Diminished Creative Industry Growth in Australia in the Digital Age

By

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Executive Summary

The Australian Productivity Commission (Commission) in its recent final report on its "Inquiry into Australia's Intellectual Property Arrangements" ("Inquiry Report") claims that "Copyright is broader in scope *and* longer in duration than needed," [1] commenting that "The scope *and* term of copyright protection in Australia … is now skewed too far in favour of copyright holders."[2] On this basis the Commission recommends a number of reforms to weaken copyright law. The Commission explicitly admits it adopts a bias in support of weaker copyright law commenting: "the Commission considers it is appropriate to 'err on the side of caution' … and consciously set weaker parameters in the way that rights are assigned, used or enforced." [3]

In this report, we show that the Commission's analysis is not only biased, but also fundamentally flawed. To illustrate the biased and flawed analysis the Commission relies on, we review a key hypothesis advanced by the Commission to support the case for weaker copyright law: that digital technologies have had significant positive effects on copyright industries, enhancing the incentive to invest in creativity, and implying that copyright protection can be weakened commensurately, without harm to the Australian community in the future.

This hypothesis can be described as a "peak" hypothesis that assumes developments in digital technologies since the beginning of the new millennium have enabled a new "peak" in creative industries reliant on copyright. The Commission demonstrates its bias, however, by:

- Emphasizing the positive impacts of digital technologies on copyright industries, without also adequately acknowledging the negative impacts of digital piracy; and
- Failing to adequately review relevant Australian Bureau of Statistics (ABS) national statistical data in any depth to test its peak hypothesis, or address the empirical question as to whether the negative impacts of digital piracy outweigh the positive impacts of digital technologies.

In this paper, we seek to test the Productivity Commission's peak hypothesis by analysing data on trends in economic contribution (value add),[4] employment, and investment in the creative sector reliant on copyright, using reliable data collected for this purpose by the Australian Bureau of Statistics (ABS), including Australian National Accounts statistics. The evidence refutes the Commission's hypothesis that digital technologies have facilitated a dramatic increase in fortunes for the creative sector reliant on copyright. To the contrary, analysis of this data shows that:

- Copyright industries' value add growth in Australia failed to keep up with economy-wide growth, amounting to a nearly $170 billion cumulative shortfall in value add for core copyright industries between 2000 and 2014; the estimated shortfall is even higher, $332 billion, when compared against earlier copyright industry value add growth rates;
- Copyright industries' employment growth in Australia also failed to maintain pre-2000 levels, resulting in a shortfall of around 260,000 industry jobs by 2011;

[1] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report December 2016 p2
[2] ibid p31 Finding 4.1
[3] ibid p73
[4] Value add is the value of gross outputs of a particular industry less the value of inputs from other industries. The sum of all industries' value add is the nation's gross domestic product (GDP). Thus, looking at the value add of copyright industries provides a measure of copyright industries contribution to GDP.

- The estimated shortfall in Film and Video Production and Post Production value add compared to GDP growth was $1.5 billion as of 2011-2012, the latest year available, with employment similarly failing to keep pace; and
- Gross fixed capital formation in artistic originals as a percentage of GDP would have been 36% higher had it maintained its 1992-2001 growth rate.

A more balanced analysis of objective data points readily available should thus have yielded more balanced recommendations by the Commission. The data suggests that any weakening of copyright protection as proposed by the Commission risks further reducing incentives to create, and further harming the Australian community over time.

Summary of Report Sections

Copyright Industries
In the first major empirical section of this report, we test the Commission's "peak" hypothesis using ABS National Accounts data and the standardised global framework for measuring copyright industries developed by the World Intellectual Property Organization (WIPO). We test the Commission's hypothesis by comparing growth in value add, employment and investment in copyright industries post 2000, when the spread of broadband internet begins in Australia, with two counterfactuals: (1) economy-wide GDP growth post 2000, and (2) copyright industry growth pre 2000. We assume that if the Commission's hypothesis that the spread of digital technologies post 2000 had a net positive effect on copyright related industries is true, then growth in value add, employment and investment in copyright industries post 2000 would have exceeded economy-wide GDP growth post 2000, and copyright industry growth pre 2000. The results, however, show the opposite:

a. Value Add: All WIPO-measured copyright industries' value add growth in Australia has slowed post 2000, and has failed to keep up with economy-wide growth in Australian GDP post 2000 quite significantly as follows:
    i. Core copyright industries' (CCI) value add would have been 25% larger, or $277 million more, by 2011-12 had CCI value add growth kept up with economy-wide GDP growth.
    ii. CCI's cumulative shortfall or deficit in value add alone totaled nearly $170 billion by 2014, compared to what it would have been had it maintained the same growth as GDP. This total is around 11% of total GDP in 2014.
    iii. CCI's cumulative shortfall or deficit in value add is even greater if its actual growth on value add is compared to what it would have been had it kept up with the CCI value add trend from 1996-2000. The total cumulative shortfall under this comparison was nearly $332 billion by 2014, a sum equal to around 22% of total 2014 GDP.
    iv. For copyright industries more broadly, including those that have an interdependent, partial or non-dedicated relationship to copyright, their share of GDP fell by 36 % from 2000 onwards, from 9.0% in 2000 to 6.6% by 2011 (the last year available). Even using a five-year average, copyright industries' share of GDP fell by around 20%, from 8.7% average share in the five years prior to 2001, to 7.3% by 2011.

b. Employment: WIPO-measured copyright industries' employment growth in Australia also slowed post-2000 compared with pre-2000 as follows:

i. For CCI, the shortfall in the annual employment by 2011 is around 260,000 jobs compared to what employment would have been if CCI employment growth kept up with its growth from 1996-2000. This implies that employment would have been 43% higher in core CCI in 2011 had pre-2000 growth rates been maintained. Given that CCI employment was 5.4% of total employment in Australia (around 11.3 million) in 2011, this means total employment in Australia would have been 2.3% higher had CCI alone maintained their pre-2000 trend growth rates.
ii. For copyright industries more broadly, including those that have an interdependent, partial or non-dedicated relationship to copyright, from 2000 onwards, copyright industries' share of total employment fell by 23%, from 9.8% in 2000 to 8.0% by 2011. Even using a five-year average, the share fell by around 12%, from an average share of 9.5% in the five years prior to 2001 to an average of 8.5% in the five years prior to 2011.

c. Investment: Gross fixed capital formation in artistic originals as a share of GDP failed to grow as fast after 2000 as it did prior to 2000. The Commission incorrectly identifies this indicator as "the most direct and robust measure of the market value of copyright material"[5] However, the Commission failed to study gross fixed capital formation in artistic originals over time using readily available ABS national statistics in its Inquiry. Contrary to the Commission's hypothesis, the data show that:
    i. Gross fixed capital formation in artistic originals as a share of GDP grew by 300% in the ten years from 1992 to 2001, from 0.04% of GDP to 0.11% of GDP, but failed to grow its share of GDP at all in the period from 2001 to 2006.
    ii. While growth has picked up more recently, it is not as high as it would have been had the 1992-2001 growth rate been maintained.

