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Department of Communications and the Arts



Bureau of  
Communications  
and Arts Research

# Estimates of labour productivity trends in Australian public and private broadcasting

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Background statistics paper

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## Key points

- Productivity is an indicator of efficiency that measures output per unit of inputs. Productivity is not a measure of profitability or market power, nor does it provide any insight into the social benefits that may occur from economic activity.
- Productivity can be measured as labour productivity or multifactor productivity (MFP). Labour productivity is the volume of output created for each labour input (hours worked or the number of employees). MFP is the output created from each composite unit of inputs, typically a mix of labour and capital.
- Productivity in the services and non-market sectors<sup>1</sup> of the economy is hard to measure. This is why the Australian Bureau of Statistics (ABS) does not publish data on MFP for non-market sector industries and why the focus of this paper is labour productivity.
- No data sources are available to easily measure and compare the productivity of different broadcasting media (e.g. radio against television), or between public and private broadcasters. The BCAR has analysed publicly available data and used assumptions where necessary to estimate trends in labour productivity between 2006–07 and 2016–17 for public broadcasters and private broadcasters.<sup>2</sup>
- The data used in this paper do not include any adjustment for changes in the quality of outputs or inputs, which is a challenge for productivity measurement in general. As a result, it does not take into account differences in the quality of broadcasting between public and private broadcasters.
- Based on the most recent data available, labour productivity has grown faster in the public and private broadcasting sectors than for the economy as a whole over the decade to 2016–17.
- Private broadcasters are estimated to have had higher labour productivity in 2016–17, averaging around \$210,000 of value added per employee in 2014-15 prices. This is around 20 per cent higher than public broadcasters.
- However, public broadcasters appear to have seen a greater improvement in labour productivity than private broadcasters over the past decade. Public broadcaster labour productivity is estimated to have grown by an average of 3.5 per cent per year between 2006–07 and 2016–17, compared with around 1.5 per cent for private sector broadcasters. Most of the difference can be explained by markedly slower employment growth in the public sector.
- In addition to employment levels, the intensity with which broadcasters use inputs will affect labour productivity. This reflects operational efficiency, capital intensity, employee skills or programming choices that require more or less intensive use of inputs due to factors such as production location or, for the national broadcasters, Charter requirements.
- These estimates of labour productivity are sensitive to the assumptions used (such as the definition of what the broadcasting sector comprises) and the extent to which the underlying data are able to capture differences in productivity between public and private broadcasters.
- The Bureau of Communications and Arts Research thanks the panel of the Inquiry into the Competitive Neutrality of the National Broadcasters (Robert Kerr, Julie Flynn and Sandra Levy) for requesting this work and for the helpful feedback on an earlier draft.

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<sup>1</sup> Non-market sectors include health care and social services, education and training, and public administration and safety industries—those that predominantly consist of government provided goods and services.

<sup>2</sup> For the purpose of the analysis, ‘broadcasting’ includes radio broadcasting, free-to-air television broadcasting, cable and subscription broadcasting, and internet broadcasting using industry categories defined by the ABS.

## Productivity is a measure of efficiency

Productivity is a measure of efficiency. It examines how much volume of output is derived from volumes of inputs. For example, the amount of iron ore extracted per worker at a mine; the megawatt/hours of electricity generated per tonne of coal burned; and the amount of wheat harvested per hectare of farmland are all measures of productivity. Because volume measures of outputs are usually unavailable for service industries, revenue from output or value added measures deflated for prices are used to get a quantity measure for productivity analysis. This means that accurate price data are vital for accurate measurement of productivity.

Productivity is not a measure of profitability or market power. Indeed, productivity and profitability can diverge in times of significant changes in market conditions. For example, during the Australian mining boom the profitability of mining operations rose significantly, which enabled lower-quality ore deposits to be exploited. This, in turn, reduced measured productivity in the mining sector compared to the rest of the economy.<sup>1</sup>

Productivity growth is important because it is the main contributor to long-run improvements in measured living standards. Over the last 40 years, the majority of growth in Australian gross domestic product (GDP) has been generated by improvements in labour productivity.<sup>2</sup>

Productivity can be examined at an economy-wide, industry or firm level (subject to data availability). The most common measures of productivity measured and discussed are economy-wide measures published as part of the national accounts—the data used to measure GDP, investment, consumption and trade in the economy. This includes labour productivity, a common measure, which compares the ratio of output per ‘labour input’ (usually expressed as the number of employees or hours worked).

