence fee revenue of £558 leads to an increase in creative industries GVA of £435m in 2021/22.

In Scenario 1, we estimate employment to increase by 16,200, and decline by 32,000 in Scenario 2 compared to the counterfactual scenario in 2021/22

In Scenario 1, we estimate that as a result of a 15% nominal increase in the BBC's licence fee revenue and the associated spending changes, employment in the creative industries sector will be 19,600 higher in 2021/22. Some of these jobs will be displaced from other sectors; employment in the rest of the UK economy is expected to fall by 3,400 in 2021/22. The net impact is estimated to be an increase employment of 16,200 in 2021/22.

We also estimate that in Scenario 2 employment in the creative industries will be 44,900 lower in 2021/22, compared to the counterfactual scenario, while employment in the rest of the economy will increase by 12,900 compared to the counterfactual scenario in 2021/22. The net impact is estimated to be a decrease in employment of 32,000.

Change in employment compared to the counterfactual scenario, '000s

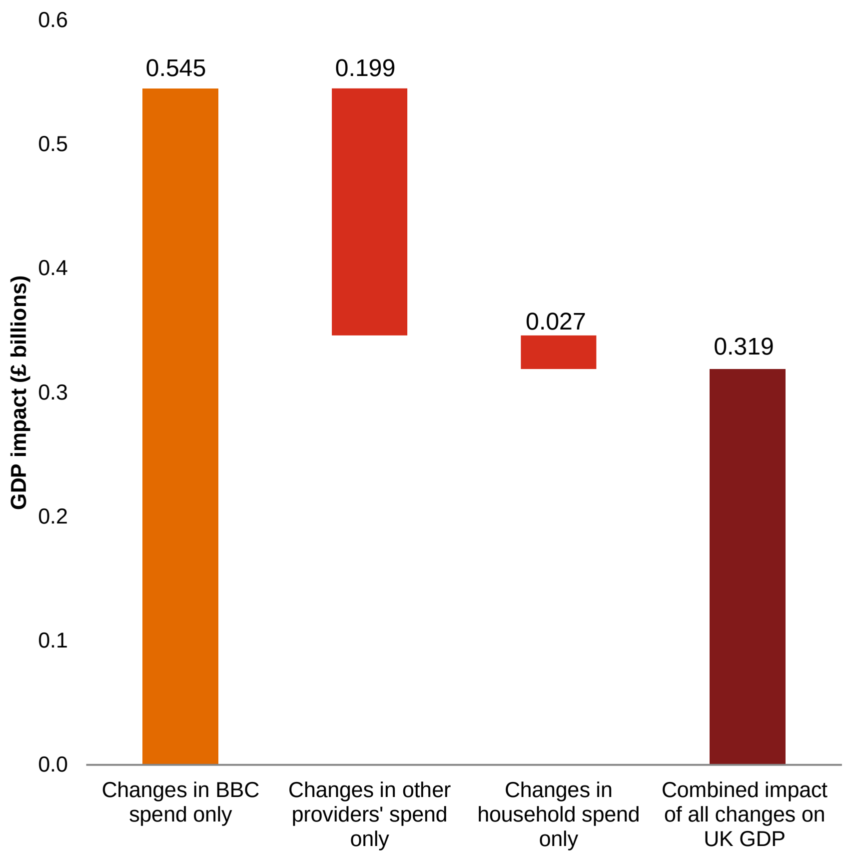
	2017/18		2018/19		2019/20		2020/21		2021/22	
Scenario	**+ 15%**	**- 25%**	**+ 15%**	**- 25%**	**+ 15%**	**- 25%**	**+ 15%**	**- 25%**	**+ 15%**	**- 25%**
Creative industries	9.9	-20.8	11.8	-29.7	15.9	-35.8	18.6	-43.5	19.6	-44.9
Rest of UK economy	-9.3	17.1	-5.7	17.0	-4.3	24.2	-4.8	16.7	-3.4	12.9
UK total	**0.6**	**-3.7**	**6.1**	**-12.7**	**11.5**	**-21.7**	**13.9**	**-26.8**	**16.2**	**-32.0**

Source: PwC analysis

Our analysis also estimates the change in employment in different sectors. It assumes that if workers move between sectors then they need to retrain, which takes time. As licence fee revenue increases, employment in the creative industries starts to increase, but at the cost of other sectors. For example, in Scenario 1, in 2017/18, there are 9,300 fewer jobs in the rest of the economy but 9,900 more in the creative industries sector. However, over time, the economy adapts as people retrain and capital is redeployed. This means that the negative impact on the rest of the economy is mitigated.