Film and Video Production and Post Production

In the second major empirical section, in order to test the above results for a specific copyright industry, and exploit a unique ABS survey of the film industry extending back to 1993-94, before the spread of digitization and the internet, we review data from the ABS Film, Television and Digital Games (FTVDG) survey of businesses mainly engaged in film and video production and post-production (FVPP) services. Our detailed review of the evidence from ABS refutes the claims of the Productivity Commission as follows:

a. Value Add: Growth in value add by FVPP services has slowed:
    i. Value add has not experienced rapid growth in the new millennium, and in fact, grew more slowly than the rest of the economy. FVPP services would have been 25% greater by 2011-12, or $277 million more, had FVPP services value add growth kept up with GDP growth.
    ii. The cumulative shortfall or deficit in FVPP services value add was nearly $1.5 billion by 2011 compared to what it would have been had it kept up with GDP growth from 2000.
b. Employment: Employment growth in FVPP services failed to keep up with employment growth maintained in FVPP prior to 2000. In addition it failed to keep up with general employment growth in the economy:

[5] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report December 2016 p105

i. Whereas employment in FVPP grew by 173% in the nine years from 1993-94 to 2002-03, employment in FVPP decreased by 0.4% in the nine years post 2002-03 to 2011-12.
ii. The fall in employment post 2002-03 largely occurred prior to the global financial crises, with employment in FVPP collapsing by 15%, from 2002-03 to 2006-07 and then recovering only slightly from 2006-07 onward, but failing to attain its prior peak.
iii. From 2002-03 to 2011-12 employment in FVPP declined with a compound average growth rate (CAGR) of -0.4%. By comparison economy wide employment grew by 2.2% CAGR.

Conclusion

The above empirical results all refute the Commission's hypothesis that the new millennium has created a peak for copyright industries, even when using their own preferred data measure, gross fixed capital formation in artistic originals. These results in turn undermine the Commission's policy recommendations, calling into question the quality and perhaps the objectivity of the analysis relied on by the Commissioners in charge of the Inquiry. Contrary to the Commission's claims, the data is consistent with the need to move to stronger copyright in Australia to restore the effective rate of copyright protection and stem the loss of value add, employment and investment. More advanced empirical work, of course, is justified, but at this stage an evidence-based approach to policy requires strengthening copyright protections to deter piracy, limit market bypass, and instead enhance the extent of market transactions in copyright, and therefore the total reward and incentive for creativity to the benefit of the Australian community in the future.

1.0 Introduction

The Australian Productivity Commission's recent final report on its "Inquiry into Australia's Intellectual Property Arrangements" ("Inquiry Report") states that*:* "Copyright is broader in scope and longer in duration than needed — innovative firms, universities and schools, and consumers bear the cost."[6]

As a result, the Commission recommends a number of reforms to weaken copyright law. A key reason given by the Commission for the need for reform is that recent developments in digital technologies, are "disrupting both the supply and demand side of the copyright 'coin'..." [7] Indeed, "The speed at which businesses are disrupted has accelerated, underscoring the need for an adaptable copyright system." [8] Although the Commission notes that "Multiple views exist on the direction copyright policy has taken in responding to these challenges" [9] the Commission ultimately reaches the conclusion that copyright should be weakened. This view appears motivated by the idea that digital technologies have had such significant positive effects on copyright industries that there is now more than adequate incentive to invest in creativity, and copyright protection can be weakened commensurately.

In particular, the Commission claims "the cost for creators to produce new works and for intermediaries to bring works to market has declined" [10] and "Consumers have access to a wider array of copyright–protected works than ever before, in a variety of formats, with 24–hour access and purchasing the new norm". [11] The Commission's hypothesis is that these positive effects from digital technologies outweigh any negative effects from digital piracy and justify a commensurate weakening of copyright law.

In this report, we show that the Commission's report and recommendations are fundamentally biased and flawed. Surprisingly, bias is not hard to prove, as the Commission itself explicitly admits it adopts a bias towards weaker copyright law, claiming that:

> "Given the asymmetric nature of how policy can be changed, the Commission considers it is appropriate to 'err on the side of caution' where there is imperfect information, and consciously set weaker parameters in the way that rights are assigned, used or enforced." [12]

To illustrate the flawed analysis the Commission relies on, we review a key hypothesis advanced by the Commission to support the case for weaker copyright law that relates to the net economic effect on copyright reliant industries of recent developments in digital technologies.

Although the Commission proposes a policy bias towards "weaker parameters" for copyright law as a solution in part to "imperfect information" and the lack of "transparent evidence-based analysis", [13] sufficient data has now become available to examine both the impact of the spread of digitisation and the Internet on the creative sector that is dependent on copyright. This paper

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[6] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report December 2016 p2
[7] ibid p108
[8] ibid p109
[9] ibid p108
[10] ibid p108
[11] ibid p108
[12] ibid p73
[13] ibid p103

examines the Commission's hypothesis that the spread of digitisation and the Internet has enabled a peak period for the creative sector using Australian Bureau of Statistics (ABS) National Accounts data to identify whether there was a correlated increase in value add, employment and investment in the creative sector during the time of the spread of digital technologies. The present review suggests that the evidence in Australia is inconsistent with the view that recent developments in digital technologies has facilitated a dramatic increase in economic success of the creative sector dependent on copyright, clearly contradicting the hypothesis set forth by the Commission.

1.1 Outline

In what follows, we use Australian Bureau of Statistics (ABS) national statistics to whether digital technologies have enabled a peak in creative industries reliant on copyright in Australia. This analysis is divided into three sections:

a) First, we identify and review the Productivity Commission's hypothesis that digital technologies have lowered upfront creation costs in the creative sector as well as the "cost of producing, distributing and marketing" creative goods, and its prediction there has been a major economic improvement in the creative sector reliant on copyright, or a "new peak" in the economic performance of the sector.
b) Second, we look at whether in fact there has been an acceleration in the growth of copyright related industries associated with the spread of the internet and digitisation in terms of their economic contribution (value-add)[14], employment and investment. We use the Australian Bureau of Statistics (ABS) National Accounts Statistics data and the World Intellectual Property Organisation (WIPO) methodology for measuring copyright reliant industries.
c) Third, we analyze similar trends focusing more narrowly on the film and television industry using the Australian Bureau of Statistics (ABS) Film, Television and Digital Games Surveys (FTVDG) data of on economic output and employment in businesses engaged in film and video production and post-production services, television broadcasting, television channel provision, and digital game development.

2.0 The Commission's Hypothesis

In the Inquiry Report, the Commission claims that the IP system generally needs to be adaptive and keep pace with technological change, in particular digital technologies: "…including the rise of cloud computing, the growth of the Internet, digitisation…"[15] Later, in a section on "Digital disruptions to the Copyright System," the Commission asserts that:

> *Digital technologies are disrupting both the supply and demand side of the copyright 'coin':*
>
> - *In some cases, the cost for creators to produce new works and for intermediaries to bring works to market has declined…, but cost reductions also threaten to 'disintermediate' many businesses within the copyright value*

[14] Value add measures the economic contribution to GDP of an industry. Value add is the value of gross outputs of a particular industry less the value of inputs from other industries.
[15] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report November 2016 p92

chain by enabling many artists to market and sell their works to consumers directly. The creation and dissemination of copyright material by altruistic providers at low or no cost is greater than ever before.

- *Consumers have access to a wider array of copyright–protected works than ever before, in a variety of formats, with 24–hour access and purchasing the new norm. But such access also enables greater scope for infringement.* [16]

The above statement mainly emphasizes the positive effects of digital technologies, and only briefly and obliquely at the end mentions the negative effect of "enabling greater scope for infringement."[17] As we show below, however, digital technologies enable greater piracy and unauthorized copying, and this has been proven to have enormous negative effects on legitimate markets for creative goods.[18] Rather than exploring the extent of the negative effects of digital piracy further, however, the Commission instead focuses on positive effects of digital technologies.