## Defining the broadcasting sector for productivity analysis

In order to be as consistent as possible with the Australian Bureau of Statistics’ (ABS) approach to productivity measurement, the BCAR has examined ABS data sources used to derive the national measures of productivity in its analysis of the broadcasting sector. This requires the broadcasting sector to be ‘defined’ in terms of the Australia-New Zealand Standard Industry Classification (ANZSIC), which is the taxonomy used to describe the different industries in the economy.

ANZSIC breaks the economy down into divisions (like Agriculture, Mining, Construction, etc.), subdivisions and industry ‘classes’. Data is collected on outputs and inputs for all divisions, some subdivisions and few classes.

The ANZSIC includes a ‘division’ called Information, Media and Telecommunications, which is broken down into 6 subdivisions. Two of these divisions encompass the broadcasting sector, with the classes in each of these subdivisions further disaggregating broadcasting:

- Division J—Information, Media and Telecommunications
  - Subdivision 54—Publishing (except internet and music)
  - Subdivision 55—Motion Picture and Sound Recording Activities
  - **Subdivision 56—Broadcast (except Internet)**
    - **Class 5610—Radio Broadcasting**
    - **Class 5621—Free to Air Television Broadcasting**
    - **Class 5622—Cable and other Subscription Broadcasting**

- **Subdivision 57—Internet Publishing and Broadcasting**
  - **Class 5700—Internet Publishing and Broadcasting**
- Subdivision 58—Telecommunications Services
- Subdivision 59—ISPs, Websearch Portals and Data Processing Services
- Subdivision 60—Library and Other Information Services.

Data on inputs and outputs at the class level is not readily available for the subdivisions of relevance. Accordingly, the BCAR has focussed on subdivisions 56 and 57 collectively, using available data sources to determine output, employment, output prices and labour productivity between public sector broadcasting and private sector broadcasting.

## Data availability means that assumptions are necessary

The BCAR has had to make some assumptions and adjustments to available data in order to derive inputs and outputs for productivity analysis because data on public and private broadcasters is not published by the ABS. These assumptions include the following.

- The output of public broadcasters in total is based on the difference between the ABS national accounts measure of value added in broadcasting and the ABS *Australian Industry* publication measure of value added in broadcasting. (The national accounts tracks all activity in the economy, whereas the Australian Industry publication is based on the private sector only. The difference between the two is assumed to define the public sector.)<sup>3</sup> The concept of real output in broadcasting is discussed in more detail in box 1.
- The number of employees of private broadcasters in total is based on the labour force statistics of all employees in broadcasting less the average staffing levels for the public broadcasters listed in relevant portfolio budget statements.
- There is no published producer price data of broadcasting output that can be used to turn nominal (value) measures of output into real (volume) measures for productivity analysis. It is common practice in such circumstances to use the ‘nearest available’ price measure. For private broadcasting, nominal output has been deflated using the ‘audio, visual and computing media and services’ series from the Consumer Price Index. For public broadcasting, the ‘total hourly rates of pay excluding bonuses’ for all public industries wage price deflator is used to derive real public broadcasting output. (This reflects standard practice for public sector industries, where wages often comprise a high share of total inputs, and provides a measure to account for any differences in wage levels between the private and public sector.<sup>3</sup>)
- The data used in this paper do not include any adjustment for changes in the quality of outputs or inputs, which is a challenge for productivity measurement in general. As a result, it does not take

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<sup>3</sup> The ABS’ *Australian Industry* publication presents estimates based on data collected from the ABS’ *Economic Activity Survey* (EAS). The EAS collects data from all private sector firms with employment of 300 or greater, and takes a sample of smaller private sector firms to get a representative view of the economy. The EAS data is also used by the ABS—along with government finance statistics and other data—to construct the national accounts. Because the EAS forms part of the inputs to the national accounts, comparing the two data sources allows for consistent measurement of different sectors in the economy.