If the BBC's licence fee revenue increases by 15%, its spending changes boost the UK's GDP by £550m whereas changes in spending by other TV providers and households have offsetting negative impacts of £200m and £30m respectively

Change in the level of GDP compared to the counterfactual scenario in 2021/22, £ billions



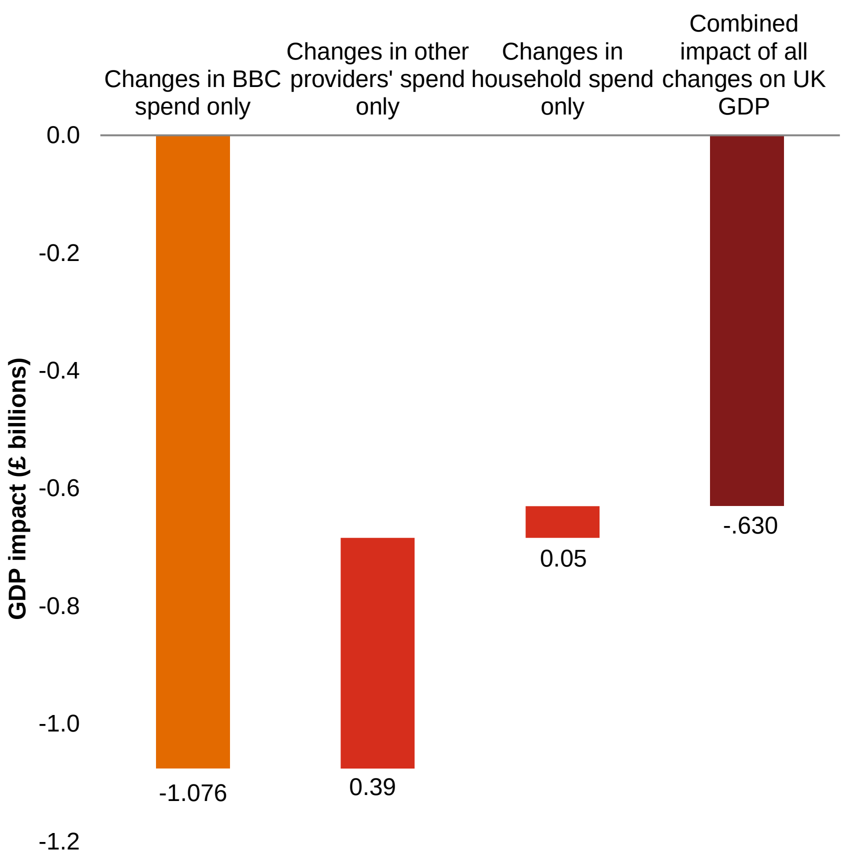
Source: PwC analysis

- We break down the impacts on GDP of the 15% increase in licence fee revenues in 2021/22, between the impact due to changes in BBC spend, changes in other TV providers' spend and changes in household spend.
- The GDP impact consists of the following components:
  - A *positive* £545m impact can be attributed to the effect due to a change in BBC spending.
  - A *negative* £199m impact can be attributed to a change in other TV providers' UK spend, assuming no change in BBC or household spend.
  - A *negative* £27m impact can be attributed to the change in household spending, assuming no change in BBC or other TV providers' spend.

The total GDP impact is £319m higher compared to the counterfactual scenario in 2021/22.

If the BBC's licence fee revenue falls by 25%, the impact of its spending changes will reduce UK GDP by £1.08bn, whereas changes in spending by other TV providers and households boost GDP by £390m and £50m respectively

Change in the level of GDP compared to the counterfactual scenario in 2021/22, £ billions



Source: PwC analysis

- We break down the impacts on GDP of the 25% decrease in licence fee revenues in 2021/22, between the impact due to changes in BBC spend, changes in other TV providers' spend and changes in household spend.
- The GDP impact consists of the following components:
  - A *negative* £1.076bn impact can be attributed to the effect due to a change in BBC spending.
  - A *positive* £390m impact can be attributed to a change in other TV providers' UK spend, assuming no change in BBC or household spend.
  - A *positive* £50m impact can be attributed to the change in household spending, assuming no change in BBC or other TV providers' spend.

The total GDP impact is £630m lower compared to the counterfactual scenario in 2021/22.

In summary, we estimate that the net impact on GDP would be an increase of £319m in Scenario 1 but a decrease of £630m in Scenario 2 in 2021/22, but our findings are sensitive to our assumptions on other TV providers' spend