Thus, although the Commission concludes its section on "Digital disruptions to the Copyright System" by emphasising "the role for Government should be to ensure a …copyright system that *balances* these competing and evolving forces,"[19] it clearly ignores the negative effects of digital piracy. Indeed, it ends the section by citing Pollock (2007) to the effect that there has been too much focus on the negative effects of digital technologies, including the greater scope for infringement, compared to the positive effects of digital technologies.[20]

The Commission's bias, and failure to adequately consider the negative effects of greater piracy and unauthorized copying due to digital technologies is indeed made even clearer in the Inquiry Report in a section entitled "Understanding how infringement impacts the community" where the Commission makes explicit its mistaken view that "determining the extent to which infringement displaces sales and impacts the economy is practically impossible." [21]

This really is a monumental overstatement and error – undermining the logical foundations of Commission's recommendations that copyright be weakened.

In fact, contrary to the Commission's assumption, the academic evidence is clear that increased infringement due to digital technologies have had very large negative effects on sales over time. For example, a recent comprehensive review of academic articles published in reputable journals on the effects of unauthorized digital file sharing on music sales has concluded that the vast majority of these studies all show file sharing caused considerable harm (Liebowitz 2014). These are not industry reports but studies by independent economists.[22] By comparison, there are in fact no articles published in reputable academic journals that find a positive impact of file-sharing on sales. Liebowitz (2014) concluded that the majority of all studies support a conclusion that the decline in sound recording sales can be explained by the growth in digital file-sharing. Moreover,

[16] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report November 2016 p108

[18] See discussion later and literature review and evidence cited in Barker, G. & Maloney, T. (2015)
[19] ibid p109
[20] ibid p109
[21] ibid 556
[22] Thus, ten published articles all show that file sharing reduced sales, these include Hong (2007, 2013), Liebowitz (2006, 2008), Michel (2006), Peitz and Waelbroeck (2004), Rob and Waldfogel (2006), Waldfogel (2010) and Zentner (2005, 2006). Two further unpublished academic papers also found that file sharing reduced music sales (see Blackburn (2004) and Zentner (2009)). See also Smith, M. D. and Telang, R., (2012) for a review of the literature that covers more than music.

on balance, the net harm caused in reduced sales has been enormous. The cumulative decline in revenues in music, for example, since Napster arrived in 1999 has been 62 % in real terms from 2000 to 2013.

The Commission's recommendations that copyright law be weakened are logically flawed due to its failure to adequately consider and acknowledge the scale of the negative effect on sales of copyright protected goods due to the greater infringement of copyright enabled by digital technologies. The Commission's recommendations to weaken copyright quite simply are based on a fundamental factual error, or mistaken assumption that the negative effect of increased infringement due to digital technologies is unknown, but presumably minor, and that therefore copyright does not need to be strengthened to counteract this effect.

The Commission nevertheless acknowledges as a fundamental principle that "IP rights are less important where innovations are difficult to copy *or* only entail minor development costs."[23] According to the above principle endorsed by the Commission, however, given we know it has become easier to copy copyright protected works, copyright has become more important and should be strengthened. Indeed, according to the last phrase in the above principle, the only caveat to the conclusion that copyright should be strengthened would be if copyright protected works now "only entail minor development costs." But there is no evidence presented by the Commission that copyright protected works now "only entail minor development costs."

The Commission, however, does take the view that creation costs have nevertheless fallen due to digital technologies, and that strength of copyright and IP protection in general should be related to changes in creation costs, falling as creation costs fall and rising as they rise, commenting for example that: "the IP system should be adaptable to change…An adaptable system is one that reflects changes in the underlying costs of innovating…"[24]

The Commission thus indicates support for the view that strength of IP protection should reflect the underlying costs of innovating. In the case of copyright, this implies protection should reflect the costs of creating. Indeed, the Commission clearly is of the view that the strength of IP rights like copyright should be directly related to the size of the sunk costs of creative activity; that as the sunk costs of creativity fall, so too should the strength of copyright. Thus the Commission quotes Tabarrok (2002), who comments that: 'it would be remarkable if 20 years were the optimal duration regardless of the size of sunk costs.'[25] While Tabarrok was discussing patent duration, the inclusion of the quotation confirms that the Commission endorses a general hypothesis that optimal strength of IP rights should be directly related to the size of the "sunk costs" associated with creativity or innovation. This implies the Commission's underlying view must be that as the "sunk costs" associated with creativity fall (e.g. because of digital technologies), so too should the strength of copyright protection.

In summary, the Commission's recommendations that copyright protection be reduced are clearly dependent on the Commission claims that digital technologies have lowered the costs of creativity. The Commission clearly claims that "the cost for creators to produce new works and for intermediaries to bring works to market has declined" [26] .. "cost reductions ….enabling many

[23] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report November 2016 p4
[24] ibid p70
[25] ibid p93
[26] ibid 108

artists to market and sell their works to consumers directly."[27] The Commission is then in effect predicting that due to these positive effects of digital technologies reducing creation costs, the creative sector economy has attained a new economic "peak" - what one might call the Commission's "peak" hypothesis – which justifies lower copyright protection. The Commission clearly relies on this "peak" hypothesis to justify major reductions in the strength of copyright law.

Therefore, this paper shall examine the evidence on whether digital technologies have in actuality created a "new peak" in the creative sector. If the Commission is right and digital technologies have lowered the upfront creation costs as well as the "cost of producing, distributing and marketing" creative works, and these have offset the negative effects of increased piracy, then one would have seen a major economic improvement in the creative sector reliant on copyright. One would predict:

i) increased value add in the creative sector reliant on copyright
ii) increased employment; and
iii) increased investment in the creative sector reliant on copyright.

The following sections will use Australian Bureau of Statistics (ABS) national statistics to test the Commission's "peak" hypothesis. More specifically, we will look at whether value add, employment and investment in creative industries reliant on copyright have increased with the spread of digitization and the internet.

As we shall see, the ABS data refutes the Commission's "peak" hypothesis. This undermines the Commission's policy conclusions. The Commission argues copyright protection should weakened commensurately with the net positive effect of digital technologies in reducing costs and therefore increasing returns, and the incentive to invest. If, however, the data shows the opposite, or that the "greater scope for infringement" has had a net negative effect, then presumably copyright should be strengthened.

3.0 Recent Trends in Creative Industries

An important development over the past 13 years that enables analysis of trends in copyright related industries is the development of a standardised global framework for measuring copyright industries and their economic contribution using national statistics by the World Intellectual Property Organization (WIPO) (WIPO 2003).

The WIPO methodology defines copyright related industries as those industries whose primary source of revenue are the reproduction, distribution, publication and sale of copyrighted materials, including film, music, audio and text. The WIPO methodology is outlined in the 2015-revised edition of the WIPO Guide on *Surveying the Economic Contribution of the Copyright-based Industries*.[28] This WIPO methodology:

1) Outlines four groups of copyright industries, identified on the basis of their level of dependence on copyright material that, when combined, form the 'total' copyright industries. These groups are:
    a. core,

[27] ibid p108
[28] http://www.wipo.int/edocs/pubdocs/en/copyright/893/wipo_pub_893.pdf

b. interdependent,
c. partial, and
d. non-dedicated support.

2) It identifies a set of major indicators:
   a. contribution to GDP, as measured copyright industry 'value add'
   b. employment in copyright industries, and
   c. foreign trade in copyright related goods and services.

In this section we will use Australian Bureaus of Statistics (ABS) national statistics data to examine all four industry groups of copyright industries and their contribution over time to

i) Value add: a key measure of an industry's economic contribution. Value added is the value of gross outputs of a particular industry less the value of inputs from other industries. The sum of all industries' value add is the nation's gross domestic product (GDP). Thus, comparing the growth of value add of Australia's copyright industries to that of total GDP provides a measure of the relative performance of the copyright industries over time; and
ii) Employment in creative industries reliant on copyright.

In addition, we shall look at a data series in the ABS national statistics which provides an indication of trends in investment related to creative industries (Gross Fixed Capital Formation in artistic originals). Importantly, we study the trends in the GFCF measure, while the Commission only examined one year of that data.

