# Deloitte.

# The economic contribution of advertising in Europe
# A report for the World Federation of Advertisers

# Contents

# Executive Summary

This report has one over-riding objective: to demonstrate what the contribution of advertising to the European and national economies is, as well as assessing its tangible benefits to EU citizens.

The World Federation of Advertisers (WFA), with the support of a wide range of industry stakeholders[1] commissioned Deloitte to quantify the economic impact of advertising, both across Europe and in a selection of other developed markets.

This was no easy task, as there are a large number of factors which can influence GDP. However, Deloitte created an econometric model to isolate the benefits of advertising to the European economy, and to individual EU markets or countries such as Japan and Canada.

The model was based on 17 years of Advertising Association/WARC[2] data (1998 – 2014) from 35 developed markets, and found that advertising spend in the EU has a seven-fold impact on the wider economy.

The key findings can be summarised under three main headings:

## On average, 1 Euro of advertising spend generated 7 Euros for the Economy

This means that the EUR 92 billion spent on advertising in 2014 in the EU is estimated to have contributed EUR 643 billion to GDP, representing 4.6% of the overall EU GDP.

Advertising contributes to wider economic growth through its ability to support competitiveness. It provides consumers with information on products and services, and helps to increase their choice of goods and services. This, in turn, drives innovation by incentivising businesses to create differentiated products and services, allowing them to out-compete their competitors not just in the EU but around the world.

## Advertising provides almost 6 million jobs in the EU, equivalent to 2.6% of all EU employment[3]

Advertising is a major source of employment and provides jobs in three ways:

- Firstly, there are people employed directly in the production of advertising. These jobs account for 16% of the 5.8m total jobs supported by advertising. The study excludes employment associated with in-house production of advertising, so this is a conservative number;

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[1] Advertising Association UK (AA), Association des Agences-Conseils en Communication (AACC), Association of European Radios (AER), European Association of Communications Agencies (EACA), European Broadcasting Union (EBU), European association of television and radio sales houses (EGTA), Internet Advertising Bureau EU (IAB EU), Mainostajat Finland, Organisation Werbungtreibende im Markenverband (OWM), Union des Annonceurs (UDA), Union des Entreprises de Conseil et Achat Media (UDECAM).
[2] AA/Warc Expenditure Report
[3] 2014 figures.

- Secondly, there are jobs created in media and online businesses that are funded by advertising, including journalists and content producers as well as people working in out-of-home (OOH) or TV, for example. This accounts for 10% of the 5.8m jobs.

  The roles in both these areas provide greater security than jobs in other sectors[4] and an average salary that is higher than the rest of the economy[5], reflecting the fact that they can be described as "quality jobs", as defined by the OECD;

- Finally, there are the jobs created in the wider economy as a consequence of advertising activity. These range from sales jobs to roles supporting the ad business in industries such as hospitality. This area also includes roles created by the advertising-stimulated demand for products and services and accounts for 74% of the 5.8m jobs.

## Advertising provides personal and social benefits by funding or part funding media services, meaning people can enjoy them for free or at a reduced rate.

Advertising ensures that EU citizens benefit from news and entertainment at a reduced cost or even for free. The €92bn spent on advertising in 2014 directly funded content of all kinds.

Outdoor advertising also provides additional civic benefits in the form of an improved urban environment while search engines help people to reduce both the time and financial cost of seeking new information.

Without advertising, funding for all sorts of media would be reduced. This could lead to more expensive TV-subscriptions, reduced newspapers and magazines' plurality and independence, and radio stations would lack the ability to provide news and entertainment throughout the day. In addition, professional sports and cultural events would need to seek financial support from another source.

On the internet, advertising largely funds free services that people across Europe use at little or no cost. For example, around 70% of EU citizens regularly use email services, while social media are accessed by all segments of the population.

Advertising matters for employment, innovation, culture and entertainment, and supports media plurality which is fundamental to democratic freedoms. The benefits are pervasive and run through the fabric of society. Europe without advertising would be poorer, less well informed and less competitive.

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[4] KPMG, 2016 (KPMG Media Tracker 2015, found at https://home.kpmg.com/uk/en/home/insights/2015/01/media-tracker.html)
[5] Eurostat data based on the following sectors: Advertising, Television, Radio, Press, Internet, and Cinema.

# 1 Introduction

Advertising plays an important role in market economies by facilitating communication between businesses and their customers. It provides customers with information to support their purchasing decisions and strengthens incentives for businesses to enter markets and to develop products. Advertising also plays an important funding role in enabling media services. This not only provides value to consumers but also increasingly supports the activities of businesses that use the services as platforms to showcase their offering.

The broad role that advertising has in the economy means its economic impacts are far-reaching. Previous Deloitte studies have investigated and sought to quantify these impacts in the UK, Ireland and Belgium.[6] The current study, commissioned by the World Federation of Advertisers (WFA), builds on this body of work and presents quantitative estimates of the economic contribution that advertising makes across Europe and a selection of other developed markets. As agreed with the WFA, the focus of this study is on generating data and it concentrates on the GDP and employment contributions of advertising.

The intention is that the data presented in this report can be used separately to support a fuller analysis on the economic impact of advertising, which may follow in a subsequent study.

## 1.1 Scope

This report presents data on the economic contribution of advertising in the EU and in selected member markets. As agreed with the WFA, these markets are:

- The United Kingdom[7];
- Belgium[8];
- Finland;
- France;
- Germany;
- Hungary; and
- EU-28

In addition, and as agreed with the WFA, the report also presents data on the GDP contribution in the following non-EU developed markets:

- Australia;
- Canada;
- Korea; and

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[6] "Advertising Pays: How advertising fuels the UK economy" (a Deloitte report for the Advertising Association published in 2013); "Advertising Pays 2: How advertising can unlock UK growth potential"; (a Deloitte report for the Advertising Association published in 2014); "Advertising Pays 3: The value of advertising to the UK's culture, media and sport." (a Deloitte report for the Advertising Association published in 2015); "Advertising: An engine for economic growth." (a Deloitte report for Core Media Communications published in 2013).
[7] Note that the estimates of the GDP impact of advertising for the United Kingdom are sourced from "Advertising Pays: How advertising fuels the UK economy" (a Deloitte report for the Advertising Association published in 2013)
[8] Results are only reported for Belgium on the GDP contribution

- Japan.

The measures of economic contribution used in this report are outlined below.

## Contribution to GDP

Chapter 2 presents estimates of the annual contribution of advertising to GDP for each of the markets outlined above. These estimates are presented in Euros, but also as a percentage of the total GDP of the market. In addition, the implied "GDP multiplier" – that is, the ratio of GDP impact to advertising spend - is reported for each market.

To contextualise the analysis, there is also a high level discussion on what considerations may be relevant when interpreting these figures ahead of any future study that conducts more detailed analysis on the drivers of impact in the different markets.

The technical detail on how the GDP estimates are calculated is included in Annex A.

## Contribution to employment

Chapter 3 presents estimates of the contribution of advertising to employment in the European markets. In addition to the total impact, this chapter presents the break-down across different categories.

As for the section on GDP, a high level discussion is also provided on what considerations may be relevant for interpreting the figures ahead of any future study.

Technical detail on how the employment estimates are calculated is included in Annex B.

## Other elements

Whilst Chapter 2 presents the aggregate contribution of advertising to GDP, it does not quantify the channels through which advertising spend impacts GDP. While not quantifiable, such channels are important to understand the reasons behind the impact. Chapter4, therefore, presents additional data on the economic contribution of advertising in a selection of markets. This is based on existing evidence on the role that advertising plays in:

- Enabling free-to-use or subsidised media services; and

- Supporting competition.

# 2 GDP impacts

## 2.1 Approach

This chapter presents estimates of the contribution to GDP that advertising has in a selection of developed markets (Figure 1).

Figure 1: Markets for which GDP impacts are reported

| EU markets | Non-EU markets |
|---|---|
| • United Kingdom<br>• Belgium<br>• Finland<br>• France<br>• Germany<br>• Hungary<br>• EU-28 | • Australia<br>• Canada<br>• Japan<br>• Korea |

Source: Deloitte analysis

There are a number of mechanisms by which advertising can contribute to GDP in a given market. These include:[9]

- Generating economic activity through the production of services;

- Supporting competition by providing customers with information about products;

- Encouraging innovation by increasing the rewards to producing a successful brand; and

- Providing significant funding sources for the provision of media services.

One possible approach to estimating the overall impact would be to quantify the individual impacts associated with each mechanism and adding them together (this can be described as a "bottom-up" approach). However, because of the extensive role that advertising plays in the economy, quantifying the overall impact of advertising on GDP on a bottom up basis has a number of inherent challenges:

- There are several mechanisms by which advertising impacts GDP, some of which may interact or cross over with each other;

- There are inherent additionality issues that need to be accounted for in any estimation technique. For example, advertising may lead to incremental sales for individual firms, but if these sales draw demand away from other products then the overall impact on GDP may be limited; and

- Many of the impacts of advertising are not easily quantifiable, such as the impact on competition in particular markets or the incentives to innovate.

Because of these challenges, taking a bottom up approach could yield inaccurate findings on the overall impact of advertising.

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[9] For a fuller analysis of the ways in which advertising impacts GDP, see "Advertising Pays: How advertising fuels the UK economy" (a Deloitte report for the Advertising Association published in 2013).

For these reasons, the analysis in this report takes a top-down approach to modelling the impact of advertising on GDP. It uses an econometric model to estimate the overall relationship between advertising spend and GDP in each of the markets, drawing on a rich data set that spans 35 countries and 17 years of data.

The advantage of this top-down approach is that it captures most mechanisms by which advertising impacts GDP to produce an estimate of the aggregate net impact of advertising. In principle, this estimate accounts for interactions, additionality issues and non-measurability issues. However because the impact is measured at an aggregate level, it is not possible to disentangle the individual impacts from the total for each market.

Full details of the modelling approach are described in Annex A.

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**Tool Box: Intuition behind the modelling approach**

In order to understand the aggregate net effect of advertising on GDP, this study uses econometric modelling to draw out its impact after controlling for other determinants of GDP.

Many factors can impact the level of GDP in a given market, such as government expenditure, levels of trade or investment, number of hours worked and so on. The level of advertising expenditure can also be a factor, but determining its specific impact on GDP while holding the other factors constant is a challenging task which econometrics helps achieve.

By using annual data across 35 countries and 17 years, the econometric model tests whether advertising has an impact on GDP over and beyond the impact of variables that have been shown to contribute to GDP and GDP growth. This impact is tested over time to ensure that what is observed is not due to other events happening in a specific year, and across countries to ensure this relationship holds across markets.

A long-run relationship between advertising spend and GDP can therefore be inferred, which can then be used to estimate the GDP impact, in Euros, of a 1 Euro spend in advertising in a given year.

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## 2.2   Results

Figure 2 shows the total EUR value of advertising spend in each of the studied markets in 2014 and Figure 3 shows the total, net GDP impacts in 2014 that are caused by the advertising spend in each market.

The total ad spend across the studied markets (EU-28, Japan, Korea, Australia and Canada) in 2014 is estimated to be EUR 146 billion. This is estimated to have supported EUR 972 billion in GDP, which is equivalent to 4.7% of total GDP in these markets.

Figure 2: Annual advertising spend by market in 2014

**EUR (million)**
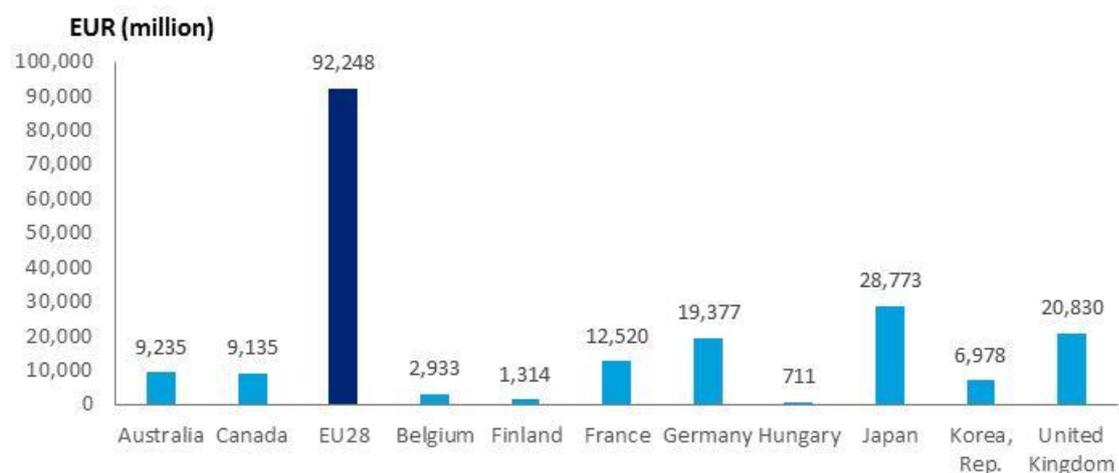


Source: Deloitte analysis, WARC[10]

Figure 3: Estimated annual GDP impact of advertising in 2014

**EUR (million)**
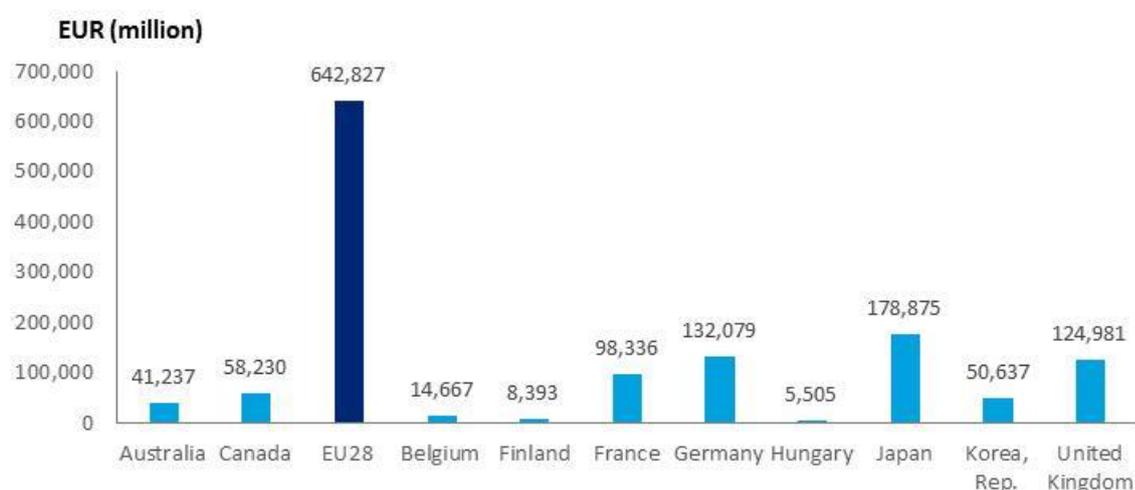


Source: Deloitte analysis

## 2.3 Interpreting the results

### 2.3.1 The GDP multiplier

The results presented above describe the total GDP impact of advertising in each of the markets. In presenting the relationship between advertising and GDP, it has proved useful in previous studies to present the impacts in terms of a GDP multiplier.[11] That is, to present the average Euro value of GDP impact per Euro ad spend. The advantage of this metric is that, by controlling for the scale of the total ad spend, it provides an arguably more tangible illustration of the impact of advertising spend. Figure 4 presents the results of the GDP multipliers.