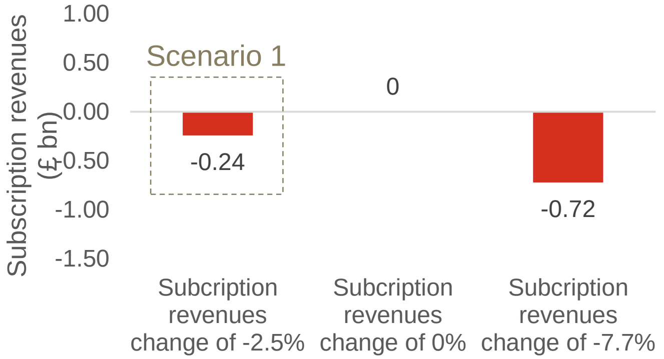
- A 15% nominal increase in the BBC's licence fee revenue (equivalent to a £558m increase in 2021/22) is expected to lead to an increase in GDP of £319m in 2021/22, compared to a scenario where there is no change in the level of 2016/17 licence fee revenue until 2021/22 (the counterfactual scenario).
- Conversely, a 25% decrease in the BBC's licence fee revenue (equivalent to a £931m decrease in 2021/22) is expected to lead to a decrease in GDP of £630m in 2021/22, compared to the counterfactual scenario.
- Creative industries sector GVA is £435m higher in Scenario 1 but £997m lower in Scenario 2 in 2021/22, compared to the counterfactual scenario.
- On the other hand, the impact on the rest of economy is negative in Scenario 1 (a fall of £116m) but positive in Scenario 2 (an increase of £367m) in 2021/22 compared to the counterfactual scenario.
- In Scenario 1, employment in the creative industries sector is expected to be 19,600 higher in 2021/22. Some of these jobs will be displaced from other sectors. Employment across the rest of the UK economy is expected to fall by 3,400 in 2021/22. The net impact is an increase in employment of 16,200.
- The results of our analysis are sensitive to our assumptions on advertising elasticities and changes in subscription revenues, which determine the extent of crowding out in the economy. In both scenarios, we have assumed a degree of crowding out. In Appendix A, we have presented the sensitivity of our findings to changes in assumptions on advertising elasticities and subscription revenues.

Appendix

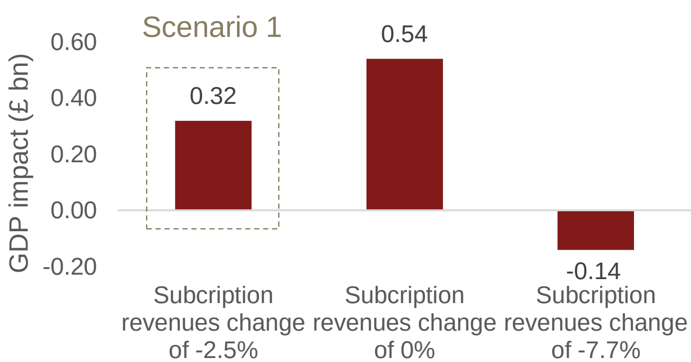
Appendix A
Sensitivity analysis

Our results are sensitive to our assumptions about the change in subscription revenues

Change in subscription revenues compared to the counterfactual scenario in 2021/22



Change in the level of GDP compared to the counterfactual scenario in 2021/22

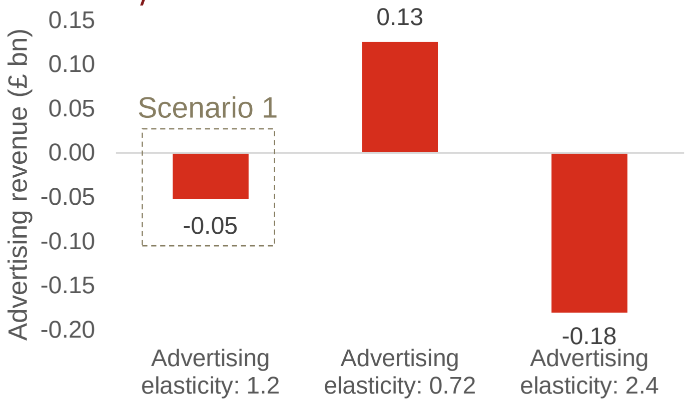


Source: PwC analysis

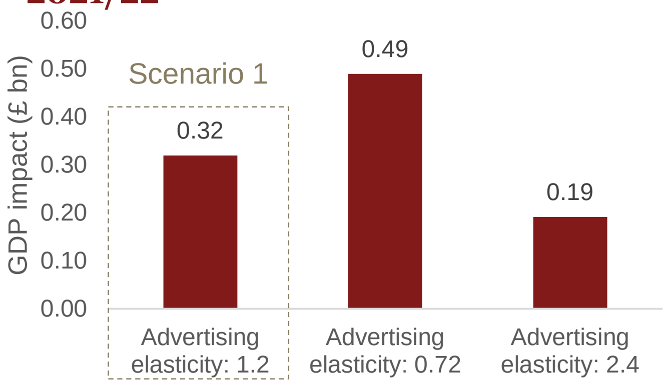
- In this appendix, we present the results of our sensitivity analysis to different assumptions for Scenario 1. We assume that an increase in BBC spend on TV content is associated with crowding out and, therefore, a lower level of subscription revenue. We recognise there is an argument to suggest there may be little to no crowding out: would consumers upgrade or churn away from their pay-TV packages? And would the pay-TV providers change their content strategy towards more first-run UK TV content as a result of a change in BBC spending?
- The results presented in Scenario 1 assume a fall in subscription revenues of 2.5%. Under this assumption, the net change in subscription revenue relative to the counterfactual scenario is £240m in 2021/22 and the total GDP impact estimated is £319m.
- We have reviewed the literature extensively and have found little empirical evidence on the extent of crowding out. The Reuters Institute study assumes that without the BBC, subscription revenue would either stay unchanged (0% change, i.e. no crowding out) in their 'pessimistic' scenario or increase by approx. 51% in their 'optimistic' scenario (the proportional impact for our study is approximately -7.7%). These values, as described by the Reuters Institute study, are extreme assumptions (i.e. it is very unlikely that the outcome would fall outside the range represented by these two extremes).
- We test the sensitivity of our results using the Reuters Institute study assumptions, but adjusting proportionately for our analysis under its optimistic and pessimistic scenarios (i.e. -7.7% and 0% change in subscription revenue respectively).
- The GDP impact using these alternate assumptions of 0% and -7.7% are a positive £540m and a negative £141m respectively. Therefore, a decrease of 1 percentage point in subscription revenues translates into a decrease of approximately £90m in GDP impact, on average.