3.1 Value Add

As noted earlier, value add is the value of gross outputs of a particular industry less the value of inputs from other industries. The sum of all industries' value add is the nation's gross domestic product (GDP). Thus, looking at the value add of copyright industries provides a measure of the contribution of copyright industries to GDP.

If the Commission is right and digital technologies have lowered the upfront costs of creativity, as well as the "cost of producing, distributing and marketing," creative goods, and such positive effects far outweigh any negative effects of digital piracy, then one would predict a major economic improvement in the creative sector reliant on copyright with total value add in the creative sector reliant on copyright growing considerably, to the extent costs fall and value created remains the same.

Two possible outcomes or predictions can be tested to assess whether the growth in value add was any more than "normal" as assumed by the Commission due to digital technologies:

1) Whether growth in value add in the creative sector reliant on copyright has been faster than growth of the general economy or GDP; and
2) Whether there been an acceleration in the growth in value add in copyright reliant industries compared to the past.

3.1.1 Counterfactual One: Copyright Industry Value Add Growth Compared to GDP

The first measure we shall use to assess how value add in copyright reliant industries fared compared to the general economy is the share of copyright industries in GDP. If copyright reliant industries benefited more than other industries from digital technologies then their share of GDP

might be predicted to increase.

Using WIPO methodology for measuring copyright related industries, Figure 1 below presents data on copyright industries share of GDP. The data is taken directly from the PWC (2012) report on the WIPO website, which applied the WIPO methodology to ABS National Statistics data. This data shows that from 2000 onwards (following the arrival of Napster in 1999 - the first major illegal downloading service), copyright industries value add, presented as a percentage of GDP, failed to keep up with the rate of growth of GDP in Australia. As a result, copyright reliant industries' share of GDP fell post 2000. Prior to 2000, copyright industry value add was growing faster than GDP, so that a share of GDP copyright industries peaked at 9.0% in 2000. From 2000 onwards, however, copyright industries' share of GDP fell by 36 % from 9.0% in 2000 to 6.6% by 2011.

Figure 1
Value add of copyright industries as a percentage of Gross Domestic Product (%)

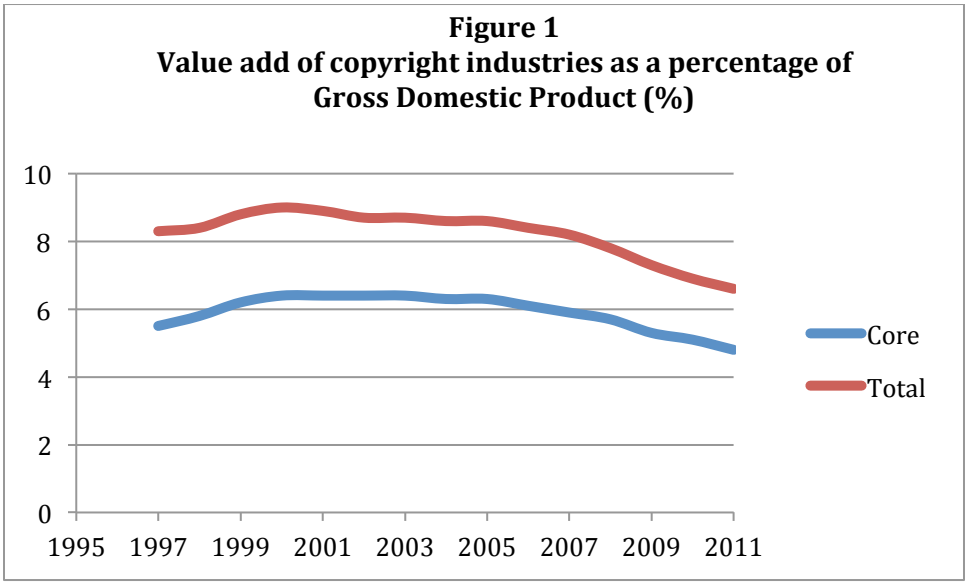


Table 1 below presents the data underlying the above graph.

Table 1 Value add of copyright industries as a percentage of gross domestic product (%)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	Core	Interdependent	Partial	Non-Dedicated	Total	Total 5 Year Average
1997	5.5	1.8	0.3	0.7	8.3	
1998	5.8	1.7	0.3	0.7	8.4	
1999	6.2	1.6	0.3	0.7	8.8	
2000	6.4	1.6	0.3	0.7	9.0	
2001	6.4	1.5	0.3	0.7	8.9	8.7
2002	6.4	1.4	0.3	0.6	8.7	
2003	6.4	1.4	0.3	0.6	8.7	
2004	6.3	1.3	0.3	0.6	8.6	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
YEAR	Core	Interdependent	Partial	Non-Dedicated	Total	Total 5 Year Average
2005	6.3	1.3	0.3	0.7	8.6	
2006	6.1	1.3	0.3	0.6	8.4	
2007	5.9	1.3	0.3	0.6	8.2	
2008	5.7	1.2	0.3	0.6	7.8	
2009	5.3	1.1	0.3	0.5	7.3	
2010	5.1	1.0	0.3	0.5	6.9	
2011	4.8	1.0	0.3	0.5	6.6	7.4

The data reveals that copyright industries' share of GDP shrank for all WIPO definitions of copyright related industries, except for the small industry category "partial", which just maintained its small 0.3% share of GDP. As a result the last column in the above table reveals that using a five-year average, total copyright related industries' share of GDP fell by around 18%, from an average share of 8.7% in the five years prior to 2001, to 7.4% by 2011.

This data in the above graph and table is also consistent with the hypothesis that the negative impact of piracy started as early as 2000. Thus in 2000, total copyright industries' share of GDP peaked at 9%, and core copyright industries at 6.4%. The share of core copyrighted industries then remained constant until 2004, and then declined more rapidly.

The fall observed in copyright industries' share of GDP indicates that copyright industry value add growth has failed to keep up with growth in GDP post 2000, Moreover, the extent to which copyright industries' value add growth failed to match normal economic growth in the economy was quite large, with significant consequences for the Australian economy. In what follows, we seek to measure the implied deficit or shortfall in value add in actual copyright industries, compared to what might have been if it had continued to grow at the same rate as the underlying economy, which seems a reasonable counterfactual rate or standard to use.

The Commission, however, suggests that estimates of total copyright industries' share of GDP at around 7% identified in the last few years in the second to last column of the above table may overstate the role of copyright industries in the economy commenting:

> *While a range of other estimates have been advanced, many are overstated ….For example, some value the contribution of the copyright industries at more than seven per cent of gross domestic product per year.*[29]

In what follows we shall focus only on core copyright industries shown in the second column of the above table, in order to avoid the Commission's concerns with the broadest WIPO measure of copyright industries.

Continuing our focus on growth trends compared to GDP, in Table 2 below, column 2 presents

[29] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report November 2016 p106

data on value add in 2011 prices for core copyright industries only. Table 2 uses the year 2000 as the turning point, as this is when the effect of the spread of the Internet and digital technologies is predicted to appear, and, is also year when the share of copyright industries value add in total GDP peaked, as shown in Table 1. We thus impose a break in Table 2 with an empty row after 1999, and conduct our analysis below separately for the pre- and post- 2000 period. In column 3 of Table 2, we then present data on actual GDP figures in 2011 prices for purposes of comparison. In column 4 of Table 2, we present an index of this GDP series based on two different baselines:

- a baseline of 100 in the year 1996, and
- a baseline of 100 in 2000.

It is worth identifying for later purposes that the timing and effect of the global financial crises (GFC) on Australian GDP is evident in column 4 of Table 2, with the GDP Index falling by 1% from 2008 to 2009. The onset of the GFC is usually dated following the collapse of major financial institutions including Lehman Brothers in late 2008.