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[10] WARC is an online service offering advertising best practice, evidence and insights from the world's leading brands. See https://www.warc.com/ for more information.
[11] For example, "Advertising Pays: How advertising fuels the UK economy" (a Deloitte report for the Advertising Association published in 2013).

Figure 4: Average GDP multipliers[12]
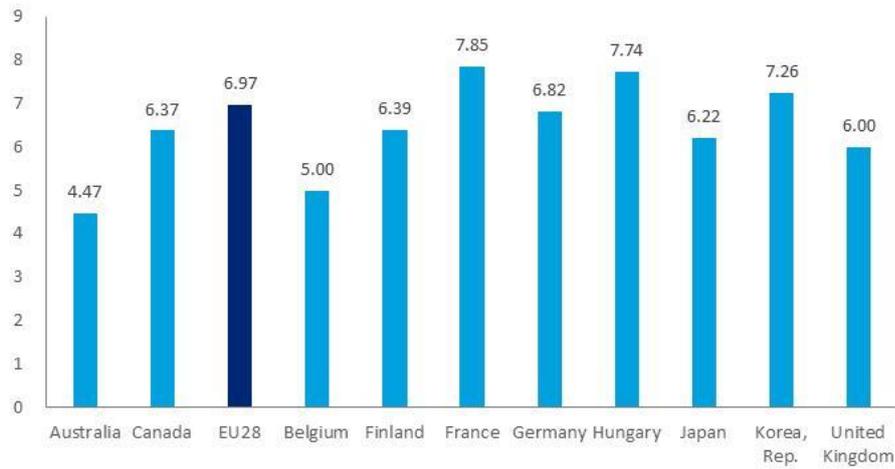


Source: Deloitte analysis

The estimated multipliers are broadly in line with estimates that were produced in previous studies. For example, a study produced in 2013 for Core Media Communications estimated the Ireland multiplier at 5.7.[13]

The estimated multipliers for most markets fall in a range of between 6 and 8, but for Australia, the GDP multiplier lies outside this range. However, while the GDP multipliers provide a useful metric for the purposes of exposition, caution should be exercised in how they are interpreted, especially when making cross-country comparisons. The relationship between advertising and GDP is complex and non-linear, with incremental returns to advertising potentially higher when ad spend is low. As a result, the average multiplier is a rough approximation of the relationship and cross-market differences will be significantly driven by differences in levels of advertising spend.

Figure 5 shows the relationship between the estimated average GDP multipliers and the ratio of advertising spend to GDP in each of the markets. As this chart shows, markets with a high advertising spend to GDP ratio generally have a low average GDP multiplier and vice versa. This chart also shows that Australia is an outlier with an advertising spend to GDP ratio of above the sample average. This helps to explain why its average GDP multiplier is below the sample average.

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[12] Note that the estimate for the United Kingdom is sourced from "Advertising Pays: How advertising fuels the UK economy" (a Deloitte report for the Advertising Association published in 2013) and the one for Belgium is sourced from "Advertising Pays: The impact of advertising on the Belgian Economy" (a Deloitte report for the Conseil de la Publicité published in December 2015)
[13] "Advertising: An engine for economic growth." A report for Core Media Communications published in 2013.

Figure 5: "GDP multiplier" vs "Ad spend to GDP ratio" by market
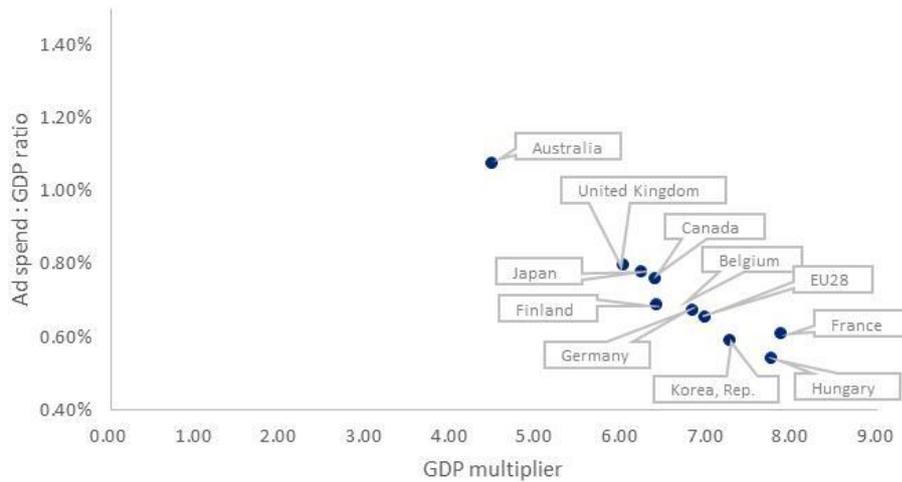


Source: Deloitte analysis, WARC, World Bank

To obtain the GDP impact of advertising in 2015 and 2016, the analysis should be conducted with additional data on all variables in those two years. However, using the EU-28 multiplier estimated based on historic data up to 2014 can give estimates as to what the impact of advertising could be in those years. Applying the EU multiplier to the ad spend data from WARC[14] in 2015 and the forecasted growth in ad spend for 2016[15] suggests that the GDP impact of advertising could be up to EUR 688 billion and EUR 709 billion in 2015 and 2016 respectively.

Figure 6: Annual advertising spend and estimated GDP impact of advertising in the EU over time
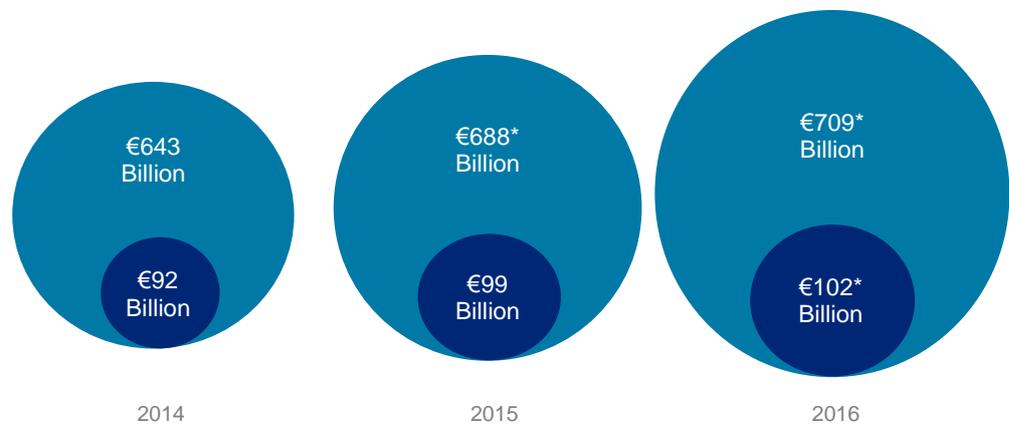


Source: Deloitte analysis, WARC

*Forecast estimates

### 2.3.2 Short-run vs. Long-run impacts of advertising

The results presented in this chapter represent the short-run GDP impact of advertising in each of the markets for the year 2014. This is the change in GDP that results from an increase in advertising in the same year.  However, advertising may also have a persistent effect on GDP. This occurs when an increase in advertising in the current year, impacts the level of GDP not only in the current year but also in future years.

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[14] http://www.warc.com
[15] WARC, September 2015, "Consensus Adspend Forecast". Forecast growth rate for the EU is based on the rates for France, Germany, Italy, Spain and the UK.

There is evidence in the economic literature to support a long-run relationship of this sort (specifically, between consumption and advertising). Keir (1993) examines this process using quarterly data for the UK from 1970 to 1991 and concludes that a £1 rise in advertising leads to an £8.97 increase in real consumption in the long-run.[16] As consumption is pro-cyclical and represents over 60% of GDP[17], this translates to a long-run GDP multiplier of around £15. In more recent work by Marattin (2008), the effects of advertising on consumption are estimated for Italy using quarterly data from 1980 to 2000.[18] The study reports that for every 1% rise in expenditure, real consumption increases by 0.034% in the short-run and 0.16% in the long-run.

For the sample considered in this study, there is less evidence to support the existence of the long-run relationship between these advertising and GDP. This does not imply the absence of a long term impact, but rather when using the current data and model specification, the long term relationship is not found to be stable enough to be conclusive.

### 2.3.3    Investigating variations in the link between advertising and GDP impact

The results above suggest advertising has a significant impact on GDP across each of the markets studied. Despite the challenges in making cross-market comparisons of the market impact figures, it appears there are some differences in the extent to which advertising impacts on GDP (for example, Korea has a higher ad spend : GDP ratio than Hungary but also a higher average GDP multiplier). A natural question is to ask: what are the drivers of any differences in the impact that advertising has on GDP across the markets?

Answering this question fully is beyond the scope of this study, but potentially important determinants are considered here.

**Channel mix**

The modelling in this study considers the GDP impact of total advertising spend in each of the markets. However, it is possible that different channel mixes may give rise to different degrees of impact. Figure 7 describes the advertising channel mixes across the different markets. It shows that the focus of the ad spend differs significantly. For example:

- Internet accounts for 43% of advertising spend in the UK but only 20% in Japan;

- Television accounts for 42% of advertising spend in Hungary, but only 25% in Germany; and

- Press (Newspapers and Magazines) accounts for 39% of advertising spend in Germany but only 19% in the UK.

[16] Keir, T., (1993), *The Aggregate Advertising- Consumption Relationship*, Revisited mimeo – University of Warwick
[17] Deloitte analysis using World Bank Data for the UK between 1998-2014
[18] Marattin, L., (2008), *The Impact of Advertising on Aggregate Consumption: The Case of Italy* – University of Bologna

Figure 7: Breakdown of advertising spend by channel in the studied markets (2014)



Source: WARC

A full analysis of the extent to which channel mix affects the impact mechanism would require the construction of a new model. This would involve not only allowing the impact of advertising spend to vary by channel, but also considering the potential effect of channel interaction. For example, the marginal impact of radio advertising may depend on levels of television advertising spend.

Such an analysis is beyond the scope of this study, but it is possible to conduct some additional econometric analysis on the current GDP impact results to investigate whether channel mix is a relevant factor. Based on this analysis, the channel mix does appear to be related to the size of the impact of total advertising on GDP. In particular, the causal effect of advertising spend is typically greater in countries that have a higher online share of advertising. All else equal, a ten percentage point shift from the offline to the online share, is associated with an estimated 3.2% increase in the impact of total advertising spend on GDP.[19]

**Product mix**

Another factor that may be relevant to the effectiveness of advertising spend on GDP is the product mix in the market. For example one might expect the impact of advertising in a market with a significant consumer goods focus to differ from the impact of advertising in a commodity based market. Again, a full analysis of this matter would require significant data collection and the development of a new model. However, using data from the World Bank on the service mix of each market, it is possible to perform a high-level analysis of how the structure of the economy may impact the relationship between advertising spend and GDP.[20]

The findings of this analysis suggest that, all else equal, in markets with a greater focus on services than industry, the impact of advertising on GDP is typically higher. In particular, a ten percentage point increase in the service share of value added is associated with an estimated average increase of 3% in the impact of advertising on GDP.

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[19] See appendix A for details of this model and the estimation results.

[20] The county-level advertising coefficients from the GDP model are regressed on the channel shares of total advertising spend, the service share of value added and an indicator for developed nation. A simplified model is also estimated, where the channel shares are replaced with the share of online. This reduces the number of regressors and improves the stability of the relationship, given the high levels of correlation between the channel variables.

**Age mix**

Demographic factors can determine product preferences and the buying behaviour of consumers. Age in particular is often cited as a driver of new product diffusion, where younger individuals are more likely to be early adopters. This in part could be due to the differential effects of advertising, which may be more persuasive amongst younger consumers.

To test this hypothesis, data is obtained from the World Bank on the population shares of 15-39 year olds and their impact on the importance of advertising is estimated. However, no statistically significant relationship between age and advertising effectiveness was found. Thus, for the model and data considered in this analysis, the distribution of age does not appear to be a contributory factor in the effectiveness of advertising on GDP.

It should of course be noted, that further econometric analysis using additional models and more disaggregated measures of the population would be required to robustly support this finding.[21] This extension is beyond the scope of the current study.

**Conclusion on the drivers of impact**

This section has considered what factors could help explain cross-market differences in the observed relationship between advertising and GDP. The high-level analysis presented here suggests that the advertising channel mix, the aggregate product mix and market demographics may be significant.[22] However, identifying the detail of the relationships requires further research.

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[21] Interactions of age with the other determinants of advertising effectiveness should also be considered. For example, the impacts of online spend might be negatively influenced by the age distribution. In this case higher online shares would have a greater effect on the impact of advertising on GDP for younger populations.
[22] It should be noted that the analysis identifies correlation but the direction of causation has not be modelled.

# 3 Employment impacts

## 3.1   Approach

This chapter presents estimates of the contribution to employment that advertising has in a selection of developed markets (Figure 8).

Figure 8: Markets for which employment impacts are reported

| EU markets |
| --- |
| • United Kingdom<br>• Finland<br>• France<br>• Germany<br>• Hungary<br>• EU-28 |

Source: Deloitte analysis

The employment estimates comprise three elements:

1.   Direct impact: These are jobs that are involved in the production of advertising.

2.   Enabling impact: These are media jobs that are supported by the role that advertising plays as a financial enabler of media services.

3.   Additional supply chain and income impacts: These are jobs that are supported along the advertising and media supply chains and throughout the wider economy as a result of (1) and (2).

The three employment effects are estimated separately for each of the markets. The total employment contribution of advertising in a given market is then the sum of these three elements.

Full details of the approach taken to calculating these effects are presented in Annex B.