Our results are sensitive to our assumptions about the change in advertising elasticities

Change in advertising revenues compared to the counterfactual scenario in 2021/22



Change in the level of GDP compared to the counterfactual scenario in 2021/22



Source: PwC analysis

- The price elasticity is the responsiveness of the volume of demand to a small change in price. It is simpler to express this as the ratio of a small percentage increase in volume (commercial impacts) to the associated percentage decrease in price.
- Price elasticity expressed as greater than 1 (e.g. 2.4) means that a 1% increase in volume (commercial impacts) is associated with a reduction in price of less than 1%, with a net increase in advertising revenues. Conversely, if the price elasticity is less than 1 (e.g. 0.72), a 1% increase in volume is associated with a price reduction of more than 1% and, therefore, with a net reduction in revenues.
- The results for Scenario 1 presented earlier assumed that an advertising elasticity of 1.2, representing a mid-range value of the estimates used in the literature (which vary between 0.72 and 2.4). Under this assumption, the change in advertising revenue, relative to the counterfactual scenario , is £50m lower in 2021/22, and the estimated total GDP impact is £319m.
- If we use the lower range elasticity of 0.72, the change in advertising revenue (relative to the counterfactual scenario) is £130m *higher* in 2021/22, and the GDP impact is projected to be a positive £490m in 2021/22.
- If we use an advertising elasticity estimate of 2.4, the change in advertising revenue (relative to the counterfactual scenario) would be £180m *lower* in 2021/22, and the GDP impact is estimated to be £190m in 2021/22.
- Therefore, an increase of £1bn in advertising revenue translates into an increase of £970m in GDP impact on average.

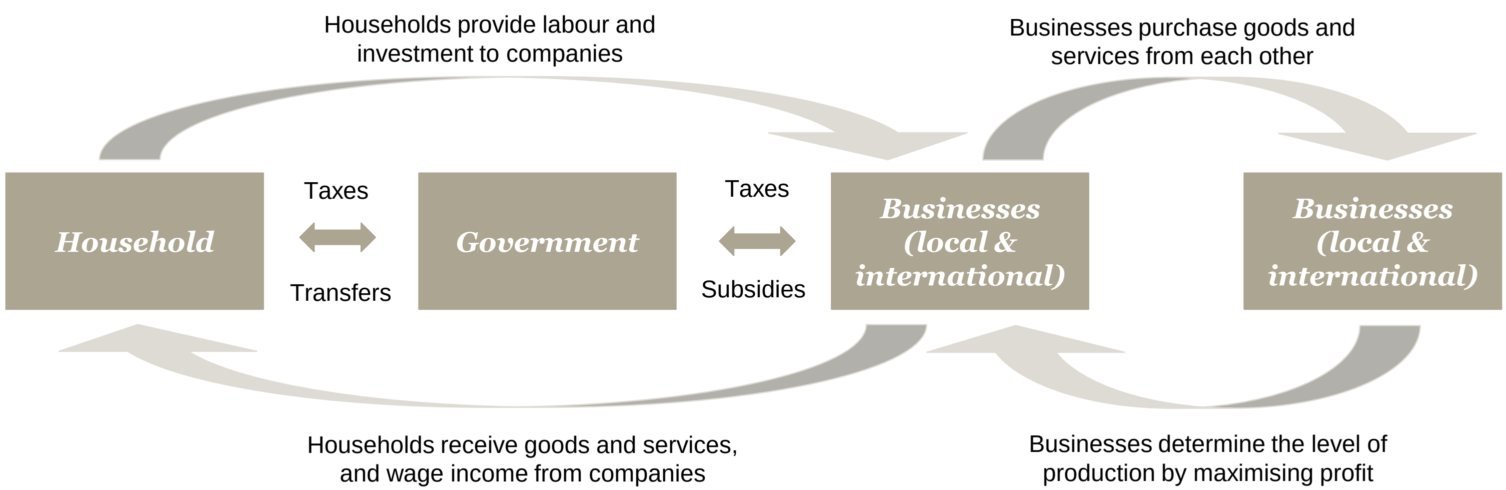
Appendix B

CGE modelling methodology

CGE models generate insightful predictions that factor in all parts of the economy