Column 5 next presents the annual "counterfactual" measure, or what the value add of core copyright industries would have been in each year if it had kept up with the growth of GDP initially during the period from 1996-1999 – and then separately from 2000. Column 6 then identifies the implied annual difference between the annual value add of core copyright industries (column 2), and what that value add might have been had it kept up with GDP growth (column 5). It is clear from column 6 that copyright industries were already falling behind general economic growth in the economy prior to the GFC impact from 2008-09, and that this growth deficit in column 6 continued to grow unabated during and after the GFC. The final column, column 7, identifies the cumulative difference, or sum of the differences between the estimated value add of core copyright industries (column 2) and what that value add might have been had it kept up with GDP growth index (column 4).

The data in Table 2 suggests that:

- For the four years 1996 to 1999 inclusive, core copyright industry (CCI) value add shown in column (2) grew faster than GDP. Column (6) thus shows the difference between actual CCI value add (from column 2) and what CCI value add would have increased if it had grown in line with GDP (from Column 5). Thus as shown in column 6 by 1999 the actual value add of core copyright industries was $7.5 billion higher than it would have been had core copyright industries grown as slow as GDP growth generally (column 2- column 5)
- For the period after 2000-2014 however core copyright industry growth slowed compared to GDP growth. Thus as shown in column 6 in every year actual value add of core copyright industries was lower than it would have been had core copyright industries grown as fast as GDP growth generally
- As shown in the last row of column 7 by 2014 the cumulative shortfall in the value add of core copyright industries was around $172 billion compared to what the value add in core copyright industries would have been had growth kept up with GDP growth during the period.

Table 2 Value Gap - Core copyright industries' Value Add: Compared to GDP Growth ($2011, $million)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Core Copyright Industry (CCI)[30]	GDP 2011 Prices	GDP Index	Counterfactual – CCI if it had grown at GDP Growth Rate	Annual Difference (2) – (5)	Cumulative Difference (2) - (5)
1996	43,174	811,054	100			
1997	46,398	857,716	106	45,657	741	741
1998	50,722	890,733	110	47,415	3,307	4,048
1999	56,627	922,067	114	49,083	7,544	11,592
2000	59,272	937,067	100	59,272	-	-
2001	60,122	965,614	103	61,078	-956	-956
2002	61,998	1,005,478	107	63,599	-1,601	-2,557
2003	63,991	1,041,875	111	65,901	-1,910	-4,467
2004	66,602	1,094,373	117	69,222	-2,620	-7,087
2005	69,590	1,147,797	122	72,601	-3,011	-10,099
2006	70,239	1,198,588	128	75,814	-5,575	-15,673
2007	72,486	1,270,479	136	80,361	-7,875	-23,549
2008	72,093	1,337,282	143	84,587	-12,494	-36,042
2009	70,371	1,334,073	142	84,384	-14,013	-50,055
2010	67,740	1,402,623	150	88,720	-20,980	-71,035
2011	67,575	1,460,339	156	92,370	-24,795	-95,830
2012	68,740*	1,475,979	158	93,360	-24,620	-120,450
2013	68,708*	1,484,310	158	93,887	-25,179	-145,629
2014	68,890*	1,500,706	160	94,924	-26,034	-171,663

The above results suggest that if one tests the Commission's hypothesis by examining whether the growth of value add of core copyright industries exceeded GDP growth, the data is inconsistent with the hypothesis. The analysis presented in Table 2, column 7, instead shows core copyright industries grew slower than GDP, and highlights the cumulative shortfall in core copyright industries value add totals nearly $170 billion by 2014 compared to what it would have been had it kept up with GDP growth - this is around 11% of total GDP in 2014.

To test whether the above results were statistically significant, we compared changes in an index of value add for core copyright industries (using data in column 2) with the trend change in the GDP index in column 4 estimated using the method of least squares. This showed that the change in the index of value add for CCI was initially above the 95% confidence interval for trend in the

[30] The value add of core copyright industries for the years 2000-2011 is taken directly from the PWC 2012 which used ABS National Statistics, national statistics release as it provided data that extended furthest back and over the longest period of time on a consistent basis. The value add of core copyright industries from 2012 to 2014 is then estimated using the growth rate for core copyright industries taken from the PWC (2015) which again used ABS national statistics release, but only included data extending back to 2006. The value add of core copyright industries from 1996 is then estimated using data from the PWC (2011) which again used ABS national statistics release, but only included data from 1995/96 to 2006/07.

GDP index, and then below trend in the GDP index, suggesting the differences observed are statistically significant.

Table 3 below presents a further test using data at three yearly intervals, which seeks to compare the average and standard deviation of the growth rate of GDP, with the average growth rate of core copyright industries, to see if the latter falls within two standard deviations of the average three year GDP growth rate of GDP over time. Column 2 in the table presents the average growth rate of GDP over the prior three-years, at the three-year intervals, while column 3 presents the standard deviation of the growth rate of GDP over the prior three-years. In column 4, there are then two sub-columns:

- in the left sub-column we estimate a *lower boundary* for the three-year average GDP growth rate by taking the average growth rate from column 2, and *deducting* two times the standard deviation in column 4; and
- in the right sub-column we estimate an *upper boundary* for the three-year average GDP growth rate by taking the average growth rate from column 2, and *adding* two times the standard deviation in column 4.

Table 3 Comparison of Core copyright industries' Value Add and GDP Growth ($2011, $million)

(1)	(2)	(3)	(4)		(5)
Year	Average GDP Growth Rate Prior 3 Years	Standard Deviation GDP Growth Rate Prior 3 years	Average Growth Rate GDP (2) less/plus 2 times Standard Deviation (3)		Average Growth Rate Core Copyright Industries Prior Three years
			Lower	Upper	
1999	4.4%	1.2%	2.0%	6.8%	9.5%
2002	2.9%	1.3%	0.4%	5.4%	3.1%
2005	4.5%	0.8%	3.0%	6.1%	3.9%
2008	5.2%	0.8%	3.7%	6.8%	1.2%
2011	3.0%	2.9%	-2.7%	8.7%	-2.1%
2014	0.9%	0.3%	0.3%	1.5%	0.6%

Finally in column 5, we present the average three-year growth rate for CCI at three yearly intervals. As shown in the table, if one compares column 5 with column 4, the CCI growth rate in column 5 during the three years prior to 1999 *exceeded the upper boundary* of the GDP growth rate in column 4 prior to 1999 – or was more than 2 standard deviations above the average GDP growth rate over the same period prior to the spread of the digitisation and the internet. As shown in column 5, however, in the three year intervals after 1999, the CCI average growth rate then falls relative to the upper and lower boundaries of the GDP growth rates shown in column 4. At first, the three year average growth rate of CCI falls to be within the upper and lower boundary range of the GDP growth rate, or to within the two standard deviations range of the GDP growth rate in 2002 and 2005. After 2005, the CCI three year average growth rate then continues to fall and goes *below the lower boundary* of the GDP growth rate - or is more than 2 standard deviations below the average GDP growth rate in 2008 and 2011. In 2014, the CCI three year average growth rate was just within the *lower* boundary of the average GDP growth rate.