## 3.2   Results

The results of the employment analysis are presented below. The following is reported for each market:

•   The total number of jobs supported by advertising;

•   The distribution of the jobs total across the three effects (direct; enabled; and additional supply chain / income impacts); and

•   The distribution of the enabled impacts across the different media sectors.

### 3.2.1   EU-28

Overall, the analysis suggests that **5,762,573** jobs are supported by advertising in the EU-28. This is equivalent to 2.6% of employment in the EU.

A majority of these jobs, 74%, come from the supply chain and income effects. That is, these jobs are supported by advertising due to the additional economic activity it creates through the use of inputs in certain industries leading to additional outputs, salaries being paid, households spending more and creating demand, and all the knock-on impacts associated with this initial advertising spend.

Around 580 000 jobs are media jobs, supported by advertising through its funding role as a media enabler. Out of these, a majority (87%) are in the Internet, Press and Television sectors. This is consistent with the share of advertising spend on these 3 sectors, around 88%.

Figure 9 illustrates describes how this figure is broken down by effect.

Figure 9: Estimated employment impact of advertising in the EU-28 (2014)
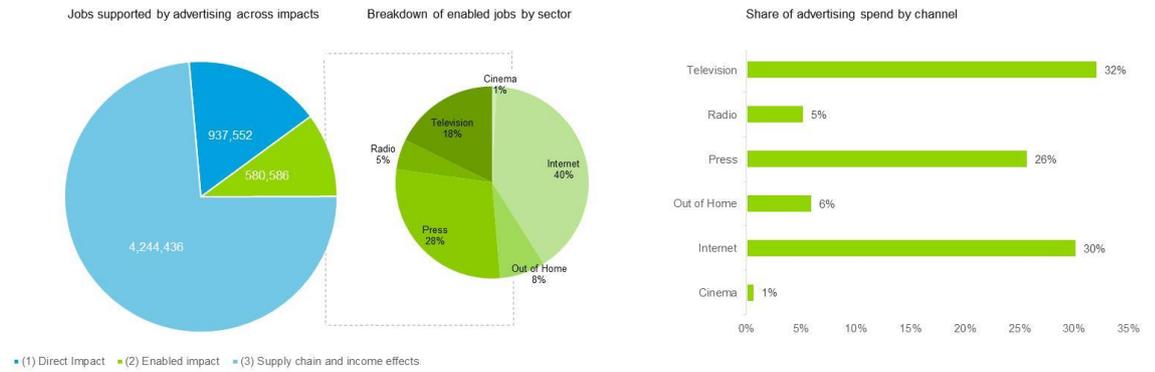


Source: Deloitte analysis

### 3.2.2 Country specific results

The study analysed the contribution to employment that advertising has in a selection of EU countries, namely Finland, France, Germany, Hungary and the United Kingdom. The table below shows that the total number of jobs supported by advertising varies across markets, from c. 50 000 in Finland to over 846 000 in Germany. While this is expected due to the different sizes of the economies considered, these jobs represent around 2% of total employment in each market, with Hungary showing the lowest proportion at 1.6%.

Table 1 – Estimates of total jobs supported by advertising and proportion of total employment by market (2014)

|  | Total jobs supported by advertising | Proportion of total employment |
|---|---|---|
| **Finland** | 50,101 | 2.0% |
| **France** | 535,708 | 2.1% |
| **Germany** | 846,584 | 2.1% |
| **Hungary** | 66,817 | 1.6% |
| **United Kingdom** | 584,245 | 1.9% |

Source: Deloitte analysis

In addition, similarly to the EU-wide estimates, most of these jobs are derived from the supply chain and income effect impact, as shown in the figure below.

Figure 10 - Estimated number of jobs supported by advertising across impacts and markets (2014)[23]



**Finland**
10,634
6,789
32,678

**France**
113,453
67,839
354,416

**Germany**
226,025
105,571
514,987

**Hungary**
12,242
9,895
44,680

**United Kingdom**
119,122
76,264
388,859

■ (1) Direct Impact

■ (2) Enabled impact

■ (3) Supply chain and income effects
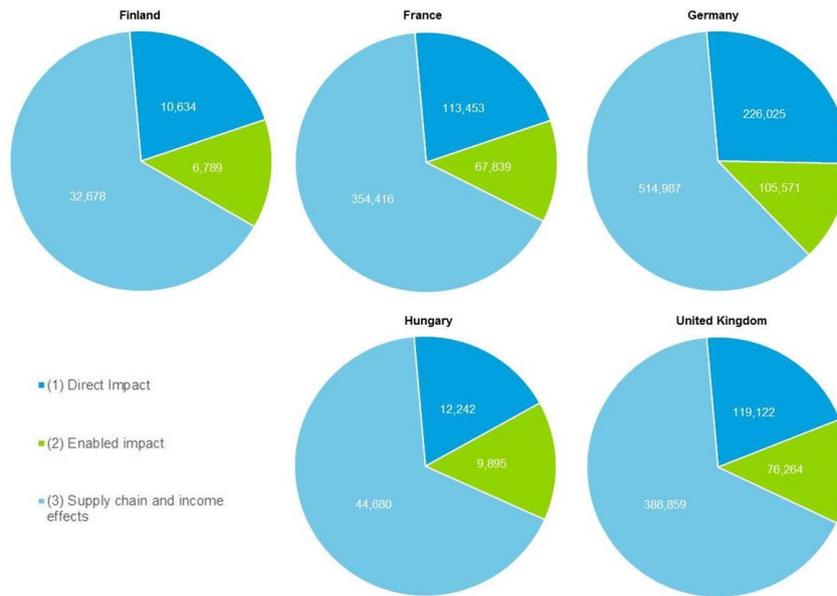
Source: Deloitte analysis

The breakdown of enabled jobs by media sector varies across countries: most of the jobs come from the Press sector in Finland and Germany while they are mostly in the Internet sector in other markets. However, consistently across markets and as seen in the EU-28, these two sectors together account for the majority of the enabled jobs.

Figure 11 – Breakdown of enabled jobs by media sector and by market



| | France | Finland | Germany | Hungary | United Kingdom |
|---|---|---|---|---|---|
| Radio | 5% | 7% | | 9% | 4% |
| Out of Home | 14% | 3% | 10% | 15% | 7% |
| Television | 12% | 10% | 9% | 19% | 19% |
| Press | 22% | 58% | 44% | 19% | 22% |
| Internet | 46% | 21% | 34% | 37% | 45% |

■ Cinema  ■ Radio  ■ Out of Home  ■ Television  ■ Press  ■ Internet
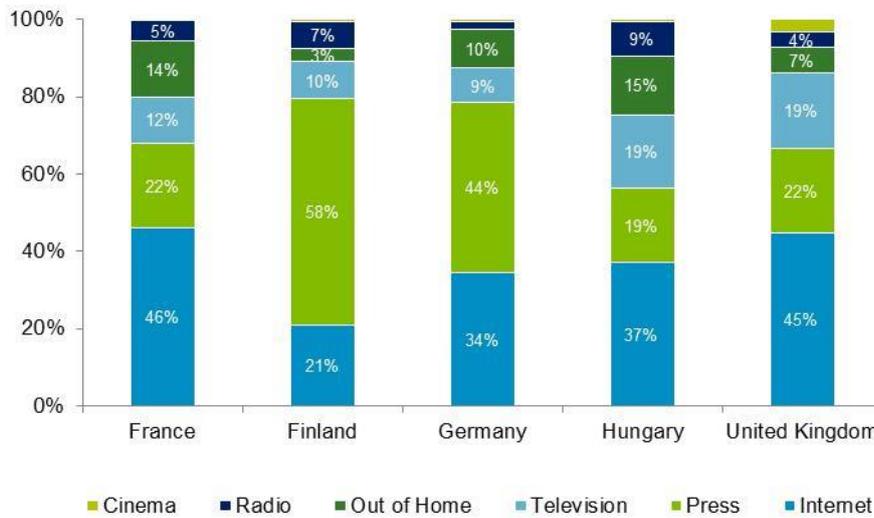
Source: Deloitte analysis

## 3.3 Interpreting the results

The estimates presented above provide a broad measure of the employment impact that advertising has in the European markets. There are a number of considerations to bear in mind when interpreting these estimates, and in particular when comparing them across markets or across industries. These considerations are discussed here.

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[23] 2014 data was unavailable for the direct employment figures in the UK and for the value added in a few sectors. When this was the case, 2013 data was used instead

### 3.3.1 The scope of the direct impact values

First, the direct employment estimates presented here are based on employment in advertising agencies. In reality the number of jobs associated with advertising production is likely to be greater as much advertising content is also produced in-house. Furthermore, the extent to which this is the case may differ across markets. However, limitations on the availability of data across the region means there are challenges to accurately assessing this on a consistent basis across the sample.

### 3.3.2 The quality of employment

The estimates of employment impact reported above do not distinguish between the quality of different jobs within the total. The OECD has classified a "quality job" as fulfilling the below criterions:

- Earnings quality;
- Labour market security; and
- Quality of the working environment.[24]

While quality of working environment can vary between different firms and is difficult to quantify, Figure 12 illustrates that the wages associated with jobs in the advertising and media sectors are on average higher than the rest of the economy in every market.[25] Moreover, recent research in the sector has shown that media professionals generally have higher perceived job security than their counterparts in other industries.[26]

Figure 12: Average salaries in the media sector compared to the whole Economy (2014[27])
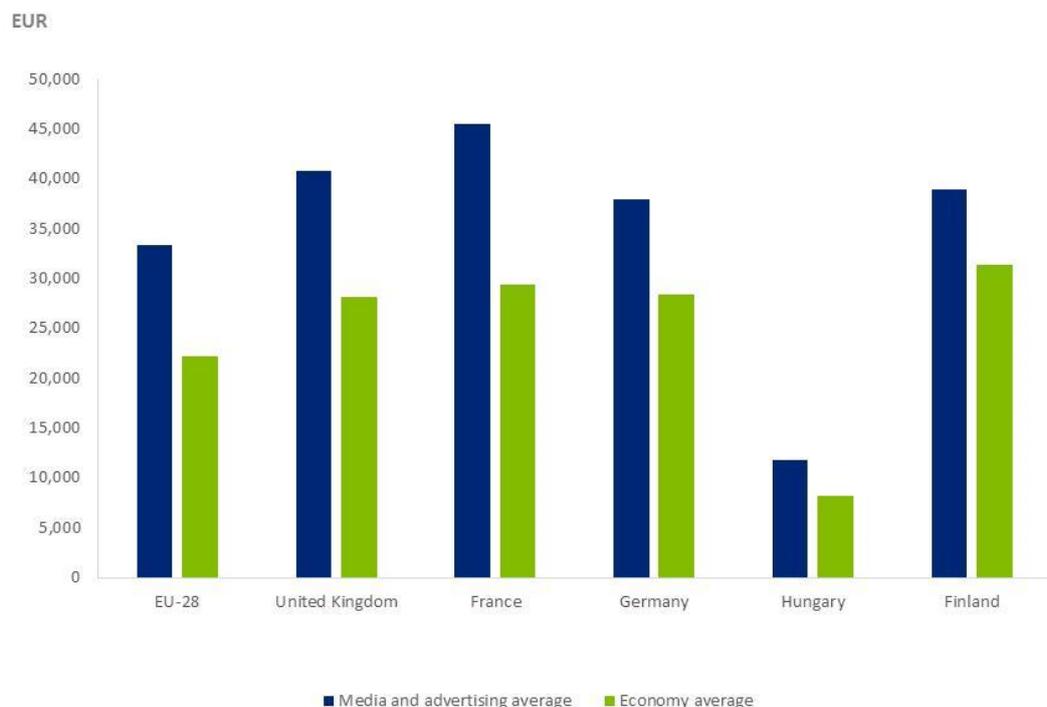


Source: Deloitte analysis, Eurostat

### 3.3.3 The relevance of channel mix

Related to the quality of jobs, the total number of jobs supported per unit of advertising spend depends on the labour intensity of the sector in which the activity takes place.[28] As labour intensity varies by

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[24] Source: OECD, available from: http://www.oecd.org/statistics/job-quality.htm
[25] The average salary in the media sector was calculated from the following sectors using Eurostat data: Advertising, Television, Radio, Press, Internet, and Cinema.
[26] KPMG, 2016 (KPMG Media Tracker 2015, found at https://home.kpmg.com/uk/en/home/insights/2015/01/media-tracker.html)
[27] For the EU-28, the data refers to 2013 as 2014 estimates weren't available.
[28] Labour intensity is the number of employees per unit of economic activity.

sector, the channel mix of advertising spend, and not just the total value, is important in determining the number of media jobs that are enabled by advertising (for the same reason, the channel mix also impacts the quality of the jobs that are supported).

The labour intensity of media sectors vary across Europe, but in general, television broadcasting has a relatively low level of labour intensity (in the EU-28 there is an average of one job created for every €121,000 of value added while in the other sectors the ratio is more than one job for every €70,000 of value added). This is reflected in the employment estimates, with enabled jobs in a given market being disproportionally small in Television (for example, in the EU-28, Television advertising accounts for 32% of total ad spend but only 18% of enabled jobs). As a result, in markets where Television advertising accounts for a large share of the total market, the average jobs return is potentially smaller than it would be with a channel mix that puts more weight on other sectors.

### 3.3.4　The distribution of employment

The employment values calculated in this study capture not only jobs in areas directly impacted by advertising, but also jobs that are supported because of the chain of economic activity that is supported throughout the economy. The majority of the employment impacts estimated here are in the wider economy, from 61% in Germany to 74% in the EU overall.

The following can be considered to understand what type of jobs this estimation includes: when advertisers and media companies produce services they demand inputs from their suppliers. Their suppliers also demand inputs to production, as do the suppliers' suppliers and so on. The impact of the advertising activity therefore extends beyond the immediate sectors and throughout the economy. In addition, as employment and income grows as a result of the economic activity, households spend more, create more demand for goods and services throughout the economy. These additional elements of economic activity play a role in supporting employment.

It is possible to estimate these employment impacts by analysing data on the inter-sectoral flow of goods and services in each of the markets and tracing where the demand goes.[29] Based on this approach, between two thirds and three quarters of total employment impacts are estimated to be accounted for by the broader effects. This is consistent with typical ratios in other industries.

Cross-market differences in the magnitude of these wider impacts are caused by differences in the value chain structures of the economies. In markets where suppliers or consumers purchase mainly imports instead of domestically produced goods and services, the overall impact is likely to be smaller because the flows of demand leave the economy more quickly. This may explain why for the EU-28 as a whole, the wider economic effects are higher (when individual countries are importing they are likely to be importing from other EU member states).