- Our scenarios are analysed using a Computable General Equilibrium (CGE) model of the UK economy. This is a large scale economic model comprising a set of equations that simulate the behaviours and economic interactions of all organizations in the economy (i.e. companies, households and the government). Such models are widely recognised and used by international and national organisations including HM Treasury.
- CGE models are designed to test different economic scenarios by adjusting or 'shocking' key variables. They adjust over time to a new equilibrium that takes into account the impact of the shock. We measure the impact of different scenarios on the UK economy relative to an assumed counterfactual scenario. Our model produces multiple outputs, for example in terms of the impact of the licence fee revenue change on GDP, sector GVA, and employment.
- Our CGE model is adapted to allow us to model BBC's interactions with the Creative Industries sector and the rest of the UK economy explicitly. We discuss this on Page 46.

Relationships in a CGE model



A CGE model is a multi-sector model that captures the dynamic relationships between various sectors, households and the government

Advantages of using a CGE model

A CGE model is a multi-sector model that captures the non-linear relationships between different sectors of the economy, households and the government. It can be used to map the behavioural response of the economy to changes in response to a change in licence fee revenue.

Specifically, these interactions are captured through a CGE model's solid microeconomic foundation. CGE models explicitly specify the production and demand functions for all parts of the economy. It takes into account the interdependence among all markets and provides numerical estimates of growth effects caused by changes in the economy. Such a perspective clearly offers advantages compared to partial equilibrium models, which often miss important intermarket relationships and ignore macroeconomic impacts

Unlike multiplier models the CGE model allow us to capture the dynamic effects due to a change in licence fee revenue. In addition, we are also be able to estimate the impact on consumption, investment as well as exports and jobs. CGE models also partially account for the potential crowding out of investment by the BBC and enable us to test and refine the results of the Reuters Institute study (that TV industry revenue could be 9% lower than they would have been without BBC TV).

Advantages of using a CGE model (cont'd)

One of the advantages of CGE modelling is that it allows us to be transparent about the assumptions used, and to test their relative impact. The assumptions applied within the CGE modelling are taken from extensive academic literature, which tests their appropriateness and robustness. The findings in this study are sensitive to our assumptions, especially on BBC, other TV providers' and households' spend. We have tested the sensitivity of our findings to these assumptions; the results of this sensitivity test are presented in Appendix A.

Disadvantages of using a CGE model

The CGE model has stronger explanatory power than the traditional multiplier models. However, the model also relies upon extensive data being available. Where data are incomplete the model may not be the best method for predictions. This is typically a more substantial issue in countries which lack detailed or robust economic data. Our model is based on data from the ONS which is regularly reviewed and updated, and is sufficient to generate a robust and detailed picture of the UK economy.

Furthermore, the results of the CGE model are sensitive to small changes in the assumptions. These assumptions are, in cases, very strong. Where assumptions are strong and uncertain CGE modelling can give a wide range of estimates and the power of the model is low. In order to mitigate this risk, we have run a series of sensitivity tests in order to test the sensitivity of the model outputs to changes in the underlying assumptions.

We have modified the UK SUTs to include the BBC as a separate sector in the UK economy using a variety of sources

CGE models estimate the impact on the wider economy of a particular scenario by comparing the scenario modelled (i.e. change in revenue from the licence fee) to a counterfactual scenario of no change:

- **Counterfactual:** we produce a forecast of creative industries output – based on historic growth and recent forecasts of long-term trends. The model is also benchmarked against UK Government forecasts of economic growth.
- **Scenario:** we model the impact of the change in licence fee on the UK economy. The linkages between the BBC, the creative industries and the wider economy within the model allow us to trace through the effects of this change across all sectors. The linkages are illustrated in the mapping on page 18.

In order to ensure that the model is complete in its coverage of the UK economy, activity across all sectors needs to be captured. In order to tailor the analysis towards capturing the most material areas of impact in greater detail, the model contains more granular sector information within the creative industries. By contrast, some areas of the economy are highly aggregated e.g. the single manufacturing sector within the model combines all aspects of a highly diverse sector.

Data used in the model

CGE models are often based on a form of National Accounts (NA) data known as Supply Use Tables (SUTs). SUTs provide data on sector-level output, consumption, business costs and taxation. They are "balanced" in the sense that income equals expenditure, which is an essential property for CGE models.

The UK Government publishes both SUTs and IO tables for the UK. SUTs are updated annually (with an 18 month lag, the most recent being for 2012), while IO tables are updated approximately every 5 years (2010 being the most recent year). In the model, the GDP and employment numbers within the counterfactual scenario are based on the 2010 IO table. The model then projects this baseline over a 60 year horizon.