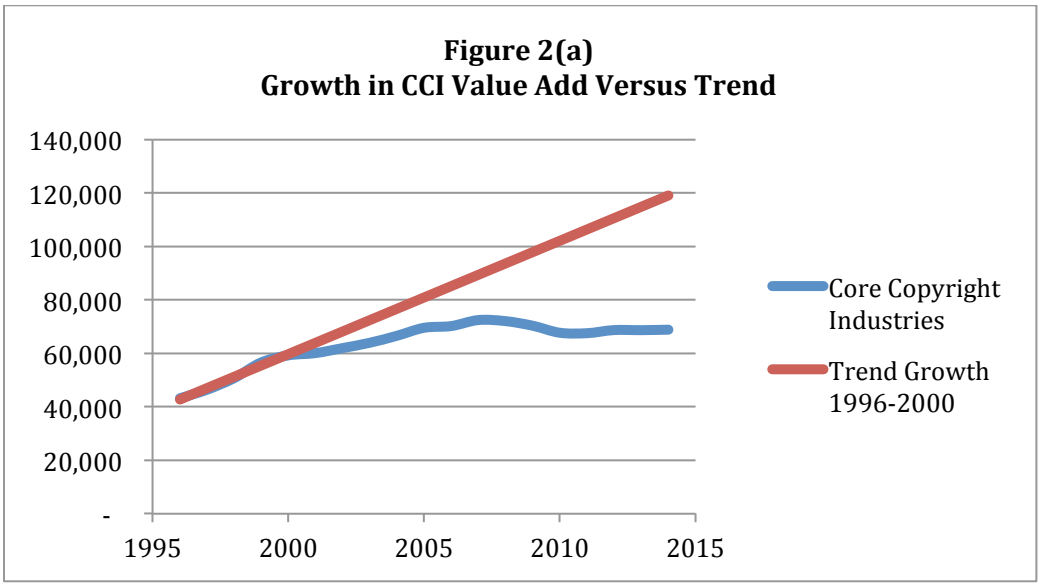
The analysis in Table 3 suggests that the growth rate of CCI fell to be significantly below the

growth rate of GDP post 2000. This further confirms that ABS national statistics data on value add does not appear consistent with the Commission's hypothesis. Had it checked, the Commission would have seen that ABS national statistics data seems inconsistent with its peak hypothesis.

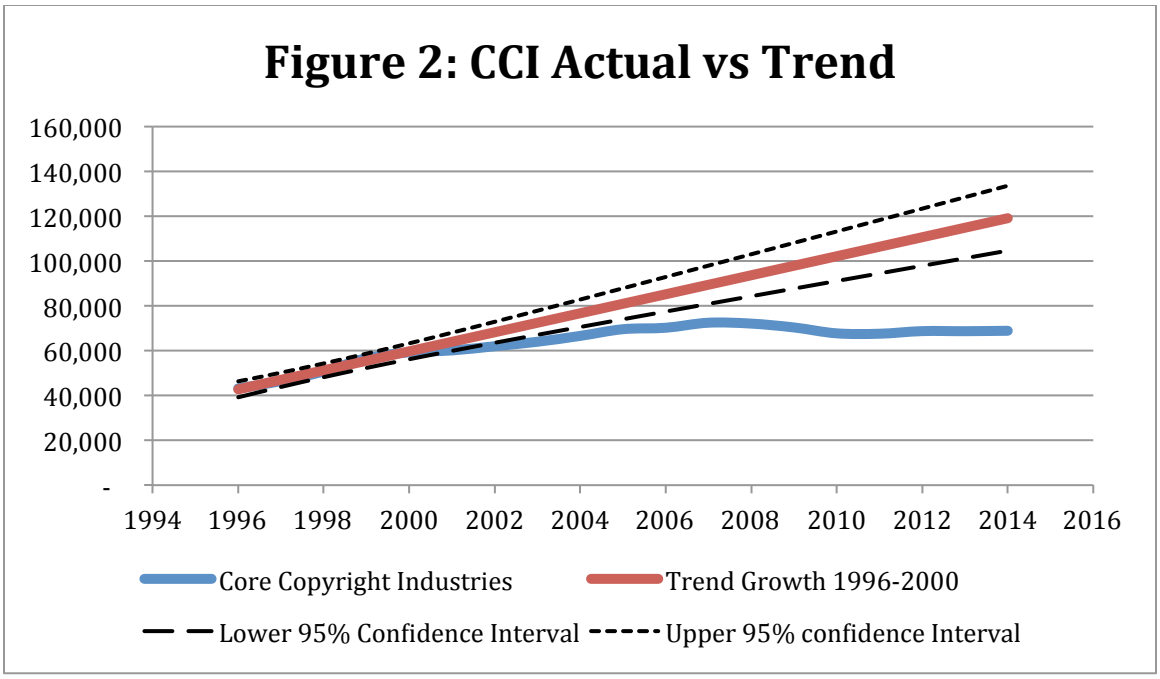
3.1.2 Counterfactual Two: Value Add Compared to 1990s Trend

In order to further test the claims of a post 2000 creative content peak, in this section we use an alternative counterfactual or benchmark. Once again, we use *only* core copyright industries (CCI), but this time test whether growth in CCI value add was greater than its trend prior to 2000 as a counterfactual. To estimate the pre-2000 trend in CCI value we use the method of least squares to fit a *straight line* to the pre 2000 annual CCI value add data. Figure 2(a) shows the result. If the Commission's claims about the spread of the Internet and digitisation are correct, then one might have expected CCI value add after 2000 to have risen above its pre-2000 trend line. As can be seen in figure 2 (a) this clearly did not happen.

Figure 2(a)
Growth in CCI Value Add Versus Trend



To test whether the above results were statistically significant, in the figure 2(b) below we fit a 95% confidence interval to the trend line to compare changes the value add for core copyright industries from 1996 to 2014 with the trend change in value add for core copyright industries from 1996-2000 estimated using the method of least squares and show that core copyright industry (CCI) post 2000 fell below the lower 95% confidence interval for the 1996-200 trend growth in value add of CCI from 1996-2000, suggesting the differences observed post 2000 are statistically significant.



In Table 4 below we present the data underlying the above graphs. In column 2, Table 4, we present actual data on CCI value add from 2001 to 2014 measured in 2011 dollars. In column 3, Table 4, the data presented is the "counterfactual" data on what CCI value add would have been had it continued to grow post 2000 in line with the trend in CCI value add from 1996-2000, assuming the positive effect of the spread of the internet and digital technologies should show up in a higher trend post 2000. The fourth column identifies the implied annual difference, again involving a shortfall, or deficit between the annual actual value add of core copyright industries (column 2), and what that value add might have been had it kept up with the trend in CCI value add from 1996-2000 (column 3). The final column, column 5, in Table 4 identifies the cumulative deficit, or sum of the differences between the estimated value add of core copyright industries (column 2) and what that value add might have been had it kept up with the trend in CCI value from 1996-2000 (column 3). As shown in the last row of column 5, this analysis suggests a cumulative shortfall in the value add of CCI by 2014 of around 332 billion compared to the value add had CCI growth kept up with the trend in CCI value from 1996-2000.

Table 4 Value Gap - Core copyright industries: Compared to Trend Growth ($2011, $million)

(1)	(2)	(3)	(4)	(5)
	Core Copyright Industries[31]	Counterfactual Trend Growth 1996-2000	Annual Shortfall Deficit	Cumulative Shortfall Deficit
1996	43,174	42,753	420	420
1997	46,398	46,996	-598	-178
1998	50,722	51,239	-517	-694
1999	56,627	55,481	1,146	452

[31] This is the same data as earlier. See footnote 13 for details.