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[29] This data is contained in Input-Output tables, provided by Eurostat.

# 4 Advertising fuels healthy competition and boosts the media sector across Europe

This section presents additional evidence on the economic contribution of advertising. Drawing on existing research it considers the role advertising plays in:

- Supporting competition.

- Enabling free-to-use or subsidised media services; and

Although not separately quantifiable, these help explain the channels through which advertising positively impacts the economy. These elements are discussed below.

## 4.1    Competition

Competition in the marketplace is important for consumers and businesses. It benefits consumers by reducing prices and increasing the choice of goods and services, while the incentives to outperform competitors can also encourage businesses to innovate, which leads to improvements in product quality. Advertising can impact on competition and the barriers to entry through a number of channels:

- Impacting on consumer behaviour;

- Impacting on search costs; and

- Impacting barriers to entry (the impediments that make it difficult for firms to set-up in the market) and market concentration (the extent to which the market is served by few players).

These are elements explored below.

### 4.1.1    Consumer behaviour

An important way in which advertising affects competition is through the impact it has on consumer behaviour. The academic literature distinguishes between two types of advertising that are relevant here:

- "Informative" advertising: When advertising is informative, it provides consumers with information on the existence of available brands, their attributes and location.

- "Persuasive" advertising: When advertising is persuasive, it alters consumers' tastes and creates product differentiation and brand loyalty.

The implications for how advertising impacts consumer behaviour depends on the type of advertising. Under the Informative view, advertising is a vehicle through which businesses can easily convey information to potential buyers. An important consequence of this view is that consumers are able to make better choices because they are more informed. As a result advertising is likely to increase price sensitivity and lower prices. However, under the persuasive view, the development of brand loyalty makes products more differentiated and leads to reductions in price sensitivity. In this case prices will tend to rise.

The overall impact of advertising depends on the balance between these effects. The literature is divided on which effect typically dominates and it appears to depend on the sector. For example, in one study using information on household purchases of fast-moving-consumer-goods, it was found that TV

advertising increased the level of price sensitivity which would lower equilibrium prices[30]. Other studies report the opposite, although empirical patterns have emerged within narrowly defined industries[31].

### 4.1.2 Search costs

The cost to consumers of obtaining information has been significantly reduced with the development of online search tools and price-comparison websites. These services allow consumers to quickly access detailed information about different products without cost, helping them make more informed choices.

Search advertising provides businesses the opportunity to scale nationally and internationally at a low cost. By providing the funding for these services, advertising is an enabler of this information and hence supports competition and benefits consumers and businesses.

### 4.1.3 Barriers to entry & concentration

The impact that advertising has on how easily firms can enter the market depends, in part, on whether advertising has an informative or persuasive effect on consumers.

Advertising in an informative capacity is a way to stimulate competition. It increases consumers' awareness of the available brands and their characteristics, raises price sensitivity and lower barriers to entry – the impediments that make it difficult for firms to set-up in the market. This puts downward pressure on mark-ups and encourages new companies to enter and trade.

However, advertising can also create additional barriers to entry. This occurs when the effect is persuasive instead of informative and leads to products that were previously perceived as similar, to now be perceived as differentiated. This lack of substitutability with the brands offered by incumbents makes it difficult for new entrants to gain market share.

There have been a number of empirical studies examining the relationship between market concentration and advertising. The evidence is again mixed, and the effects differ by industry. In one study, advertising was found to have a negative significant effect on entry in the consumer goods sector but no effects in producer goods industries[32].

## 4.2 Online funded platforms

The digital revolution has transformed trading practices and revolutionised commercial models. Advertising funded platforms such as Google and Facebook, help to:

- Reduce barriers to entry into new markets, by providing SMEs[33] with an effective low-cost tool to promote products and acquire customers through search and display advertising

- Provide essential sales-channel for online-only companies, without the large sunk-costs that are required to establish physical outlets in different jurisdictions

- Provide consumers with free information that would otherwise have to be paid for without the funding generated by paid search advertising

In a study carried out by Deloitte[34], it was reported that around 76 billion searches were conducted by UK consumers on generalist search engines such as Google Search, Bing, and Yahoo in 2014. More importantly, for companies using Google AdWords – paid advertising copy that appears when users carry out searches, Deloitte estimates that businesses receive between 3 to 8 euros in advertising profits for every 1 euro they invest.

The study also highlights how businesses use advertising funded platforms to generate new leads and compete with existing organisations. These are companies like Chips Away, a car body repair specialist based in Oxfordshire. They used Google AdWords to target their marketing to a 15 mile

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[30]Erdem (2008)
[31]Bagwell (2007)
[32] Orr (1974)
[33] Small and medium size enterprises
[34] Google's Economic Impact: United Kingdom | 2014

radius of their location and reported a 15-20% increase in business since the start of their campaign. While traditional market channels continue to form a critical part of the advertising sector, the growth of digital media has enabled many businesses to access consumers in ways that may not have been commercially viable in the past.

## 4.3   Enabling media

In many markets advertising plays an important role in funding media services. This allows consumers to access services such as commercial TV, radio and Internet services without charge and to access newspapers and magazines at reduced prices.[35]

Figure 13 shows a wide range of media and communication devices, enjoyed by consumers across various markets. The fact that they do not have to pay for these services (or pay reduced rates) due to funding from advertising represents a source of value for consumers.

Figure 13: The use of selected media/communications services: proportion of people who use it at least once a week[36]
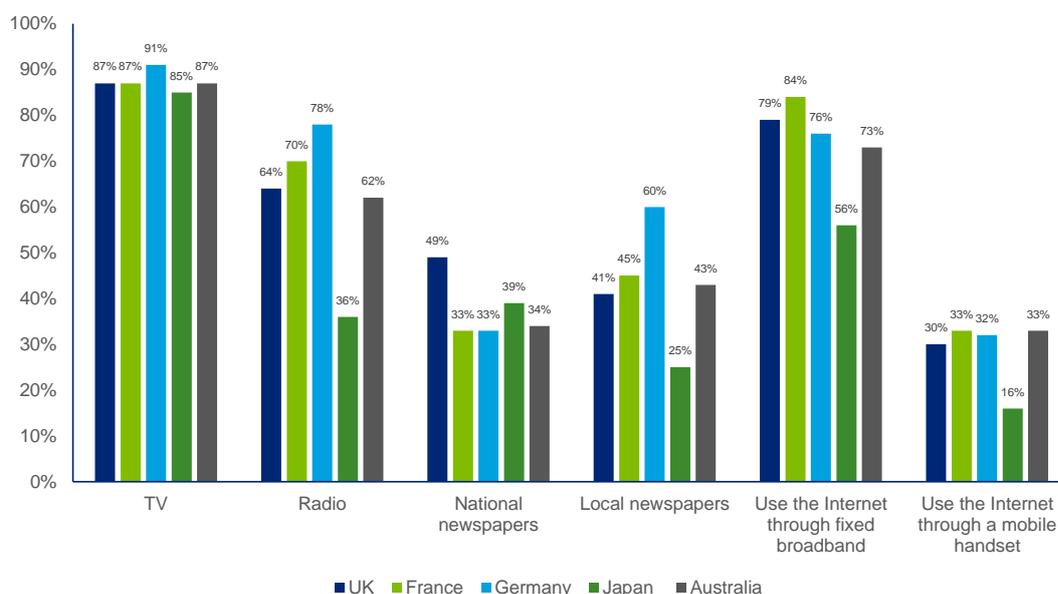


Source: Ofcom consumer research, 2015

While data for Finland was not available from the same source, a different dataset also suggests that media services are widely used. For example, 91% of households were estimated to own a TV set in 2010, almost all (99.6%) owned a radio set, and 85% had a PC system at the time.[37]   In addition, 56% of people used a mobile device for internet access in 2012, a figure which rose to 74% in 2015.[38]

Moreover, in Europe over EUR 110 billion and EUR 119 billion were spent on advertising across various media and communication services in 2014 and 2015 respectively.

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[35] Previous Deloitte research for the UK Advertising Association has investigated this link more fully. For more details see "Advertising Pays: The value of advertising to the UK's culture, media and sport."
[36] Newspapers do not include magazines
[37] Source: Open Society Foundations (2014) Mapping Digital Media – Finland, Country Report, available from: https://www.opensocietyfoundations.org/reports/mapping-digital-media-finland
[38] Source: Eurostat, available from: http://ec.europa.eu/eurostat/data/database

Figure 14: Advertising spend per media channel in 2014 and 2015 in Europe[39]

**2014, Billions**

€18.6
€25.9
€35.8
€32.5

■ Newspaper ■ Television ■ Internet ■ Other

**2015, Billions**

€17.6
€28.9
€36.1
€37.2

■ Newspaper ■ Television ■ Internet ■ Other
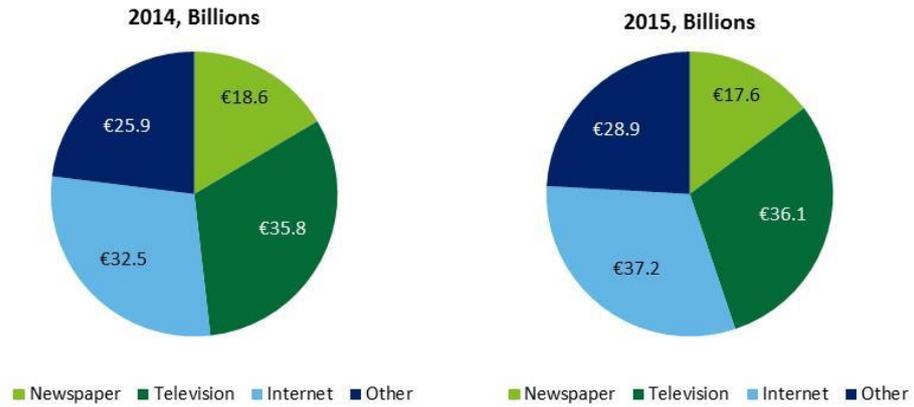
Source: WARC

To illustrate the benefits of advertising, the sections below present data on the funding role that advertising plays in media.

### 4.3.1   Television

Recent research suggests that globally advertising accounts for 40% of the revenues to TV broadcasters (Figure 15).

Figure 15: Share of advertising revenue in global TV broadcasting revenue

Public licence fee
9%

Advertising
40%

Subscriptions
51%
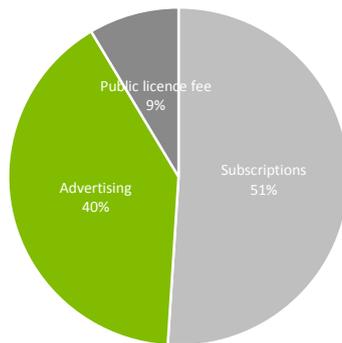
Source: Ofcom / IHS

On a market by market level there is some variation in the role that advertising plays. For example, in Australia advertising accounts for 53% of broadcaster revenues, whereas in Germany it accounts for only 26%. This partly reflects differences in funding models and particularly the extent to which public funding plays a role. Figure 16 shows the funding breakdown for different markets.

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[39] Newspaper does not include magazines

Figure 16: Proportion of TV broadcasting revenue accounted for by advertising (2014)

| Country | Subscription | Public funding | Advertising |
|---------|-------------|----------------|-------------|
| Australia | 31% | 17% | 53% |
| Korea | 65% | 6% | 30% |
| Japan | 36% | 19% | 44% |
| Germany | 29% | 46% | 26% |
| France | 43% | 27% | 31% |
| UK | 45% | 27% | 28% |

■ Subscription   ■ Public funding   ■ Advertising
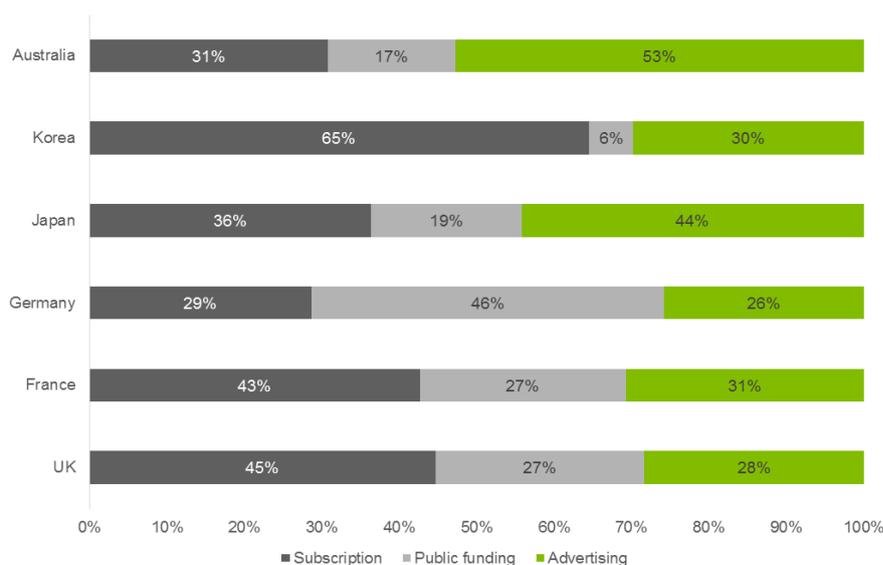
Source: Ofcom / IHS

Data from the UK, France and Germany suggest that some of the most popular commercial broadcasters are more reliant on advertising revenues than the market average as shown in Figure 17.