As major private sector broadcasters have employment of greater than 300, they are in the scope of the EAS.

A risk to using the data in this way is if parts of public broadcasting activity have been counted in the EAS. One proxy to check for this is to examine the income measures in the *Australian Industry* publication for evidence of government payments. The total income measure appears is largely consistent with the sales and service income measure for the broadcasting sector, which indicates small or negligible funding from government for operational costs—suggesting the data are fit-for-purpose.

into account differences in the quality of broadcasting between public and private broadcasters. This is discussed in more detail in box 2.

### Box 1: Conceptualising real output in broadcasting

Ideally, for productivity analysis, there is an accurate and observable measure of the ‘volume’ of output. In the case of broadcasting there are some measures of output, but each presents challenges in valuing that output.

For example, one approach is to measure the volume of output as the number of hours of content that is broadcast. This would mean an hour of test pattern is the same volume of output as an hour of ‘first-run’ drama; and that an hour of ‘prime time’ material is worth as much as an hour in the small hours of the morning. It would also mean that a station with two multichannels is ‘producing’ twice as much as a station with one channel—even if the former is time-delaying the broadcast between its channels. At its logical conclusion, the direct volume measure is ‘capped’ to the 24 hours in the day. This suggests that the direct measurement of the volume of broadcasting output may not be effective to measure productivity.

Another approach would be to measure volume by ‘viewer-hours’—the number of hours spent watching a given channel or medium. Such a measure accounts for the value of different hours of output, but assumes that content watched by more people is more highly valued. It is also affected by factors such as reach and affordability, which may not be directly linked to the efficiency or productivity of broadcasting.

If the value of output is to be factored in as part of measurement, then using measures of output that account for production costs (inputs) and/or popularity (advertising revenue) may be more appropriate. This can be done by using value measures of output that include these factors, and then adjusting them for movements in prices of inputs and outputs to derive volume measures. This is the approach taken in this paper.

### Box 2: Productivity and quality

For the purposes of productivity analysis, the measures of inputs and outputs used should be as close to volume measures as possible. In principle, this would include making adjustments for the different quality of inputs and outputs so that the resulting productivity measures only reflect changes in efficiency.<sup>4</sup>

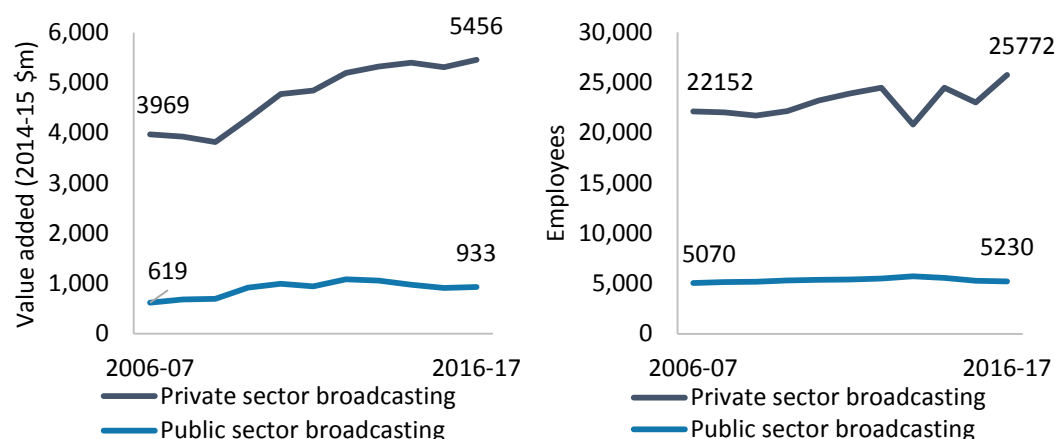
Finding quality-adjusted measures is a challenge for productivity measurement generally.<sup>5</sup> It is not possible for broadcasting based on the data sources available.

This means that the findings presented in this paper cannot be used to draw conclusions about how changes in the quality of inputs or outputs affect labour productivity growth in broadcasting. Nor can they be used to determine the relative quality of outputs of, and inputs used by, different broadcasting sectors.

## Unpacking the outputs, inputs and productivity trends in the broadcasting sector

Figure 1 shows the BCAR's estimates of real output and employment for the public and private sector broadcasters between 2006–07 and 2016–17.