Incorporating the BBC into UK SUTs

We have modified the UK SUTs to include the BBC as a separate sector in the UK economy using a variety of sources. This is done through mapping the BBC's purchases and outputs within the Supply Use framework. This allows us to incorporate specific changes with respect to the BBC – change in licence fee revenue in this instance – and therefore increases the accuracy of our estimates.

To estimate the BBC's GVA, we used data on the components of GVA (wages and EBITDA), taxes and expenditure on inputs are obtained from BBC Annual Reports for the corresponding year. Total BBC GVA was £1.1 bn whereas total expenditure was £3.6 bn of which £2.6 bn was on content, £202m on distribution, and £546m on infrastructure and support, and the remaining (£300 m) on other items.

Appendix C

Literature review – crowding out by public service investment

Our assumptions are based on estimates used in other studies and/or historic trends

- We have reviewed available industry and academic evidence on the crowding out/in effects of changes in the BBC's revenue from the licence fee on its spending. Based on our review of the evidence, we believe that the methodology followed in the Reuters Institute study is the most appropriate in this context; we use this methodology and the underlying assumptions as the starting point for our analysis, while making adjustments based on the latest available data, the literature reviewed and the scale of our scenarios.
- In this section, we discuss the literature reviewed in greater detail. **Our overall conclusion is that there is limited empirical evidence on the extent of crowding out in the UK media sector:**
    - Ofcom's Market Impact Assessment (2015) indicates that the aggregate financial impact of the BBC's service proposals on commercial broadcasters' advertising revenues (absent a dynamic response) is likely to be negative. On the other hand, the study indicates that the impact of the proposed changes, considered in isolation, are not likely to affect subscription revenues. Note that the scenarios considered in our study are much larger compared to the proposals considered in this study.
    - An Ofcom (2014) study on PSB spending concluded that the growth in income for the commercial PSBs did not necessarily translate into growing investment in content, unless the right incentives are in place. Similarly, Ofcom's third review of PSBs notes that the level of BBC investment in fun-run original content appears to be a contributory factor in stimulating ITV to spend more through competition.
    - A Communication Chambers (2015) study analysing the impact of several changes to BBC services (moving BBC Three online, launching a BBC One +1 channel, adding two hours per day of CBBC, and enhancing BBC iPlayer) concludes that the market impact on commercial broadcasters is likely to be positive but minimal.
    - Another Ofcom (2004) study assessing the impact of new BBC services highlights the specific impact of the new services on marginal competitors and risky innovation in nascent market niches. This may deter future investment and limit market entry. There may also be specific instances where acts by the BBC – for example in the treatment of rights – could foreclose the emergence of competition in a market.
- We have also reviewed a number of studies examining at the extent of crowding in/out in an international context, but have not found empirical evidence that can be used for our analysis.

* Our scenarios are (i) Scenario 1: 25% reduction in the Licence Fee; (ii) Scenario 2: 10% reduction in the Licence Fee

The Ofcom market impact assessment provides supporting evidence on our assumptions on advertising elasticities

Source	Description
Proposed changes to BBC Three, BBC iPlayer, BBC One and CBBC – Market Impact Assessment *Ofcom (2015)*	This study presents the findings of a Public Value Test (PVT) of significant changes to the BBC's UK Public Services. These changes include the closure of BBC Three as a broadcast channel; the reinvention of BBC Three as an online only service; the launch of a BBC One+1 channel; the extension of CBBC by two further hours to broadcast from 7am until 9pm; the development of BBC iPlayer beyond existing catch-up services to include an increased number of premieres and selected content commissioned by third party partners; and increased investment in first run drama for BBC One. **Key findings:** • Ofcom's modelling indicates that the aggregate financial impact of the BBC's service proposals on commercial broadcasters' advertising revenues (absent a dynamic response) is likely to be negative. For ITV (excluding ITV Studios) the study estimates the impact represents about 0.4% to 0.8% of its advertising revenues and would reduce its 2013 profit after tax by the order of 1.5% to 3.0%. • The study expects that the proposals would directly feed through to Channel 4's programming budget, and therefore its ability to deliver its public remit. We estimate the impact would equate to about 0.2% to 0.5% of its advertising revenues, slightly less than the impact for ITV and Channel 5. This corresponds to around 0.5% to 1.0% of Channel 4's first run, UK originated programme budget. • Overall these proposals will lead to the BBC gaining share of total viewing, largely due to the BBC capturing more viewers as a result of launching BBC One+1 which is not completely offset by the closure of BBC Three. • In addition to the impact on advertising revenues for commercial broadcasters, the study also considered the potential impact on subscription revenues for platforms such as Sky or Virgin Media, and subscriptions for VOD services such as Netflix. The study estimates that the BBC's service proposals are not likely to result in a meaningful number of households altering their subscription purchasing decisions. • The study does not quantify the dynamic impacts of changes in behaviour by commercial channels or the wider impact on related markets, either further up the value chain or for complementary services.