Figure 17: Role of advertising in funding the services of popular TV broadcasters in the UK, Germany and France (2014) and several EU countries in which RTL group operates (2015)[40]

**Local TV market shares**

| | UK ITV | Germany P7S1 | Several EU countries RTL group | France TF1 |
|---|--------|--------------|--------------------------------|------------|
| Market share | 35% | 26% | 23% - 37% | 25% |
| Advertising revenue | 55% | 60% | 49% | 72% |

□ Non advertising revenue   ■ Advertising revenue
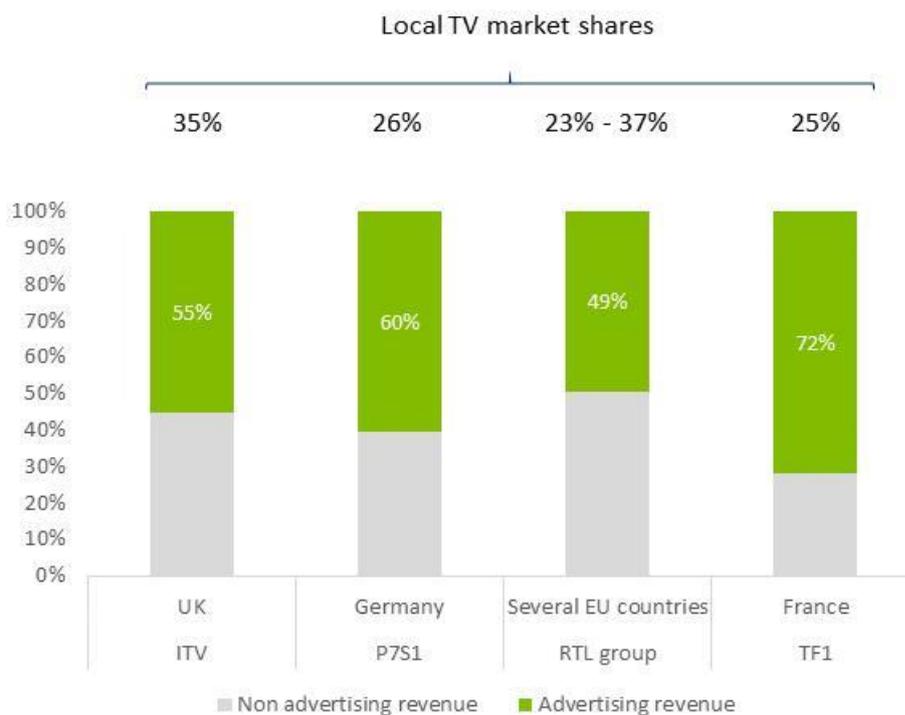
Source: Deloitte analysis based on company reports

While data was not directly obtainable from company reports, similar patterns are observed in other European markets. For example in Finland, commercial TV broadcasters remain heavily dependent on advertising as a source of revenue, with statistics showing that 24% of TV's revenue is derived from

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[40] RTL group operates in Germany, France, Netherlands, Belgium, Hungary, Croatia and Spain
http://www.rtlgroup.com/files/pdf1/2016.03-rtl-group-full-year-results-2015.pdf

advertising.[41] In addition, European companies owning most popular commercial TV stations in Finland are also dependent on advertising, with 35% of their income derived from advertising in TV and other forms of media.[42]

## 4.3.2 Radio

Recent research suggests that in general radio broadcasters are even more reliant on advertising as a source of income than Television broadcasters. The total share of global radio broadcasting revenues accounted for by all radio (public and commercial) in 2014 is estimated to be 75% (Figure 18).

Figure 18: Share of advertising revenue in global radio broadcasting revenue (2014)
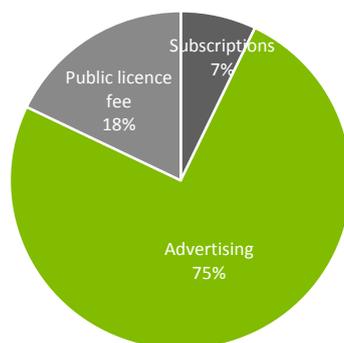


Source: Ofcom analysis based on data from PwC Global Entertainment and Media Outlook 2015-2019

As with Television, the funding model of radio differs substantially between markets. Again, the significant public licence fees in the European markets mean that radio broadcasters are slightly less reliant on advertising in those markets than in other markets such as Australia, Japan and Korea.

However, commercial radios derive almost all of their revenues from advertising, with data suggesting that this proportion is around 83% in Germany [43] and 95% in Finland.[44]

## 4.3.3 Internet

Several Internet services, such as personal email, search and social media websites (amongst others) can be accessed without charge because they are funded by advertising revenues.

### Email

Figure 19 presents Eurostat data on the proportion of people in the European markets who regularly use email.[45]

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[41] Data source: Statistics Finland, found at http://www.stat.fi/til/jvie/2014/jvie_2014_2015-12-04_tau_005_en.html
[42] Source: Annual reports of Sanoma and Bonnier Media Group for the fiscal year 2015
[43] Ofcom analysis based on data from PwC Global Entertainment and Media Outlook 2015-2019 and http://www.vprt.de/verband/presse/pressebilder/content/grafiken-zur-vprt-prognose-zum-medienmarkt-2015-0?c=4
[44] Statistics Finland, Open Society Foundations (2014) report on Finland Media
[45] The data is taken from a survey which asked respondents if they had used internet to access emails in the past 3 months. As such, it could include both paid for and free email services.

Figure 19: Share of individuals who send or receive e-mails on the internet in selected European countries in 2015
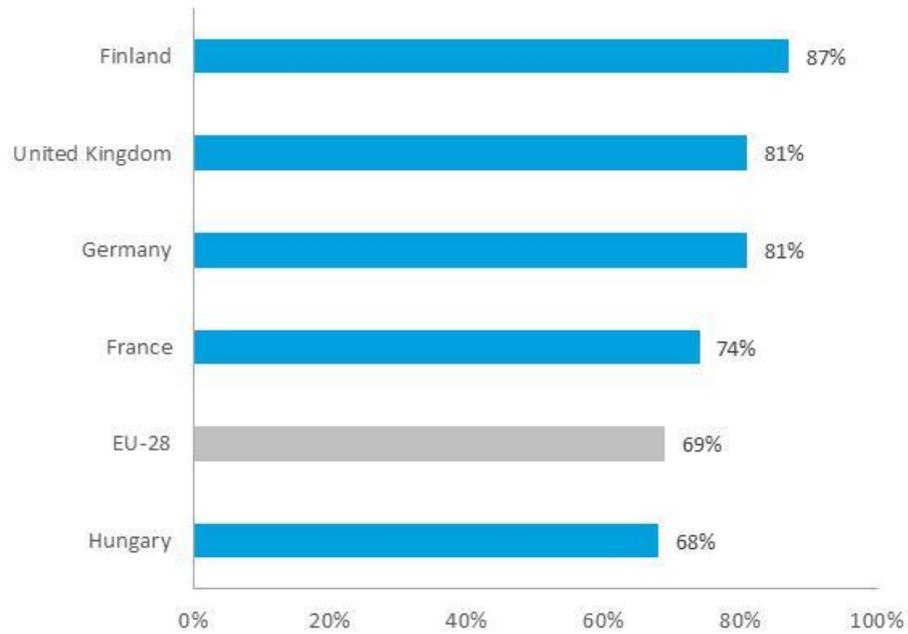


Source: Eurostat

## Search

Figure 20 presents data on the popularity of search engines across different markets. It shows the results of an IPSOS survey from 2013 on the proportion of people who used search engines at least once a week.

Figure 20: Proportion of people who used search engines at least once a week in 2013, by market
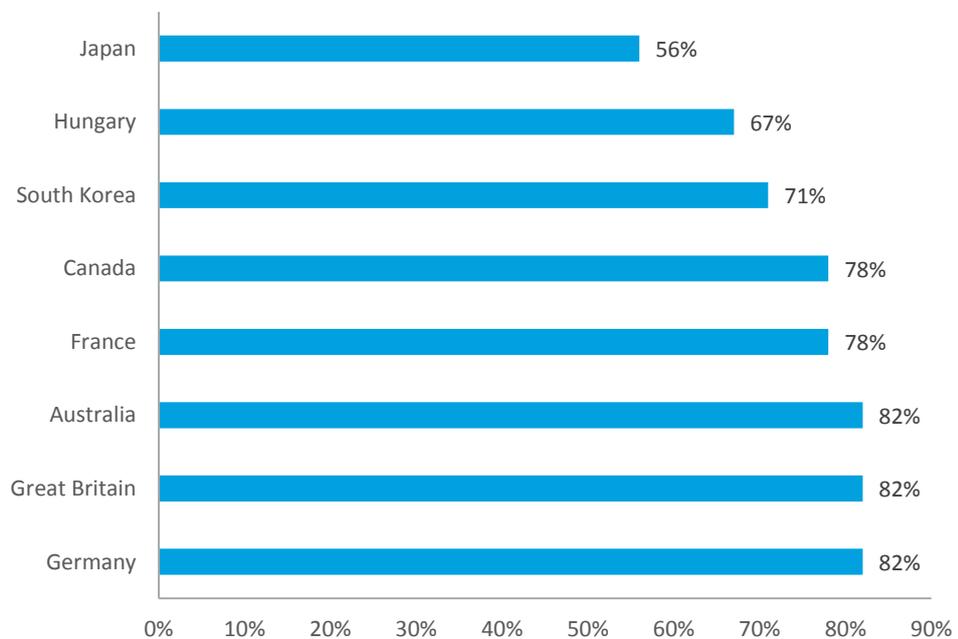


Source: Ipsos 2013

The results show high levels of utilisation of internet search engines in European countries. This confirms other national-level studies. In Finland, the statistics authority has reported that close to 80%

of its population uses the internet to search for goods and services information, with the figure being as high as 92% for the 16-24 age group.[46]

## Social media

Table 2 shows a series of metrics on the use of popular social media sites that are funded by advertising revenues, while Figure 21 shows the proportion of people in various age groups across different markets who say they use social media websites at least once a week.

Table 2: Global usage statistics for selected ad funded social media sites (activity per average minute)

| Service provider | Usage metric | Volume per minute |
|---|---|---|
| Facebook | Posts liked by Facebook users | 4.17 million |
| Twitter | Tweets sent by Twitter users | 347,222 |
| YouTube | Hours of video uploaded to YouTube | 300 |
| Instagram | Photos liked on Instagram | 1.74 million |
| Pinterest | Images pinned by Pinterest users | 9,722 |
| Reddit | Votes cast by Reddit users | 18,327 |
| Vine | Videos played by Vine users | 1.04 million |
| Snapchat | Snaps shared by Snapchat users | 284,722 |
| Buzzfeed | Videos viewed by Buzzfeed users | 34,150 |

Source: Deloitte analysis based on Domo

Figure 21: Proportion of internet users who use social networks at least once a week
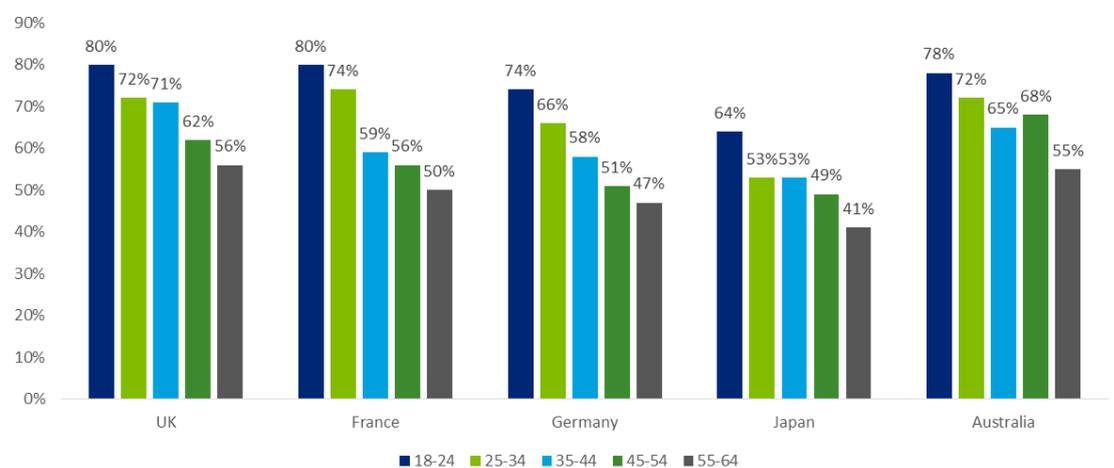


Source: Ofcom consumer survey 2015

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[46] Source: Statistics Finland, available from: http://www.stat.fi/til/sutivi/2014/sutivi_2014_2014-11-06_tau_018_fi.html

The argument is supported by national statistics in other European markets. For example, statistics in Finland found that as much as 93% of people between the age of 16 and 24 follow social network services.

Figure 22 – Percentage of the population in Finland that followed social network service in the past 3 months, by age group
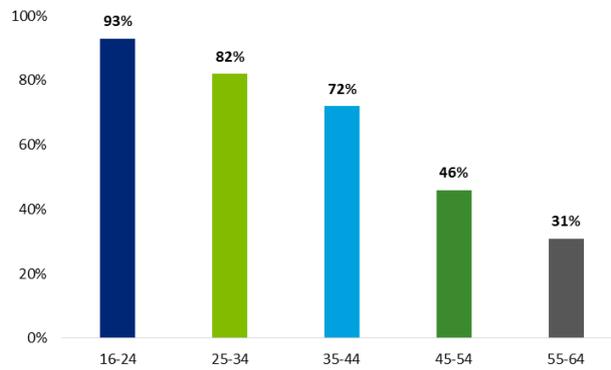


Source: Statistics Finland, 2014

There is also an increasing trend for European businesses to use social networks to market products, obtain reviews, recruit employees and to interact with customers to help develop their goods and services. Figure 23 shows the proportion of businesses that use social networks in 2013 and 2015.

Figure 23: Proportion of enterprises that use social media (2013, 2015)
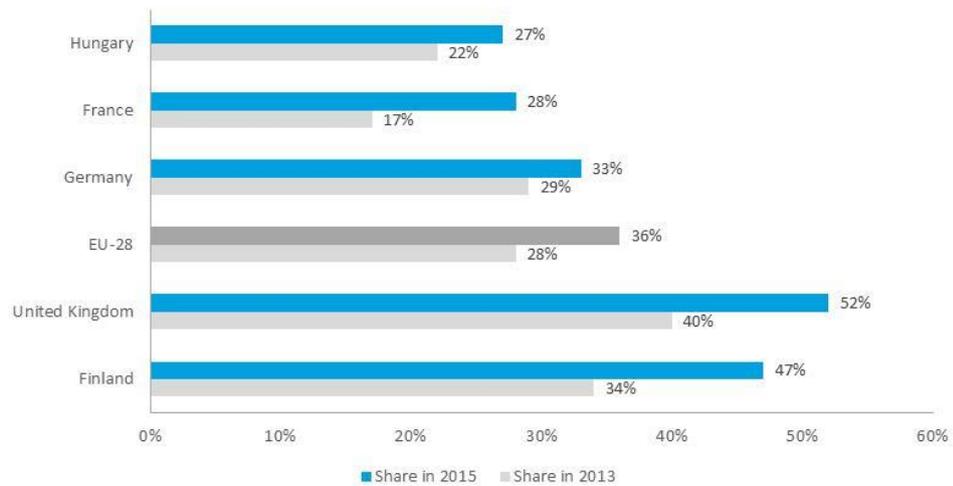


Source: Eurostat

# 5 Conclusions

This report presents evidence on the economic contribution of advertising in Europe and a selection of non-EU developed markets. This is estimated to include:

- A contribution to GDP worth EUR 643 billion in the EU (from an annual ad spend of EUR 92 billion).