Figure 1: Estimated real output (value added) (LHS) and employment (RHS) for the broadcasting sector

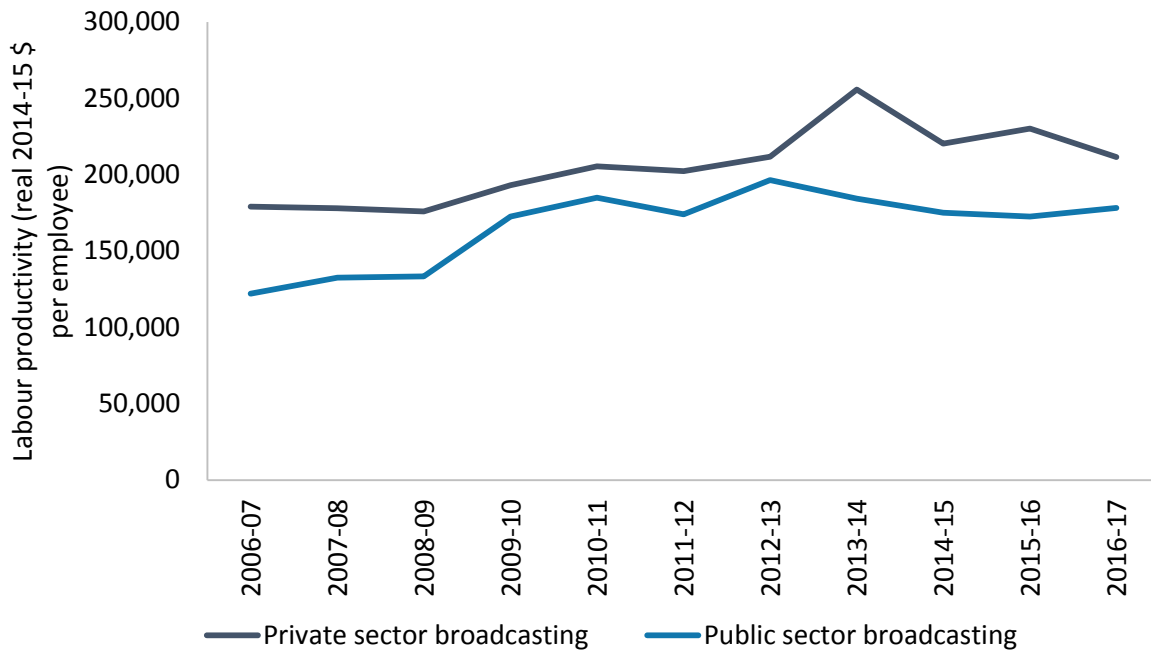


Source: BCAR estimates based on ABS (2018) *Australian Industry, 2016–17*, Cat. no. 8155.0; ABS (2018) *Australian System of National Accounts, 2016–17*, Cat. no. 5204.0; ABS (2018) *Consumer Price Index, Australia, Mar 2018*, Cat. no. 6401.0; ABS (2018) *Labour Force, Australia, Detailed, Quarterly*, Cat. no. 6291.0.55.003; ABS (2018) *Wage Price Index, Australia*, Cat. no. 6345.0; Department of Communications and the Arts (various) *Portfolio Budget Statements*, Canberra.

The ratio of real output to the number of employees defines labour productivity for the broadcasting sector (figure 2). This suggests that the productivity level of the private sector has been higher than that of the public sector. This is not a surprising result, as much of the activity of public sector broadcasting is likely to be aimed at segments of the market that are non-commercial, which are in turn likely to be more resource-intensive to provide. It may also reflect different capital intensities between the broadcasters—which have not been examined here due to lack of consistent data.