Sources:
'Proposed changes to BBC Three, BBC iPlayer, BBC One, and CBBC'. A Market Impact Assessment. Ofcom (2015). URL: http://stakeholders.ofcom.org.uk/binaries/research/tv-research/bbc-mias/market_impact_assessment_report.pdf

The Ofcom review of public sector broadcasting which reviews the level of funding and investment does not provide quantitative estimates for use in our analysis

Source	Description
Public Service Content in a Connected Society *Ofcom (2014)*	This study presents the findings of the third review of public sector broadcasting in the UK. In particular, the paper considers future market developments, structural changes to PSB funding, and assesses how commercial PSB's incentives to invest might be changing. **Key findings:** The study concludes that the overall levels of investment in specific genres and sub-genres appear to be dictated almost exclusively by the incentives of specific institutions to invest, driven by three key factors: 1. The level of funding available to invest 2. The commercial PSB channels' public service remits and licence obligations and the status of C4C as a publicly-owned organisation 3. The level of investment required to optimise value to shareholders, which is in turn heavily influenced by levels of competition for audience share in specific market segments. The study concludes that the growth in income for the commercial PSBs does not necessarily translate into growing investment in content, unless the right incentives are in place (i.e. there is no 'crowding out'). Further, some PSBs may be incentivised to invest only to the degree required to compete effectively for share. For example, ITV competes mainly with BBC One. Therefore, the level of BBC One investment in first-run original programmes therefore appears to be a contributory factor in stimulating ITV to spend more through competition. The study does not, however, provide quantitative evidence that can be used in our analysis.
Public sector broadcasting without the BBC Peacock (2004)	This study examines the impact of a change in public service broadcasting policy where a limited public service broadcasting fund is available on a competitive basis to all broadcasters and producers. The report concludes that this mechanism would be sufficient to ensure the provision of programmes with 'public service content' that would not be fully provided in a commercial market, and would allow the market to adapt to new technologies and changing views as to the desired content of public service broadcasting. **Key findings:** The study does not provide any estimates of the size or impact of such a policy change. However, it recommends that access to the BBC should become voluntary (e.g. by subscription). It also provides recommendations on the corporate structure of the BBC to allow it function with a wider range of corporate aims than a purely commercial organization. The report does not provide any empirical estimates of the impact on the BBC or on other PSBs of the proposed policy change.

Sources:
'Public Service Content in a Connected Society ' (2014). URL: http://stakeholders.ofcom.org.uk/binaries/consultations/psb-review-3/summary/PSBR-3.pdf
'Public service broadcasting without the BBC' (2004) URL: http://www.iea.org.uk/sites/default/files/publications/files/upldbook254pdf.pdf

Studies analysing the impact of changes in BBC services do not provide quantitative evidence of the extent of crowding-in or crowding out of investment by other TV providers

Report	Description
Forecast consumption and preliminary market impact assessment of revised BBC services *Communication Chambers (2015)*	This paper provides forecasts of the change in usage and reach of the BBC's services, and a preliminary assessment of the market impact of the service changes of the BBC's proposals to: • Move BBC Three online • Launch a BBC One +1 channel • Add two hours per day of CBBC, from 7 to 9pm • Enhance BBC iPlayer **Key findings:** • The proposed service changes result in a slight overall gain in viewing for the BBC of 0.17% in 2017. • This gain results in small changes in viewing for the commercial broadcasters. The paper concludes that the market impact on commercial broadcasters is likely to be positive but nominal.
Assessment of the Market Impact of the BBC's New Digital TV and Radio Service *Ofcom (2004)*	This study assesses the effect of the new services on the overall market (i.e. the impact on developments in market structure and competition). In particular, it assesses the impact of digital take-up on the effectiveness of competition in the broadcasting sector and the extent to which the BBC contributes to these changes. The study also assesses impacts where competition or innovation may be threatened by the presence of the BBC (i.e. the impact on the finances and business models of specific commercial operators and the implications of these effects for competition, including the BBC's own quantification of the impact of BBC's new services on its rivals). **Key findings:** • The study finds that there are benefits of the BBC's digital TV and radio services to the competitive process – particularly through Freeview and DAB. • The study highlights the specific impact of the new services on marginal competitors and risky innovation in nascent market niches. This may deter future investment and limit market entry. In particular, there may also be specific instances where acts by the BBC – for example in the treatment of rights – could foreclose the emergence of competition in a market. • However, the study does not provide any quantitative evidence on the question of crowding out/crowding in.