2000	59,272	59,724	-452	-0
2001	60,122	63,966	-3,844	-3,844
2002	61,998	68,209	-6,211	-10,055
2003	63,991	72,451	-8,460	-18,516
2004	66,602	76,694	-10,092	-28,608
2005	69,590	80,937	-11,347	-39,954
2006	70,239	85,179	-14,940	-54,894
2007	72,486	89,422	-16,936	-71,830
2008	72,093	93,664	-21,571	-93,402
2009	70,371	97,907	-27,536	-120,938
2010	67,740	102,150	-34,410	-155,347
2011	67,575	106,392	-38,817	-194,164
2012	68,740	110,635	-41,895	-236,059
2013	68,708	114,877	-46,170	-282,229
2014	68,890	119,120	-50,230	-332,459

The above result indicates that the data does not support the Commission's hypothesis. The growth of value add of copyright industries post 2000 did not exceed the trend in CCI value add from 1996-2000. The analysis presented in Table 4, column 5, in the last row thus highlights the cumulative shortfall or deficit in core copyright industries (CCI) value add compared to what it would have been had it kept up with the trend in CCI value add from 1996-2000, totals nearly $332 billion by 2014, this is around 22% of total GDP in 2014.

3.2 Employment

Using WIPO methodology for measuring copyright related industries, Figure 3 below presents data on copyright industries share of employment. The data is taken directly from the PWC (2012) report on the WIPO website, which applied the WIPO methodology to ABS National Statistics data. It shows that from 2000 onwards, copyright industries employment failed to keep up with the rate of growth of employment in the general economy. Prior to 2000, copyright industry employment was growing faster than the overall employment growth rate, so that employment in copyright industries as a share of total employment peaked at 9.80% in 2000. From 2000 onwards, however, copyright industries' share of total employment fell steadily by 23%, from 9.8% in 2000 to 8.0% by 2011.

Figure 3:
Employment in copyright industries as a percentage of employed persons (%)

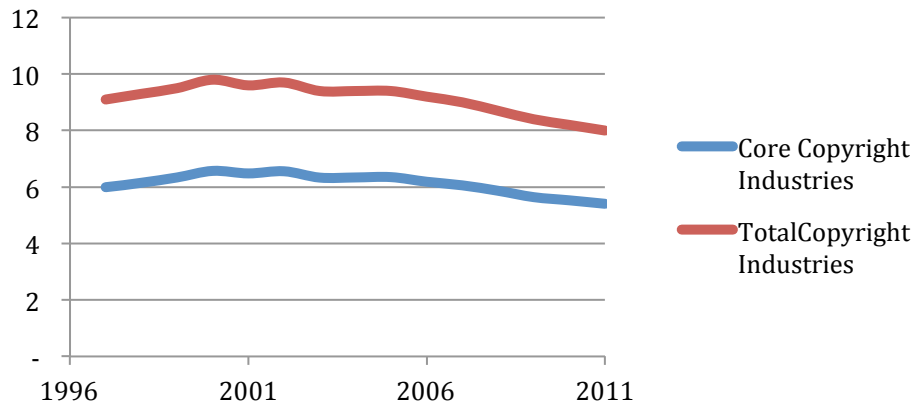


Table 5 below presents the data underlying the above graph. As shown in the last column even using a five-year average, total copyright industries' employment as a percentage of total employment fell by around 11%, falling from an average share of around 9.5% in the five years prior to 2001 to an average of around 8.5% in the five years prior to 2011.

Table 5: Employment in copyright industries as a percentage of total employed persons (%)

Year	Core	Interdependent	Partial	Non-dedicated	Total	Total 5 Year Average
1997	5.98	1.54	0.57	1.00	9.10	
1998	6.15	1.54	0.59	1.02	9.30	
1999	6.34	1.50	0.61	1.05	9.50	
2000	6.57	1.53	0.61	1.09	9.80	
2001	6.48	1.51	0.58	1.03	9.60	9.46
2002	6.56	1.50	0.59	1.05	9.70	
2003	6.33	1.48	0.59	1.00	9.40	
2004	6.34	1.47	0.58	1.01	9.40	
2005	6.35	1.45	0.59	1.01	9.40	
2006	6.19	1.46	0.59	0.96	9.20	
2007	6.06	1.42	0.58	0.94	9.00	
2008	5.87	1.37	0.57	0.89	8.70	
2009	5.64	1.33	0.57	0.85	8.40	
2010	5.53	1.28	0.57	0.81	8.20	
2011	5.41	1.25	0.57	0.78	8.00	8.46

Table 6 below examines employment in *only* core copyright industries (CCI), and tries to measure the shortfall in employment once again post 2000. For this purpose, we use the trend in employment in CCI prior to 2000 as a counterfactual. If the Commission's hypothesis about the spread of the internet and digitisation post 2000 were true, then one might have expected the trend in CCI employment to increase. In column 2 of Table 6, actual data on CCI employment

from 2001 to 2011 is presented. In column 3 of Table 6, we then present "counterfactual" data on what CCI employment would have been had it continued to grow post 2000 in line with the trend in CCI employment from 1997-2000, assuming the effect of the spread of the internet and digital technologies should show up in higher trend growth post 2000.

In column 4 of Table 6, we identify the implied annual difference, again involving a shortfall, or deficit between the annual actual employment in CCI (column 2), and what employment might have been had it kept up with the trend growth rate in CCI employment from 1996-2000 (column 3). As shown in the last row of column 3, this analysis suggests the shortfall in the annual employment in core copyright industries by 2011 of around 260,000 compared to the employment that would have been obtained had CCI employment growth kept up with trend growth rate in CCI employment from 1996-2000. This implies employment would have been 43% higher in CCI in 2011 had pre-2000 growth rates been maintained. Given CCI employment was 5.4% of total employment in Australia, as shown in the table above, this means total employment in Australia would have been 2.3% higher. – (i.e. 43% of 5.4% higher).

Table 6: Employment: Core copyright industries as Compared to Trend Growth

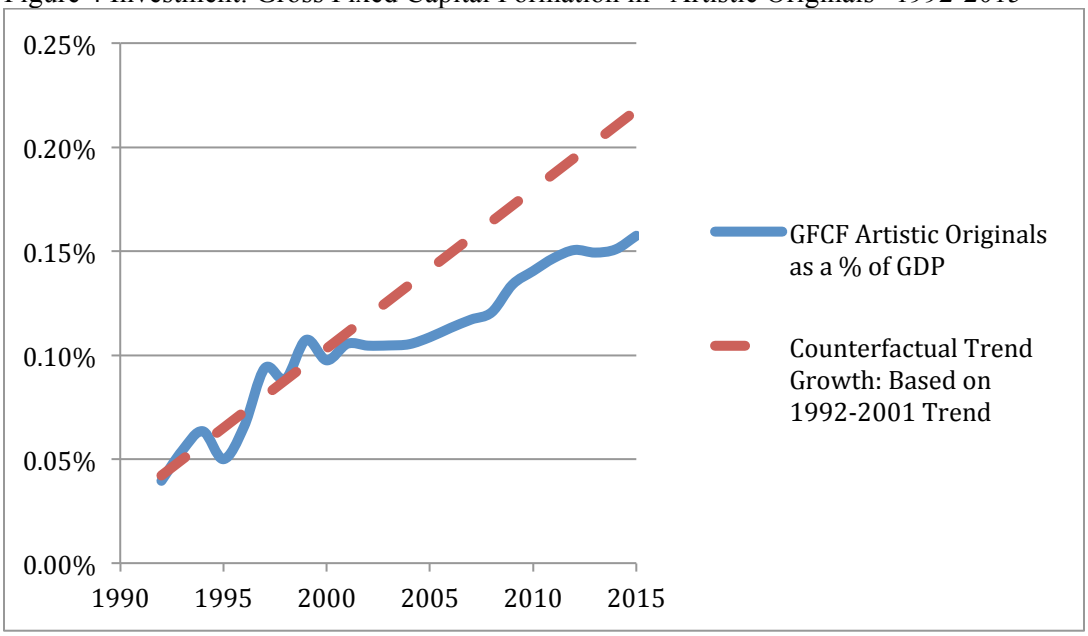
(1)	(2)	(3)	(4)
	Core Copyright Industries	1996-2000 Trend Prediction	Annual Shortfall Deficit
1997	498,744	496,987	1,757
1998	522,720	523,921	-1,201
1999	547,988	550,855	-2,867
2000	580,101	577,789	2,312
2001	589,155	604,723	-15,568
2002	599,863	631,657	-31,794
2003	595,582	658,591	-63,009
2004	605,195	685,525	-80,330
2005	622,599	712,459	-89,860
2006	626,533	739,393	-112,860
2007	629,593	766,326	-136,733
2008	632,831	793,260	-160,429
2009	616,919	820,194	-203,275
2010	612,995	847,128	-234,133
2011	612,664	874,062	-261,398