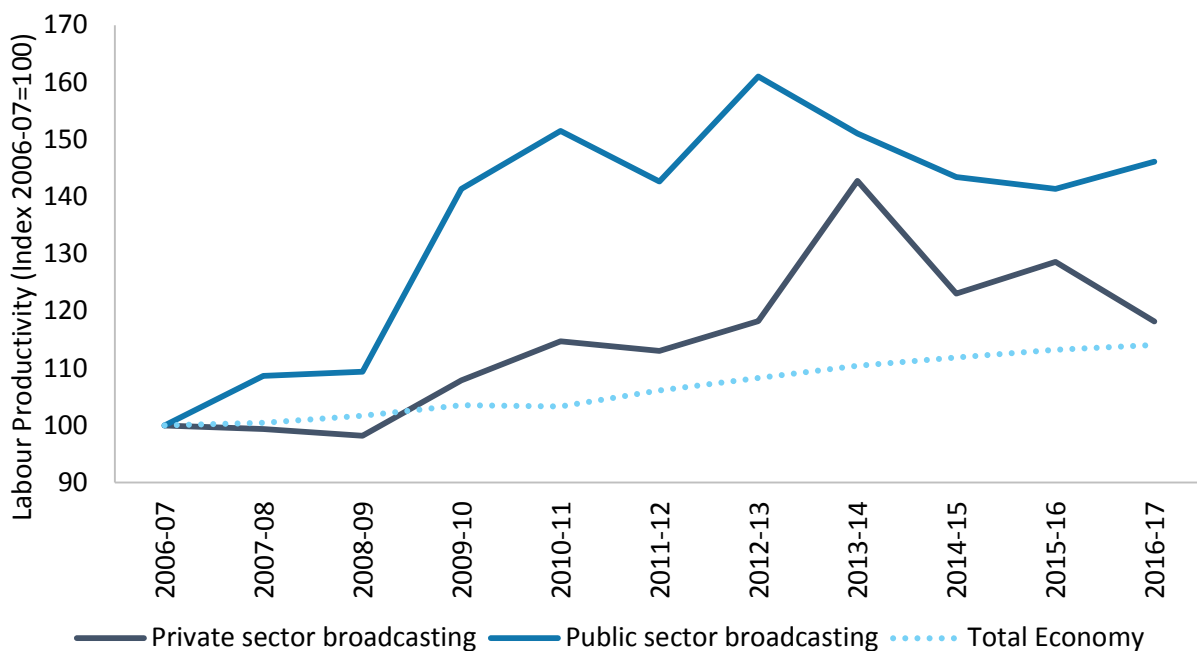
Figure 2: Estimated labour productivity levels in the broadcasting sector, 2006–07 to 2016–17



Source: BCAR estimates, based on the data sources to figure 1.

The estimated labour productivity growth rates are also of interest, as it is growth in productivity that represents improvements in efficiency. Indexing both labour productivity series to 2006–07, it becomes apparent that estimated public sector labour productivity growth in broadcasting has exceeded that of the private sector (figure 3). Labour productivity has grown faster in the public and private broadcasting sectors than for the economy as a whole.

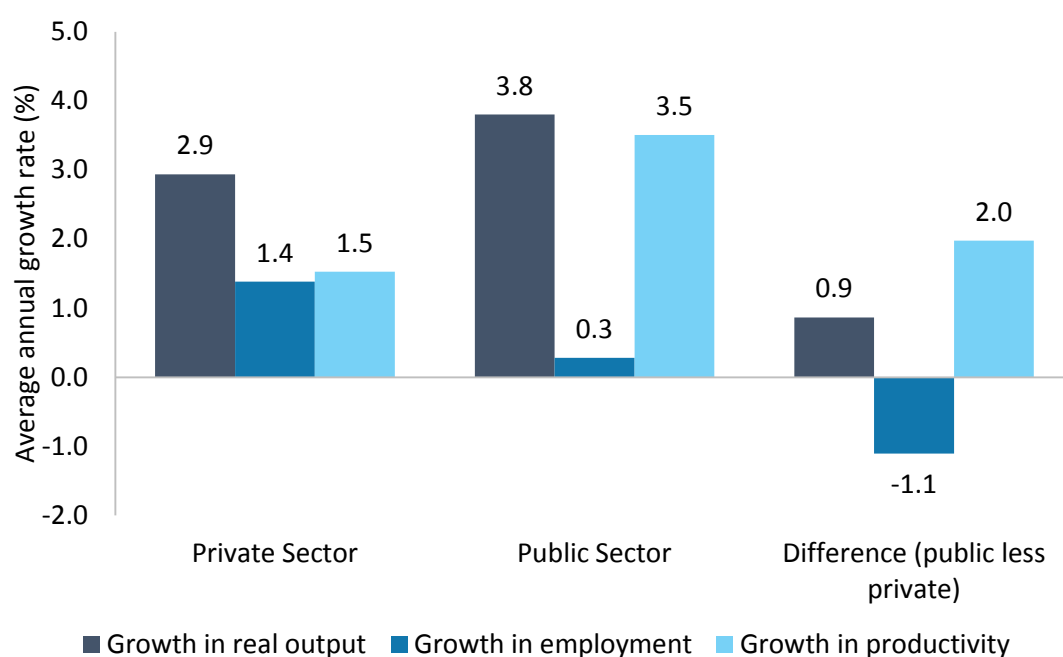
Figure 3: Estimated labour productivity growth in the broadcasting sector, 2006–07 to 2016–17