- A contribution to employment of approximately 5.8 million jobs across the EU.

- Several further economic contributions, for example in the form of enabling media services. Evidence on the overall impact on competition is mixed.

The report also highlights a number of ways in which the impact may vary across different markets. These include differences in channel mixes and differences in market features (such as product focus and demographics). However, fully investigating the extent to which these differences impact the economic effectiveness of advertising requires a fuller analysis, which is beyond the scope of the current study.

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# Annex A: Estimating the GDP impacts

## Summary

The effects of advertising on gross domestic product (GDP) are estimated using an augmented model of economic growth. Additional variables are included in the process to account for variations in economic activity that are not explained by advertising. The model is estimated using annual data for 35 countries over the period 1998 – 2014 and the effects of advertising are allowed to differ across countries. The results show advertising to be a significant driver of GDP, and on average report that a 1% rise in advertising leads to a 0.4% increase in GDP in the same period. At the market level these econometric outputs are used to estimate the impact of advertising on GDP in a given country.

## Econometric model

From the literature on economic growth, an augmented Autoregressive Distributed Lag (ARDL) model is specified as follows:

$$\log \Delta\, GDP_{it} = \alpha_0 + (\rho - 1) \log \Delta\, GDP_{it-1} + \beta_{1i} \log AD_{it} + \beta_2 \log AD_{it-1} + \log x'_{it}\, \theta + \log x'_{it-1}\, \theta_2 + \lambda_t + u_i + \varepsilon_{it} \qquad (1)$$

where $\Delta \log GDP_{it}$ denotes the growth in real GDP of country $i$ in year $t$, $AD_{it}$ is real advertising, $x_{it}$ is a vector of growth determinants, $\lambda_t$ is a period effect, $u_i$ is a country effect and $\varepsilon_{it}$ is the error. The error is assumed to be independent across countries and periods. The time effect is included to capture annual changes that are common to all countries, whereas the country effect includes factors that are time invariant and unique to each jurisdiction.[47] To accommodate dynamic effects, the model includes a first lag of all variables. Furthermore to allow for heterogeneity in the impacts of advertising across countries, the coefficient on $\log AD_{it}$ is country specific and treated as a fixed-effect. Thus the short-run or impact advertising elasticity is $\beta_{1i}$, whereas in the long-run, the elasticity is $(\beta_{1i} + \beta_2)/(1 - \rho)$.

Note that the analysis does not use GDP per capita as is often the case in the literature. Instead it focuses on GDP in levels and include total population as a variable in $x_{it}$. This is less restrictive than a model where population is used as a scaling factor for the variables.[48] Following Aiginger and Falk (2015), the additional determinants of growth are derived from economic theory and include investment, openness and government expenditure. Investment is a fundamental determinant of economic growth and generates capital stock. Openness is proxied by the sum of exports and imports and leads to comparative advantages and the diffusion of new technologies. Government spending is a proxy for government size. The effects will depend on whether government spending is targeted towards productive or non-productive activities. Finally, all variables in $x_{it}$ are measured in real-terms and with the exception of population, are expressed as a % of real GDP.

## Estimation method

If economic growth and advertising are determined simultaneously in equilibrium, then advertising will be endogenous and correlated with the error. If firms instead based future decisions on the profitability in the current year, then advertising will be pre-determined. In this case, advertising expenditure will be uncorrelated with the error in the current period, but correlated with errors in previous years, i.e. $E[\varepsilon_{it-1} \log AD_{it}] \neq 0$. This argument can be extended to the other determinants of economic growth which are often considered to be pre-determined in empirical analysis. Furthermore, it may also be the

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[47] The country effect is assumed to be correlated with all of the explanatory variables in (1) but uncorrelated with their changes.
[48] Consider a model featuring advertising-per-capita. This makes the restrictive and somewhat unnecessary assumption that a 1% rise in population has an equal and opposite effect as a 1% rise in advertising

case that some of the variables in (1) are correlated with the country specific effect. For example, jurisdictions facing higher levels of regulation may also experience higher levels of government spending. Whilst the fixed effects estimator can accommodate such correlation, it will be inconsistent if the variables are endogenous and biased if the variables are pre-determined.[49] This situation is compounded by the inclusion of the lagged dependent variable, which will be correlated with the county-specific effect by construction.

To overcome these issues, Deloitte apply the system Generalized method of moments (GMM) technique developed by Arellano and Bover (1995) and Blundell and Bond (1998). This method considers the model (1) in both levels and first differences, and forms identifying moment conditions using lags of the included variables as instruments. The estimator is appropriate for situations where the number of time-periods is small relative to the number of panels, the dependent variable is highly persistent[50] and when the explanatory variables are either endogenous, predetermined and/or correlated with the country-specific effect.

The country specific effect is eliminated for the model in first differences and the moment conditions for the set of contemporaneously endogenous variables $x_{is}^{end}$ are given by:

$$E[x_{is}^{end} \Delta \varepsilon_{it}] = 0, \qquad \forall s \leq t - 2 \tag{2}$$

$$E[\log GDP_{is} \Delta \varepsilon_{it}] = 0, \quad \forall s \leq t - 2 \tag{3}$$

Thus the lagged values of the endogenous and dependent variables at period $t - 2$ and earlier are valid instruments for the model in first differences. For the set of pre-determined variables, denoted $x_{is}^{pre}$, the moment conditions are:[51]

$$E[x_{is}^{pre} \Delta \varepsilon_{it}] = 0, \qquad \forall s \leq t - 1 \tag{4}$$

When the variables are highly persistent, the lagged levels will be weak instruments and the parameter estimates will suffer from small sample bias. This is likely to be the case using macro-economic data which may exhibit a unit-root. Thus to improve the efficiency of the estimator, Arellano and Bover(1995) additional consider moment equations based on the levels form of the model:

$$E[\Delta x_{is}^{end}(\varepsilon_{it} + u_i)] = 0, \qquad \forall s \leq t - 1 \tag{5}$$

$$E[\log \Delta GDP_{is}(\varepsilon_{it} + u_i)] = 0, \quad \forall s \leq t - 1 \tag{6}$$

$$E[\Delta x_{is}^{pre}(\varepsilon_{it} + u_i)] = 0, \qquad \forall s \leq t \tag{7}$$

The differences of the endogenous and predetermined variables at or earlier than dates $t - 1$ and dates $t$ respectively are instruments for the levels model. Finally variables that are strictly exogenous are treated as standard-instruments in the estimator.

## Validity of instruments

For the instruments to be valid, they must be correlated with the explanatory variables and uncorrelated with the error term. To test this requirement, three specification tests are carried out post-estimation (section 5). The first is a Sargan test of overidentifying restrictions and is a test of the null hypothesis that the instruments and the errors are independent. The second is the Arellano Bond(1991) test for serial correlation in the error terms. The instrumental variables estimator is consistent if the errors are serially uncorrelated, hence a failure to detect such correlation is further evidence as to the suitability of the selected instruments. The third is a difference in Sargan test and is implemented to determine whether the extra instruments provided by the levels equation are valid. It is also used sequentially to investigate whether the individual variables in (1) are exogenous, endogenous or pre-determined.

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[49] This is also the case for the random-effects estimator which will be inconsistent in short-panels if there is any correlation between the variables and the country-specific effect.
[50] This occurs when shocks to GDP take a long time to decay and will arise if the coefficient on the lag dependent variable is close to unity.
[51] For variables that are strictly exogenous and uncorrelated

## Data

This study uses longitudinal data on 35 countries over the period 1998 to 2014. Observations on advertising expenditure are obtained from the WARC database and data for all remaining variables are sourced from the World Development Indicators database of the World Bank.

## Results

### Parameter estimates

The instruments used in the GMM estimator are created on the assumption that advertising and lagged GDP are endogenous and that the remaining variables are pre-determined.[52] Four sets of instruments are used to estimate the parameters (1) and the results are presented in table 3. The first set (Model-1) set uses lagged levels of the variables as instruments in the first-difference equation, from $t-1$ to $t-4$ for the predetermined variables and from $t-1$ to $t-4$ for the endogenous series. For the levels equation, first differences are used at date $t$ for the predetermined variables and date $t-1$ for the endogenous series.

As the model contains a fixed-effect on advertising, the number of instruments will be far greater than the number of observations in the sample. This offers no improvement over pooled Ordinary Least Squares (OLS)[53] and will simply return the bias of this estimator. To resolve this issue and help lessen any finite-sample bias, the instrument count is dramatically reduced by forming a collapsed set of instruments from the lags of the advertising variable. This process creates one instrument for each lag-distance, instead of one for each distance and time period.

The remaining columns of Table 2 provide the estimates from further reductions in the instrument count. The second set (Model-2) restricts the maximum lag of the variables used as instruments in the first-difference equation to $t-3$. The third (Model-3) reduces this further to $t-2$ whereas the fourth (Model-4) uses lag $t-2$ of the endogenous variables and lag $t-1$ of predetermined series.

The results of the overall Sargan test fail to reject the null hypothesis of any correlation between the instruments and the errors. This is supported by the difference in Sargan statistics between the system GMM and first-difference estimators which test the suitability of the level equation instruments. Furthermore, the Arellano Bond test shows no evidence of second order serial correlation in the errors. Thus on the basis of the specification tests, the instruments appear to be valid.[54]

The coefficients on advertising in the current are positive and significant for all models,[55] and yield estimated (average) short-run elasticities of 0.043% to 0.053%. The coefficient on lagged advertising is also significant, as is the lag of real GDP. These estimates produce long-run point elasticities of 0.095% to 0.154%.

However, to determine whether there is a significant long-run effect, it is necessary to test the non-linear hypothesis: $H_0: (\beta_{1i} + \beta_2)/(1 - \rho) = 0$ and not just the individual parameters themselves. A Wald test of the above hypothesis is carried for each of the 35 countries and for all four models. The results indicate that for only 8 countries in the sample, advertising has a significant (p<0.05) long-run effect. This provides some evidence to suggest that the effects of advertising may in fact be transitory for the majority of the countries considered in this analysis.

### Advertising multipliers

Table 4 sets out the short-run and long-run advertising multipliers for each of the 35 countries, including the EU28 area.[56] The figures represent the average increase in real GDP following a permanent 1 Euro rise in advertising expenditure.[57]

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[52] Difference in Sargan tests used in preliminary analysis support these assumptions

[53] If the number of instruments equals the number of observations in an instrumental variables-estimator, the r-squared in the first-stage regression is unity. The estimator would then be equivalent to least-squares.

[54] The high p-values for the Sargan-Hansen test could be somewhat optimistic due to the large number of instruments

[55] Only a subset of the coefficients for the 35 countries are displayed in the table

[56] SR = short run multiplier and LR = long run multiplier.

## Advertising elasticities

Table 5 sets out the short-run and long-run advertising elasticities multipliers for each of the 35 countries, including the EU28 area. The figures represent the percentage increase in real GDP following a permanent one percentage rise in real advertising expenditure.

Table 3: Estimated parameters of the growth model

| | Model-1 | Model-2 | Model-3 | Model-4 |
|---|---|---|---|---|
| $\log GDP_{t-1}$ | 0.930*** | 0.931*** | 0.929*** | 0.941*** |
| | (59.83) | (57.03) | (43.53) | (46.43) |
| $\log AD^{Australia}$ | 0.0467*** | 0.0489*** | 0.0481*** | 0.0598*** |
| | (3.68) | (3.67) | (3.85) | (4.28) |
| $\log AD^{Canada}$ | 0.0465*** | 0.0485*** | 0.0479*** | 0.0596*** |
| | (3.69) | (3.67) | (3.80) | (4.22) |
| $\log AD^{France}$ | 0.0478*** | 0.0496*** | 0.0491*** | 0.0608*** |
| | (3.77) | (3.73) | (3.84) | (4.27) |
| $\log AD^{Germany}$ | 0.0472*** | 0.0492*** | 0.0480*** | 0.0596*** |
| | (3.76) | (3.72) | (3.78) | (4.17) |
| $\log AD^{Hungary}$ | 0.0407*** | 0.0431*** | 0.0434*** | 0.0573*** |
| | (3.17) | (3.22) | (3.52) | (4.20) |
| $\log AD^{Japan}$ | 0.0489*** | 0.0510*** | 0.0495*** | 0.0600*** |
| | (3.89) | (3.86) | (3.91) | (4.26) |
| $\log AD^{Korea\,Rep.}$ | 0.0443*** | 0.0464*** | 0.0448*** | 0.0566*** |
| | (3.58) | (3.58) | (3.68) | (4.11) |
| $\log AD^{Slovak\,Rep}.$ | 0.0403*** | 0.0424*** | 0.0422*** | 0.0560*** |
| | (3.14) | (3.16) | (3.40) | (4.03) |
| $\log AD^{UK}$ | 0.0483*** | 0.0504*** | 0.0492** | 0.0606*** |
| | (3.83) | (3.80) | (3.91) | (4.28) |
| $\log AD_{t-1}$ | -0.0356** | -0.0372*** | -0.0359** | -0.0475*** |
| | (-2.59) | (-2.64) | (-2.55) | (-3.37) |
| $\log INV$ | 0.150*** | 0.148*** | 0.144*** | 0.139*** |
| | (7.64) | (7.38) | (7.44) | (6.86) |
| $\log INV_{t-1}$ | -0.0706*** | -0.0696*** | -0.0655*** | -0.0638*** |
| | (-4.18) | (-4.06) | (-3.41) | (-3.32) |
| $\log POP$ | 0.164** | 0.173** | 0.187** | 0.221** |
| | (2.31) | (2.32) | (2.27) | (2.50) |
| $\log POP_{t-1}$ | -0.119* | -0.129** | -0.132* | -0.161** |
| | (-1.90) | (-1.97) | (-1.83) | (-1.99) |
| $\log TRAD$ | 0.0305 | 0.0304 | 0.0296 | 0.0299 |
| | (1.54) | (1.52) | (1.42) | (1.31) |
| $\log TRAD_{t-1}$ | 0.0225 | 0.0245 | 0.0262 | 0.0248 |
| | (1.21) | (1.27) | (1.26) | (1.07) |
| $\log GOV$ | -0.142*** | -0.146*** | -0.164*** | -0.154*** |
| | (-3.29) | (-3.21) | (-3.28) | (-3.12) |
| $\log GOV_{t-1}$ | 0.115*** | 0.117*** | 0.114** | 0.122*** |
| | (2.70) | (2.72) | (2.66) | (2.81) |
| Advertising elasticity: short run | 0.044 | 0.046 | 0.046 | 0.059 |
| Advertising elasticity: long run | 0.117 | 0.126 | 0.134 | 0.188 |
| Sargan (p-value) | 0.99 | 0.99 | 0.99 | 0.99 |
| Sargan difference(p-value) | 0.99 | 0.99 | 0.99 | 0.99 |
| Arellano-Bond AR2 (p-value) | 0.097 | 0.100 | 0.104 | 0.109 |
| Number of countries | 35 | 35 | 35 | 35 |
| Total observations | 552 | 552 | 552 | 552 |

**Notes:**
1) Estimation by System-GMM using xtabond2 in Stata 13.1
2) t-statistics based on robust standard errors are reported in parentheses.
3) ***Significant at the 1% level. ** Significant at the 5% level. *Significant at the 10% level.
4) The Sargan test is a Sargan-Hansen test of overidentifying restrictions. The null hypothesis is that the instruments are uncorrelated with the error. The Sargan difference test is for the levels instruments only

[57] The multipliers are computed at the annual values of GDP and adverting (i.e. from 1998-2014). Table entries then represent the average of these annual multipliers for each country.