Sources:'Assessment of the Market Impact of the BBC's new digital TV and radio services'. Ofcom (2004). URL: http://stakeholders.ofcom.org.uk/binaries/research/tv-research/bbc-mias/bbc-news.pdf, Forecast consumption and preliminary market impact assessment of revised BBC services' Communications Chambers (2015). URL: http://downloads.bbc.co.uk/bbctrust/assets/files/pdf/review_report_research/service_changes/market_impact_assessment.pdf

We have reviewed UK and international studies focussing on the media sector and the wider economy, but they do not provide quantitative evidence that can be used in our analysis

Source	Description
Public and private broadcasters across the world – The race to the top *BBC (2013)*	This study presents research, covering 14 markets across the globe, showing that the competitive dynamics underpinning the UK media industry also exist in other markets. Using bespoke datasets, it explores whether public funding crowds out commercial investment. **Key findings:** • Overall, countries with well-funded PSB who invest in high-quality, diverse new content tend also to have commercial markets which generate strong revenue and levels of investment in high-quality, diverse new content. This pattern is most pronounced in the Nordic countries, Australia and the UK. • There is a degree of variance between levels of public funds and commercial revenues across the 14 countries in the sample, due to a range of TV market, macroeconomic and regulatory factors. The study found that, other things being equal, markets with higher levels of public funding have higher levels of commercial funding on a per capita basis. • The study found no evidence to suggest that high levels of public funding crowd out commercial funds.
PSB review: Investment in TV genres *Mediatique. (2014)*	The report investigates the factors influencing PSB content investment decisions in TV by genre. The analysis focusses on analysing genre profitability via a calculation of gross margin, taking account of total revenue and the cost of production. The analysis is based on an annual database of programmes broadcast in peak across the PSB channels in 2013, tagged as to broadcaster, genre, duration, viewing audience, viewing share and the proportion that was live/consolidated. A focus on peak-time audience reflects the significant contribution of peak viewing to overall outcomes. **Key findings:** • The report, which looks at a scenario with no BBC, concludes that the UK market is not large enough to support a HBO-style operator. • The report finds that content investment decisions at the PSBs are ultimately determined by the balance of financial outcomes, corporate objectives and wider practical considerations. • Investment decisions are influenced by the potential of certain programmes – and genres – to optimise revenue across multiple windows and territories: this is typically the primary prism through which shows are assessed. • Each genre's commercial attractiveness varies among the three PSBs. There is some correlation between the scale of audiences secured by each genre and its profitability, although some genres that secure small audiences can still secure a positive contribution. • The study suggests that as market trends evolve, and the penetration of PVRs and on-demand devices increase, ROI profiles will shift further, particularly for those genres whose consumption is already biased towards non-live viewing.

Sources: 'Public And Private Broadcasters Across The World – The Race To The Top'. BBC (2013). URL: https://downloads.bbc.co.uk/aboutthebbc/insidethebbc/howwework/reports/pdf/bbc_report_public_and_private_broadcasting_across_the_world.pdf;
Mediatique. (2014). PSB review: Investment in TV genres. URL: http://stakeholders.ofcom.org.uk/binaries/broadcast/reviews-investigations/psb-review/psb3/Investment_in_TV_Genres.pdf

We have reviewed UK and international studies focussing on the media sector and the wider economy, but they do not provide quantitative evidence that can be used in our analysis

Source	Description
The impact of government spending on the private sector: crowding out versus crowding-in effects *Furceri and Sousa (2009)*	This paper assesses the impact of changes in government spending-GDP ratio on the short term growth rates of private consumption and investment, using a sample of 145 countries. **Key findings:** • The paper concludes that government spending produces important crowding out effects, by negatively affecting both private consumption and investment. The result is broadly robust to both country and time effects, and different econometric specifications. • The effect of government consumption on private consumption and investment does not depend on the phase of the business cycle, but differ substantially among regions. • Although the paper does not provide any quantitative estimates of elasticities that can be used for our analysis, it finds that for the UK, the impact of government spending is statistically insignificant with regards to crowding out.
Macroeconomic Rates of Return of Public and Private Investment: Crowding in and Crowding out Effects *Afonso and Aubyn (2006)*	This study uses annual data from 14 European Union countries, plus Canada, Japan and the United States to evaluate the macroeconomic effects of public and private investment through econometric analysis. The analysis also allows the assessment of the extent of crowding-in or crowding out of both components of investment. **Key findings:** • The study concludes the crowding-in effects of public investment on private investment vary across countries, while the crowding-in effect of private investment on public investment is more generalised. The net impact on total investment for the UK is slightly contractionary. • The paper does not provide any quantitative estimates of elasticities that can be used for our analysis.

Sources:
Furceri, D., & Sousa, R. (2009). The impact of government spending on the private sector: Crowding out versus crowding in effects
Afonso, A., & St Aubyn, M. (2009). MACROECONOMIC RATES OF RETURN OF PUBLIC AND PRIVATE INVESTMENT: CROWDING-IN AND CROWDING-OUT EFFECTS. *The Manchester School*, *77*(s1), 21-39.
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