Source: BCAR estimates based on the data sources to figure 1.

The rates of growth, and the proximate causes for the differences between the public and private sectors, are easier to understand by unpacking the trends in output and employment growth. Figure 4 shows this for the public and private sectors, as well as the difference between the two over the 2006–07 to 2016–17 period.

Figure 4: Estimated average annual growth rates of output (value added), employment and labour productivity in broadcasting, 2006–07 to 2016–17



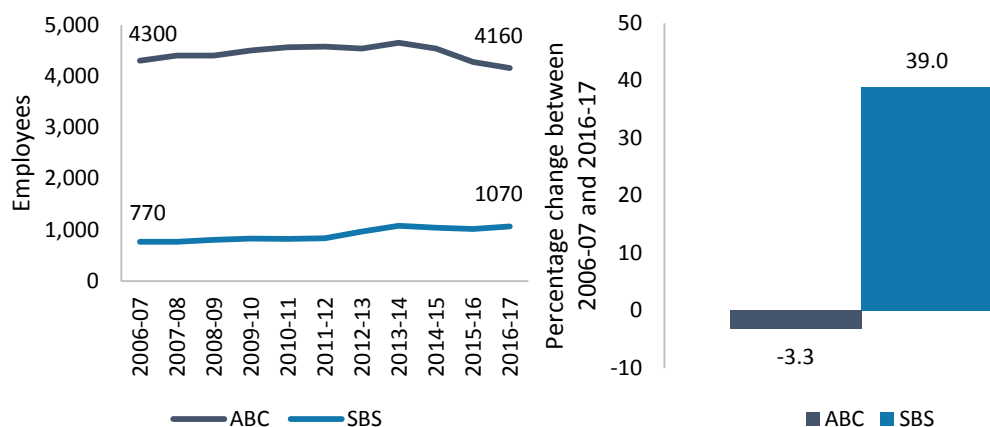
Source: BCAR estimates based on sources to figure 1.

What the data indicate is that estimated labour productivity growth has been faster in the public sector over the period due to both faster output growth and slower employment growth. Estimated output growth averaged 2.9 per cent per year for private sector broadcasting between 2006–07 to 2016–17, compared to 3.8 per cent per year for public sector broadcasting. Estimated employment growth averaged 1.4 per cent per year in private sector broadcasting over that period compared to 0.3 per cent per year in public sector broadcasting.

### Why is public sector broadcasting employment growth so low?

The majority of the difference in the rate of productivity growth between public and private broadcasters comes from the slower rate of employment growth in the public sector. The data from portfolio budget statements allow for a disaggregation of employment trends within the ABC and SBS (figure 5).

Figure 5: Staffing for public broadcasters between 2006–07 and 2016–17



Note: Employees are determined by the average staffing level achieved according to the relevant portfolio budget statement in the following year.

Source: Department of Communications and the Arts (various) *Portfolio Budget Statement*. Canberra.

These data indicate that the slow rate of employment growth between 2006–07 and 2016–17 is largely due to a decline in the number of employees at the ABC—from around 4,300 at the beginning of the period to around 4,160 at the end of the period. This is in contrast to trends at the SBS, where employment increased from around 770 to 1,070 in the same period.