5) Arellano Bond AR2 test is for the null hypothesis of no second-order serial correlation in the first-differenced residuals
6) Model 1 uses lagged levels of the variables as instruments in the first-difference equation, from t-1 to t-4 for the predetermined and t-2 to t-4 for the endogenous. For the level equation, first differences are used dated t for the predetermined and t-1 for the endogenous. To reduce the instrument count, a collapsed set are used for advertising.
7) Model 2 sets the max lag length of the variables used as instruments to t-3 in the first-difference equation
8) Model 3 sets the max lag length of the variables used as instruments to t-2 in the first-difference equation
9) Model 4 sets the max lag length of the pre-determined variables used as instruments to t-1 in the first-difference equation
10) The levels coefficients on advertising are displayed for a selection of countries. All others are significant at the 5% level
11) The models includes year dummies

Table 4 – Short run and long run average advertising multipliers

| Country | model1 | | model2 | | model3 | | model4 | |
|---|---|---|---|---|---|---|---|---|
| | SR | LR | SR | LR | SR | LR | SR | LR |
| Australia | 4.27 | 14.46 | 4.47 | 15.33 | 4.40 | 15.56 | 5.47 | 19.21 |
| Austria | 5.30 | 15.14 | 5.56 | 16.24 | 5.51 | 17.24 | 7.03 | 23.53 |
| Belgium | 6.44 | 18.01 | 6.73 | 19.02 | 6.74 | 21.22 | 8.61 | 29.07 |
| Bulgaria | 5.05 | 4.13 | 5.35 | 5.29 | 5.32 | 7.12 | 7.25 | 15.16 |
| Canada | 6.10 | 20.36 | 6.37 | 21.41 | 6.28 | 21.90 | 7.82 | 27.00 |
| Croatia | 7.20 | 12.78 | 7.58 | 14.11 | 7.56 | 16.65 | 10.19 | 30.21 |
| Cyprus | 9.19 | 16.32 | 9.66 | 17.92 | 9.77 | 23.05 | 13.33 | 44.17 |
| CzechRepublic | 7.69 | 14.53 | 8.10 | 16.12 | 8.02 | 17.98 | 10.54 | 27.84 |
| Denmark | 6.68 | 20.78 | 7.02 | 22.34 | 7.03 | 24.61 | 8.81 | 31.33 |
| Estonia | 10.58 | 7.53 | 11.24 | 10.34 | 11.41 | 17.60 | 15.95 | 43.21 |
| Finland | 6.09 | 18.87 | 6.39 | 20.28 | 6.35 | 21.62 | 8.02 | 28.48 |
| France | 7.56 | 27.41 | 7.85 | 28.30 | 7.77 | 29.09 | 9.62 | 35.97 |
| Germany | 6.54 | 22.86 | 6.82 | 23.86 | 6.65 | 23.39 | 8.26 | 28.54 |
| Greece | 6.59 | 19.72 | 6.92 | 21.19 | 6.82 | 21.94 | 8.66 | 29.23 |
| Hungary | 7.30 | 13.04 | 7.74 | 15.17 | 7.79 | 18.73 | 10.30 | 30.15 |
| Ireland | 7.27 | 20.46 | 7.59 | 21.35 | 7.53 | 22.92 | 9.77 | 33.73 |
| Italy | 9.02 | 32.12 | 9.41 | 33.75 | 9.05 | 31.17 | 11.16 | 36.59 |
| Japan | 5.96 | 23.14 | 6.22 | 24.22 | 6.04 | 23.18 | 7.31 | 26.04 |
| Korea,Rep. | 6.94 | 19.49 | 7.26 | 20.62 | 7.01 | 19.36 | 8.86 | 24.36 |
| Latvia | 7.73 | 7.95 | 8.20 | 9.94 | 8.22 | 13.71 | 11.39 | 30.95 |
| Lithuania | 11.10 | 17.27 | 11.70 | 19.60 | 11.79 | 25.29 | 15.80 | 44.52 |
| Malta | 7.84 | 11.00 | 8.27 | 12.52 | 8.53 | 19.45 | 11.84 | 41.03 |
| Netherlands | 6.91 | 21.07 | 7.24 | 22.42 | 7.33 | 25.82 | 9.18 | 32.94 |
| Norway | 8.33 | 27.67 | 8.69 | 28.94 | 8.76 | 32.29 | 11.02 | 42.62 |
| Poland | 8.72 | 22.93 | 9.15 | 24.73 | 8.97 | 25.08 | 11.49 | 34.11 |
| Portugal | 4.19 | 10.56 | 4.39 | 11.18 | 4.35 | 12.15 | 5.61 | 17.05 |
| Romania | 10.04 | 17.49 | 10.57 | 19.46 | 10.34 | 20.15 | 13.68 | 32.82 |
| SlovakRepublic | 4.87 | 8.11 | 5.12 | 8.96 | 5.09 | 10.50 | 6.76 | 17.48 |
| Slovenia | 7.81 | 13.73 | 8.26 | 15.81 | 8.39 | 20.60 | 11.30 | 36.98 |
| Spain | 7.83 | 24.92 | 8.19 | 26.35 | 7.97 | 25.61 | 9.88 | 30.16 |
| Sweden | 6.17 | 19.57 | 6.45 | 20.65 | 6.49 | 22.96 | 8.04 | 27.92 |
| Switzerland | 6.05 | 17.11 | 6.31 | 17.89 | 6.17 | 17.76 | 7.94 | 25.03 |
| Turkey | 13.26 | 41.38 | 13.86 | 43.76 | 13.45 | 41.94 | 17.08 | 55.79 |
| UnitedKingdom | 5.39 | 20.17 | 5.63 | 21.14 | 5.50 | 20.70 | 6.77 | 24.93 |
| UnitedStates | 4.50 | 18.58 | 4.65 | 18.89 | 4.53 | 18.25 | 5.40 | 19.54 |
| eu28 | 6.67 | 22.40 | 6.97 | 23.52 | 6.84 | 23.65 | 8.53 | 29.38 |

Table 5 – Short run and long run average advertising elasticities

| | model and period | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | — model1 — | | — model2 — | | — model3 — | | — model4 — | |
| Country | SR | LR | SR | LR | SR | LR | SR | LR |
| Australia | 0.05 | 0.16 | 0.05 | 0.17 | 0.05 | 0.17 | 0.06 | 0.21 |
| Austria | 0.04 | 0.13 | 0.05 | 0.14 | 0.05 | 0.14 | 0.06 | 0.20 |
| Belgium | 0.04 | 0.12 | 0.05 | 0.13 | 0.05 | 0.15 | 0.06 | 0.20 |
| Bulgaria | 0.04 | 0.03 | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 | 0.11 |
| Canada | 0.05 | 0.16 | 0.05 | 0.16 | 0.05 | 0.17 | 0.06 | 0.21 |
| Croatia | 0.04 | 0.07 | 0.04 | 0.08 | 0.04 | 0.09 | 0.06 | 0.17 |
| Cyprus | 0.04 | 0.07 | 0.04 | 0.08 | 0.04 | 0.10 | 0.06 | 0.20 |
| CzechRepublic | 0.04 | 0.08 | 0.04 | 0.09 | 0.04 | 0.10 | 0.06 | 0.15 |
| Denmark | 0.05 | 0.14 | 0.05 | 0.15 | 0.05 | 0.17 | 0.06 | 0.21 |
| Estonia | 0.04 | 0.03 | 0.04 | 0.04 | 0.04 | 0.06 | 0.06 | 0.15 |
| Finland | 0.05 | 0.14 | 0.05 | 0.15 | 0.05 | 0.16 | 0.06 | 0.21 |
| France | 0.05 | 0.17 | 0.05 | 0.18 | 0.05 | 0.18 | 0.06 | 0.23 |
| Germany | 0.05 | 0.16 | 0.05 | 0.17 | 0.05 | 0.17 | 0.06 | 0.21 |
| Greece | 0.05 | 0.13 | 0.05 | 0.14 | 0.05 | 0.15 | 0.06 | 0.20 |
| Hungary | 0.04 | 0.07 | 0.04 | 0.08 | 0.04 | 0.10 | 0.06 | 0.17 |
| Ireland | 0.04 | 0.12 | 0.05 | 0.13 | 0.05 | 0.14 | 0.06 | 0.21 |
| Italy | 0.05 | 0.17 | 0.05 | 0.18 | 0.05 | 0.16 | 0.06 | 0.19 |
| Japan | 0.05 | 0.19 | 0.05 | 0.20 | 0.05 | 0.19 | 0.06 | 0.21 |
| Korea,Rep. | 0.04 | 0.12 | 0.05 | 0.13 | 0.04 | 0.12 | 0.06 | 0.16 |
| Latvia | 0.04 | 0.04 | 0.04 | 0.05 | 0.04 | 0.07 | 0.06 | 0.15 |
| Lithuania | 0.04 | 0.06 | 0.04 | 0.07 | 0.04 | 0.09 | 0.06 | 0.16 |
| Malta | 0.04 | 0.06 | 0.04 | 0.06 | 0.04 | 0.10 | 0.06 | 0.21 |
| Netherlands | 0.05 | 0.14 | 0.05 | 0.15 | 0.05 | 0.17 | 0.06 | 0.22 |
| Norway | 0.05 | 0.15 | 0.05 | 0.16 | 0.05 | 0.18 | 0.06 | 0.24 |
| Poland | 0.04 | 0.11 | 0.05 | 0.12 | 0.04 | 0.13 | 0.06 | 0.17 |
| Portugal | 0.04 | 0.11 | 0.05 | 0.12 | 0.04 | 0.13 | 0.06 | 0.18 |
| Romania | 0.04 | 0.07 | 0.04 | 0.08 | 0.04 | 0.08 | 0.06 | 0.13 |
| SlovakRepublic | 0.04 | 0.07 | 0.04 | 0.07 | 0.04 | 0.09 | 0.06 | 0.14 |
| Slovenia | 0.04 | 0.07 | 0.04 | 0.08 | 0.04 | 0.11 | 0.06 | 0.19 |
| Spain | 0.05 | 0.15 | 0.05 | 0.15 | 0.05 | 0.15 | 0.06 | 0.18 |
| Sweden | 0.05 | 0.15 | 0.05 | 0.15 | 0.05 | 0.17 | 0.06 | 0.21 |
| Switzerland | 0.04 | 0.13 | 0.05 | 0.13 | 0.05 | 0.13 | 0.06 | 0.18 |
| Turkey | 0.05 | 0.14 | 0.05 | 0.15 | 0.05 | 0.14 | 0.06 | 0.19 |
| UnitedKingdom | 0.05 | 0.18 | 0.05 | 0.19 | 0.05 | 0.19 | 0.06 | 0.22 |
| UnitedStates | 0.05 | 0.21 | 0.05 | 0.21 | 0.05 | 0.20 | 0.06 | 0.22 |
| eu28 | 0.05 | 0.16 | 0.05 | 0.16 | 0.05 | 0.17 | 0.06 | 0.21 |

## Model Advertising heterogeneity

The model (2) allows for heterogeneity in the impacts of advertising, by allowing the coefficient on $\log AD_{it}$ to vary across countries. This parameter, which is equivalent to the short-run advertising elasticity, is treated as a fixed effect and estimated for each jurisdiction.[58] It is hypothesised that variations in the advertising elasticities may be associated with differences in the channel distribution of advertising, the product mix of each country and the age distribution of the population. Following Plümper & Troeger(2007), the following model is specified for the estimated advertising coefficients:

$$\hat{\beta}_{1i} = \lambda_0 + AdShares'_i \pi_1 + ProductShares'_i \pi_2 + v_i \tag{8}$$

where $AdShares$ is a vector of advertising shares by channel, $ProductShares$ is a vector of output shares by category and $v_i$ is an innovation. As (8) is not necessarily underpinned by economic theory, the parameters $\pi$ cannot be given a causal interpretation. Instead the model is be considered to be the best linear prediction under mean squared error loss. Thus $E[v_i] = 0$ and the variables will be uncorrelated with the error by construction i.e. $E[AdShares_i v_i] = E[AdShares_i v_i] = 0$. OLS will be a consistent estimator of the parameters (8).

## Data

The observations on advertising expenditure are disaggregated into 8 channels and average country shares are constructed over the 1998-2015 sample period. The channels are provided by WARC and comprise: online, television, outdoor, cinema, print and radio. Data is also obtained from the World Bank on the shares of gross value added split by service and industry, an indictor to identify developed

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[58] The advertising coefficient is correlated with the lag dependent variable by construction. However, unlike the country-effect, the random component cannot be removed by differencing, as advertising is time varying.
Thus the lagged levels and differences of the dependent variables will be correlated with the error in the levels and difference equation making these unsuitable as instruments. This necessitates a fixed effects treatment.

nations. Summary statistics of the variables used in equation (8) are set-out in Table 5. The model is fitted to each of the short-run elasticity estimates as provided in Table 6.

Spend on printed media (newspaper and magazine) accounts for the largest share of real advertising, with an average share of around 40% over the sample period. This is followed by television 38%, online 9% and outdoor and radio with equal shares of just over 6%. Services account for the largest component of value added with an average share of 70% and the majority of the nations included in the sample are developed (79%).