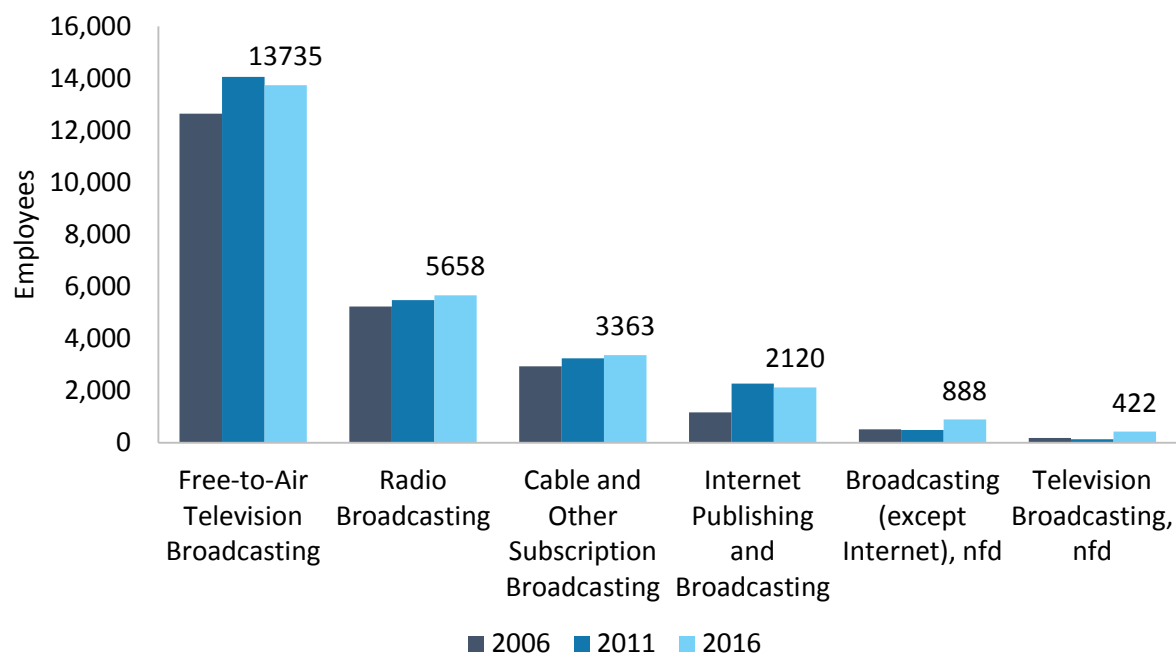
### Is the aggregate change in broadcasting employment due to a particular form of broadcasting?

Data at the class level—the level of disaggregation required to specifically identify employment trends for different types of broadcasting—is not available on an annual basis. However, Census data are able to provide some information about how employment has changed over time in the broadcasting sector.

Figure 6 shows employment in the broadcasting subdivisions from the 2006, 2011 and 2016 Census. Free-to-air television broadcasting is the largest employer in the sector; comprising around half of employment for the sector, or around 14 000 employees in 2016. Disaggregating the change in employment between the 2006 and 2016 censuses indicates that around:

- 30 per cent of employment growth was in Free-to-Air Television Broadcasting
- 27 per cent of employment growth was in Internet Publishing and Broadcasting
- 12 per cent of employment growth was in Radio Broadcasting
- 12 per cent of employment growth was in Other Subscription Broadcasting
- 16 per cent of employment growth was in broadcasting industries not further defined.

Figure 6: Census employment by broadcasting ANZSIC class



Source: Industry of employment data from 2006, 2011 and 2016 Census; accessed from ABS TableBuilder Basic.

Note: Total Broadcasting employment for 2016 was around 26 000 for census data, compared to around 30 000 for 2016–17 in the Labour Force Survey. ‘nfd’ = ‘not further defined’, which occurs where the industry specified in response to the relevant census question cannot be allocated to a further level of disaggregation.

## Appendix: Sensitivity testing

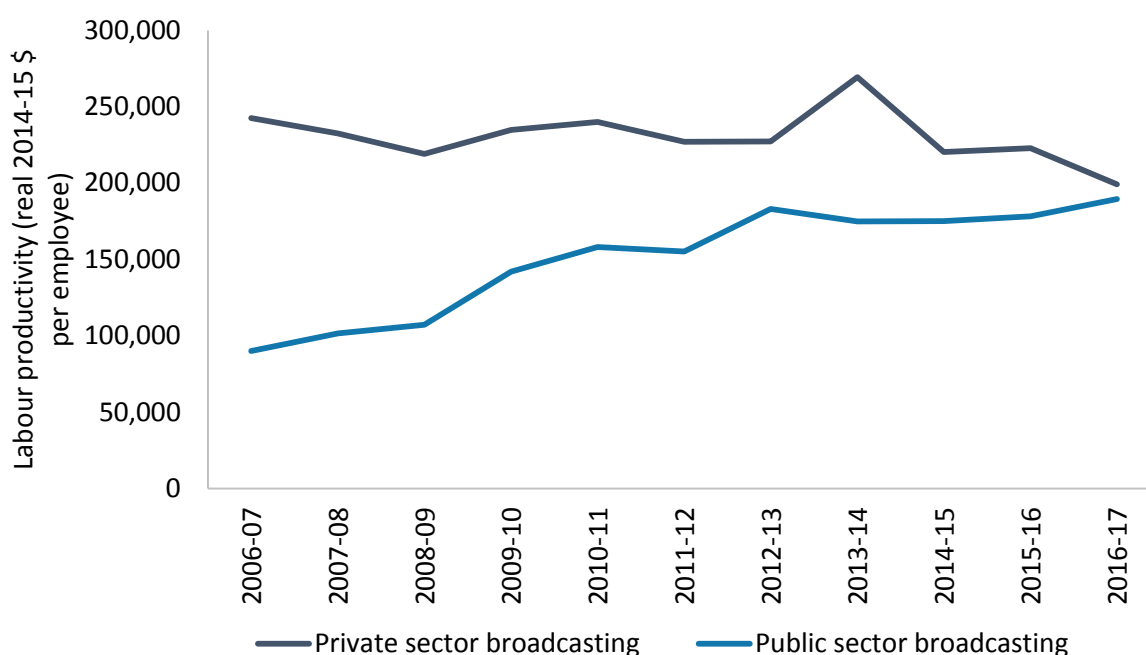
### The effect of price deflators

The volume measure of broadcasting outputs is hard to observe, and so the value of output adjusted for prices (deflation) is used to derive an output measure. The price series used for the adjustment can therefore affect productivity measures.

For private broadcasting, the ‘audio, visual and computing media and services’ series from the Consumer Price Index is used for the adjustment. For public broadcasting, the ‘total hourly rates of pay excluding bonuses’ for all public industries wage price deflator is used.

To test the sensitivity of the productivity measures to these choices, the public price deflator was used for private broadcasting output, and vice versa (Figure A). The results show the overall finding, that public broadcasting labour productivity has been lower in level terms, but has grown faster than private broadcasters, is robust.

Figure A: Sensitivity testing productivity estimates with different price deflators



Source: BCAR estimates, based on the data sources to figure 1.

Note: This figure shows the effect of using the public sector price deflator for the private sector and the private sector price deflator for the public sector. Public sector labour productivity has been lower than private sector productivity, but the growth of the former has exceeded the latter to the point where it was almost identical by 2016–17.

## References

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- <sup>1</sup> Topp et al. (2008) *Productivity in the Mining industry: Measurement and Interpretation*, Productivity Commission Staff Working Paper, Canberra.
- <sup>2</sup> BCAR estimates based on ABS (2018) *Australian System of National Accounts, 2016–17*, Cat. No. 5204.0.
- <sup>3</sup> For example, see ABS (2000) *Australian System of National Accounts—Concepts, Sources and Methods*, Cat. no. 5216.0, paragraph 10.38; Francois, L. & Derek, B. (2014) *Understanding National Accounts*, OECD Publishing, Paris.
- <sup>4</sup> OECD (2001) *Measuring Productivity: Measurement of Aggregate and Industry-level Productivity Growth*, OECD Manual, Paris, p. 35.
- <sup>5</sup> OECD (2001) *Measuring Productivity: Measurement of Aggregate and Industry-level Productivity Growth*, OECD Manual, Paris, p. 37.