Table 6 – descriptive statistics of variables in the elasticity model (8)

| Variable | Variable Description | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| $\hat{\beta}_{1i}^{model1}$ | Advertising elasticity model1 | 0.04 | 0.00 | 0.04 | 0.05 |
| $\hat{\beta}_{1i}^{model2}$ | Advertising elasticity model2 | 0.12 | 0.05 | 0.03 | 0.21 |
| $\hat{\beta}_{1i}^{model3}$ | Advertising elasticity model3 | 0.05 | 0.00 | 0.04 | 0.05 |
| $\hat{\beta}_{1i}^{model4}$ | Advertising elasticity model4 | 0.12 | 0.05 | 0.04 | 0.21 |
| *ShareOnline* | Online share of l advertising | 8.78 | 5.28 | 0.87 | 18.44 |
| *ShareTV* | TV share of advertising | 38.24 | 15.87 | 16.68 | 72.97 |
| *ShareOutdoor* | Outdoor share of advertising | 6.25 | 2.98 | 0.00 | 13.73 |
| *ShareCinema* | Cinema share of advertising | 0.55 | 0.42 | 0.00 | 1.70 |
| *SharePrint* | Print share of advertising | 39.91 | 12.79 | 13.44 | 62.76 |
| *ShareRadio* | Radio share of advertising | 6.26 | 2.77 | 2.13 | 12.20 |
| *ShareService* | Service share of value added | 70.46 | 5.95 | 58.54 | 81.34 |
| *ShareIndustry* | Industry share of value added | 29.54 | 5.95 | 18.66 | 41.46 |
| *Developed* | Indicator for developed nation | 0.79 | 0.41 | 0.00 | 1.00 |

## Parameter estimates

Table 7 provides the estimated parameters of the four elasticity models (8) setting the share of television and the share industry as bases.[59] The service share of value added and the indicator for developed nation are both significant at the 10% level in elasticity models 1 - 3. This is not case for the distribution of advertising which are mainly insignificant.

To mitigate the effects of collinearity and to increase degrees of freedom given the small size of the sample, the model (8) is re-estimated by replacing the channel share variables with the total share of online. The results are displayed in table 8 and now suggest that online advertising is significant at the 10% level in all models. In particular, an exogenous shift of 10 percentage points from the share of offline to the share of online, is accompanied by an expected (average) increase of 3.2% in the advertising elasticity. For service, the equivalent increase is a 3% rise in the elasticity. Table 9 sets out the results for all models.

Table 7 – Estimated parameters of the elasticity model

| | Model-1 | Model-2 | Model-3 | Model-4 |
|---|---|---|---|---|
| *ShareOnline* | 0.000129 | 0.000129 | 0.000137[*] | 0.0000469 |
| | (1.52) | (1.57) | (2.01) | (1.05) |
| *ShareOutdoor* | -0.000105 | -0.000104 | -0.0000824 | 0.00000634 |
| | (-0.48) | (-0.49) | (-0.44) | (0.05) |
| *ShareCinema* | 0.00104 | 0.000968 | 0.000995 | 0.00132[**] |
| | (0.76) | (0.73) | (0.90) | (2.11) |
| *SharePrint* | 0.0000158 | 0.0000168 | 0.0000367 | 0.0000578[**] |
| | (0.47) | (0.51) | (1.24) | (2.68) |

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[59] This means that all estimates are difference relative to the base. Hence a positive value for a channel share indicates that the effect of this variable is larger than the effect of television.

| | | | | |
|---|---|---|---|---|
| *ShareRadio* | -0.000170 | -0.000169 | -0.000118 | -0.0000394 |
| | (-0.76) | (-0.80) | (-0.65) | (-0.38) |
| *ShareService* | 0.000192*** | 0.000188*** | 0.000165*** | 0.0000818* |
| | (2.96) | (3.05) | (2.85) | (1.85) |
| *Developed* | 0.00394*** | 0.00386*** | 0.00294*** | 0.000785 |
| | (3.79) | (3.88) | (3.41) | (1.27) |
| *Constant* | 0.0265*** | 0.0290*** | 0.0296*** | 0.0489*** |
| | (5.52) | (6.34) | (6.90) | (14.87) |
| N | 34 | 34 | 34 | 34 |
| R2 | 0.588 | 0.600 | 0.629 | 0.569 |

*t* statistics in parentheses
\* $p < 0.10$, \*\* $p < 0.05$, \*\*\* $p < 0.01$

Table 8 – Estimated parameters of the elasticity model (online share as only channel)

| | (model1) Lag4 | (model2) Lag3 | (model3) Lag2 | (model4) Lag1 |
|---|---|---|---|---|
| *ShareOnline* | 0.000172** | 0.000172** | 0.000189*** | 0.0000986* |
| | (2.50) | (2.59) | (3.26) | (1.98) |
| *ShareService* | 0.000192*** | 0.000187*** | 0.000165** | 0.0000869 |
| | (3.08) | (3.17) | (2.67) | (1.43) |
| *Developed* | 0.00400*** | 0.00392*** | 0.00312*** | 0.00120 |
| | (4.02) | (4.09) | (3.49) | (1.48) |
| *Constant* | 0.0256*** | 0.0281*** | 0.0297*** | 0.0506*** |
| | (5.76) | (6.66) | (6.55) | (10.87) |
| N | 34 | 34 | 34 | 34 |
| R2 | 0.547 | 0.558 | 0.576 | 0.339 |

*t* statistics in parentheses
\* $p < 0.10$, \*\* $p < 0.05$, \*\*\* $p < 0.01$

Table 9 - % Change in elasticity for an exogenous 10-point increase in the shares

| | ShareOnline | ShareService |
|---|---|---|
| Model-1 | 3.92 | 4.37 |
| Model-2 | 3.75 | 4.06 |
| Model-3 | 4.15 | 3.63 |
| Model-4 | 1.68 | 1.48 |
| Average | 3.19 | 3.01 |

# Annex B: Estimating the employment impacts

This chapter describes the methodology used to calculate the employment estimates in Chapter 3. These estimates quantify the number of jobs that are supported by advertising through the following effects:

1. Direct impact: These are jobs that are involved in the production of advertising.

2. Enabling impact: These are media jobs that are supported by the role that advertising plays as a financial enabler of media services.

3. Additional supply chain and income impacts: These are jobs that are supported along the advertising and media supply chains and throughout the wider economy as a result of (1) and (2).

The three employment effects are estimated separately for each market under consideration. They are then summed to give the total employment contribution of advertising in a given market. Figure 24 provides an overview of the modelling approach.

Figure 24: Overview of the employment estimation methodology
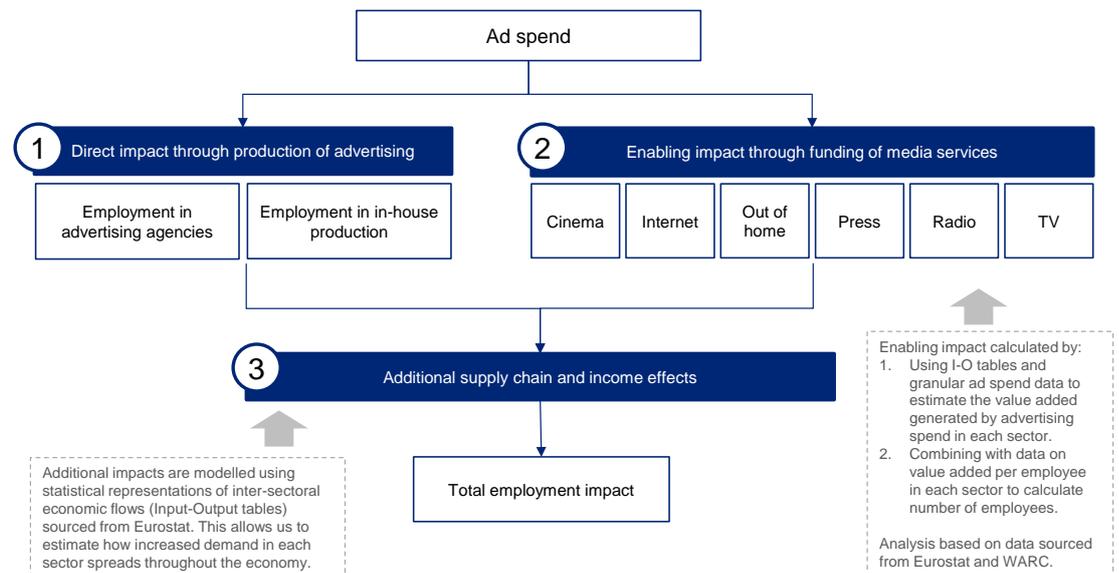


The approach to estimating each of the individual effects is outlined below.

## Estimating the direct impact (1)

The total number of jobs involved in the direct production of advertising is calculated as the sum of:

- Employment in advertising agencies; and

- Employment associated with the "in-house" production of advertising.

Eurostat produces data on the number of jobs in advertising agencies across each of the selected markets. However Eurostat does not report data for employment of in-house production. In addition the availability of relevant data at the market level is mixed.

Assumptions can be used to derive consistent estimates of the number of jobs associated with in-house advertising. However, making such assumptions at a market level is challenging given data availability. In addition, as the estimates of direct impact feeds into the estimates of the supply chain and income effects, the overall results are sensitive to these assumptions. Therefore, the results presented here do not include the in-house advertising element of direct employment and, in this respect, they represent conservative estimates of the value of direct employment impacts.

## Estimating the enabling impact (2)

Advertising supports jobs in the media sectors by providing an important source of income for firms in those sectors. The number of jobs supported in this way is quantified through the following steps:

1. The average value added to turnover ratio in each media sector and each market is calculated using data from market specific Input-Output tables sourced from Eurostat.

2. These estimates are combined with ad spend data for the relevant channel in the relevant market to calculate the value added supported by advertising in each media segment.

3. These figures are then combined with data from Eurostat on the average value added per employee to derive the number of jobs supported by advertising.

These steps are summarised below.

Figure 25: Summary of approach to calculating enabling impact on employment
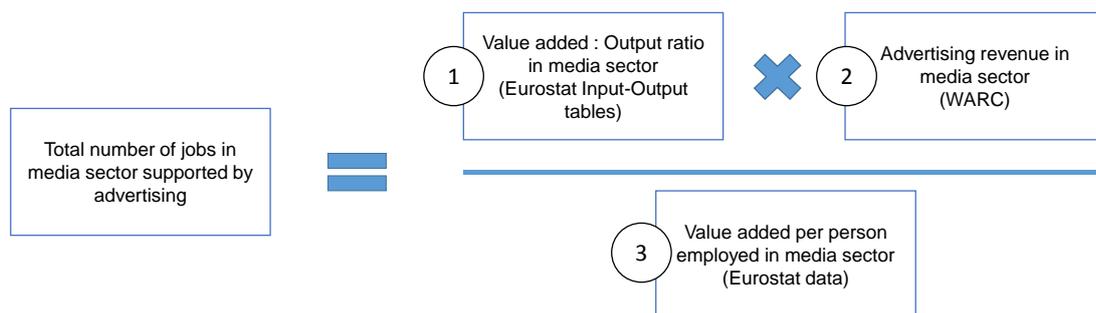


Source: Deloitte analysis

The method outlined above is used to estimate all enabled impacts except for the Radio and Television segments in Slovakia. In these segments Eurostat reports negative value added per employee ratios, so applying the method above would not be appropriate. For these segments the methodology is based on a revenue approach in which average revenue per employee is combined with the channel expenditure.

## Estimating the supply chain and income effects (3)

The employment impacts that are estimated in effects (1) and (2) occur as a result of economic activity that exists directly because of advertising (either the production of advertising content or activity which occurs because of the funding role that advertising plays in the media). However the overall impact on employment is likely to be greater than this because of two additional effects:

- Indirect impact: As advertising and media businesses increase their activity, they will need to increase their purchases of inputs. This will translate to more demand for the goods and services produced by each player in the advertising and media value chains and hence increase their employment requirement. Furthermore, to meet the higher demand, each player in the supply chain will have to increase their purchases of intermediate goods and services, which in turn will result in higher revenues for their suppliers. This chain of demand expansions continues throughout the economy and at each stage firms have additional

employment requirements because of their activities. The sum of these employment requirements is known as the indirect impact on employment.

- Induced impact: As employment and income increases, there is likely to be an increase in household consumption which will increase output further. The employment generated by the higher household expenditures is known as the induced impact.

Estimating these impacts involves tracing the flows of purchases through the economy. Central to this analysis is the Input-Output table. This is a statistical description of the economy, which lists the value of the goods produced by each sector and how much of that output is used by each sector. Input-Output tables, modelling the economy with 65 sectors, are provided by Eurostat for each of the EU markets and for the EU as a whole.

Applying matrix algebra to the Input-Output tables it is possible to estimate the impact on the equilibrium of the economy of an increase in economic activity in the various sectors. Denoting by d the vector of final demand, A the Input-Output table and x vector of output in the economy, then the following relationship holds in equilibrium:

$$x = Ax + d$$

This equation can be thought of as the condition that supply (the left hand side) is equal to demand (the right hand side), where Ax is the demand for intermediary goods and services and d is the exogenous aggregate final demand. The equation is solved for x as follows:

$$x = (I\text{-}A)d$$

where I is the identity matrix. Using this methodology it is possible to derive output multipliers for each sector and each market. That is, the total increase in output that arises in equilibrium in response to a unit increase of output in a given sector. These multipliers can then be applied to the employment estimates to derive estimates of the total employment that is generated. The calculated multipliers for each sector and each market are given in Table 3.

Table 3: Estimates of Type II multipliers applied to the direct and enabled employment effects to derive the total employment estimates.[60]

| Employment effect | Sector | UK | France | Germany | Hungary | EU-28 |
|---|---|---|---|---|---|---|
| **(1)** | Advertising agencies | 3.05 | 2.96 | 2.50 | 3.07 | 4.40 |
| **(2)** | Cinema | 2.80 | 3.21 | 2.80 | 2.55 | 3.81 |
| | Internet | 2.85 | 2.75 | 2.63 | 2.96 | 2.43 |
| | Out of home | 3.05 | 2.96 | 2.50 | 3.07 | 4.40 |
| | Press | 3.05 | 3.10 | 2.72 | 3.44 | 2.10 |
| | Radio | 2.80 | 3.21 | 2.80 | 2.55 | 3.81 |
| | Television | 2.80 | 3.21 | 2.80 | 2.55 | 3.81 |

Source: Deloitte analysis based on Eurostat data

The relevant multipliers in Table 3 are applied to the estimates of the direct and enabled employment impacts (based on the sector in which they occur) and then summed to give the total employment impact in the market. The value of the additional impact in the economy is the difference between the total employment impact and the impacts from (1) and (2).

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[60] Multipliers are typically categorised into either Type I or Type II multipliers. Type II multipliers include both indirect and induced impacts whereas Type I multipliers do not include induced impacts.