The above result indicates that the employment data is inconsistent with the Commission's hypothesis. The Commission's hypothesis tends to predict that growth in employment in copyright industries post 2000 would have exceeded the trend in CCI employment from 1996-2000. The analysis presented in the Tables above however suggests the opposite. Growth in employment in copyright industries post 2000 was below the trend in CCI employment from 1996-2000. Indeed employment in core copyright industries would have been 43% higher in 2011 had pre-2000 growth rates been maintained. This means *total* employment in Australia would have been 2.3% higher, given CCI employment was 5.4% of total employment in Australia, as shown in the table above (i.e. 2.3% = 43% of 5.4%).

3.3 Investment - Gross Fixed Capital Formation in Artistic Originals

Turning to investment measures, here we focus on gross fixed capital formation (GFCF) in artistic originals across the whole Australian economy. Figure 4 below presents data on gross fixed capital formation in artistic originals as a percentage of GDP. GFCF varies over time but grows faster from 1992-2001. The dashed straight line in figure 3 identifies the predicted trend growth rate in GFCF in artistic originals from 1992 to 2001. As shown, growth in GFCF in artistic originals as a percentage of GDP slows from around 2001, and would have been considerably greater today if growth rates had continued at the earlier trend from 1992-2002.

Figure 4 Investment: Gross Fixed Capital Formation in "Artistic Originals" 1992-2015



In Table 7 below, column 2 presents the actual data on gross fixed capital formation in artistic originals as a percentage of GDP underlying Figure 4. Column 3 further presents the counterfactual used in Figure 4, projecting what this percentage would have been if it had continued to grow post 2001 at the same rate as it had grown in the ten years from 1992-2000. Contrary to the Commission's hypothesis, the data show that

i. Gross fixed capital formation in artistic originals as a share of GDP grew by 300% in the ten years from 1992 to 2001, from 0.04% of GDP to 0.11% of GDP, but failed to grow its share of GDP at all in the period from 2001 to 2006.
ii. While growth has picked up more recently, it is not as high as it would have been had the 1992-2001 growth rate been maintained. As shown in the last row of Column 3 of Table 7, by 2015, GFCF in artistic originals as a percentage of GDP would have been 36% higher, or 22% of GDP, rather than the realized 16% cited by the Commission, had it continued to grow at its 1992-2001 trend growth rate post 2001.

Table 7 Investment: Gross Fixed Capital Formation in "Artistic Originals" 1992-2015

(1)	(2)	(3)
	Gross fixed capital formation: Artistic originals All Industries Current prices AS % OF GDP	Counterfactual Trend Growth 1992-2001
1992	0.04%	0.04%
1993	0.05%	0.05%
1994	0.06%	0.06%
1995	0.05%	0.07%
1996	0.07%	0.07%
1997	0.09%	0.08%
1998	0.09%	0.09%
1999	0.11%	0.10%
2000	0.10%	0.10%
2001	0.11%	0.11%
2002	0.10%	0.12%
2003	0.10%	0.13%
2004	0.11%	0.13%
2005	0.11%	0.14%
2006	0.11%	0.15%
2007	0.12%	0.16%
2008	0.12%	0.16%
2009	0.13%	0.17%
2010	0.14%	0.18%
2011	0.15%	0.19%
2012	0.15%	0.19%
2013	0.15%	0.20%
2014	0.15%	0.21%
2015	0.16%	0.22%

It is worthwhile noting in relation to the above data that the Productivity Commission claims that "The most direct and robust measure of the market value of copyright material for Australia is the amount spent creating it." The PC then states that "Australia capital expenditure on 'artistic originals' (the category of goods covered by copyright)" is the correct measure. [32]

The capital expenditure (CE) on 'artistic originals' (AO) referred to by the Commission is in fact the same measure as that presented above but described by the ABS as Gross Fixed Capital Formation (GFCF) in Artistic Originals (AO).

The Commission is wrong to describe GFCF on 'artistic originals" as the "most direct measure of the market value of copyright material for Australia". The use of this measure indicates some confusion on the part of the Commission, as GFCF on AO is **not** a direct measure of the market

[32] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report December 2016 p105

value of copyright at all, but rather a measure of investment, and therefore, of inputs. Gross fixed capital formation in artistic originals, does not accurately measure the market value of the ultimate product covered by copyright, even though it may relate to it. Instead, the value add measures discussed above are a better direct measure of the market value of copyright goods and services for Australia.

Moreover, not only is the Commission's focus misplaced in terms of its unit of measure, it also does not look at *trends* in its preferred measure. If the Commission believed the advent and spread of the internet and digital technologies had created a peak in creative output, it should have looked at trends in gross fixed capital formation in artistic originals. Instead, the Commission only identifies GFCE on 'artistic originals' for one year.[33]

As we have shown above, if the Commission had looked at trends in its preferred measure, namely gross fixed capital formation (GFCF) in artistic originals (AO) it would have found, that GFCF in AO would have been considerable higher in 2015 if it had continued to grow at the trend it attained from 1992-2001.

Rather than testing its hypothesis that the advent and spread of the internet and digital technologies had created a peak in creative output by looking at trends, the Commission's estimate of gross fixed capital formation in artistic originals share of GDP in 2015 at "about 0.16 per cent" seems instead to simply be an attempt to downplay the significance of copyright industries generally, or make a pointed criticism of what it claims are "inflated estimates" of copyright's share of GDP.[34] Although the Commission is not explicit about what measure is being criticised, as noted earlier the cited 7% share appears to accord with the share of GDP of the broadest WIPO measure of copyright related industries identified in the last row of Table 1 column 6. This measure averaged 7% from 2008 as shown in the last row of column 6 of Table 1. Without being specific, the Commission comments generally about this broad WIPO measure of copyright related industries:

> "Such valuations capture more than the value of copyright material, and include the costs of labour and other capital in activities such as advertising, distribution and collecting royalties." [35]

The obvious problem with this is that the Commission's measure of copyright GCFE *also* includes the costs of labour and other capital that are involved in other activities. The economy is ultimately interconnected. The question therefore for all measures is what costs of labour and capital are relevant to measuring copyright? Why would they only include capital expenditure or inputs required to support GFCF in AO as claimed by the Commission? It really depends on what one is trying to measure.

The Commission rightly suggests the need to correctly measure "the value of copyright material". The Commission, however, fails to acknowledge that the WIPO methodology does this by measuring value add - or the value of *gross outputs of a particular industry* less the value of *inputs from other industries*. WIPO thus explicitly seeks to avoid the error of including inputs in the measure of value that are best attributed to other industries. We are left with the question of

[33] ibid p105
[34] ibid p 106
[35] Australian Productivity Commission Inquiry Intellectual Property Arrangements Final Report December 2016 p 106

how to define an industry, and its relevant outputs and inputs, in order to measure value add.

The place to start is by defining the output that is the source of the value being measured. In the case of copyright, the output is quite simply something that is newly invented or created. Copyright covers new or original expressions of an idea (but not the idea itself). Value from this new output then arises only when the output is delivered to consumers who want to consume them. There is no existing industry category in the national accounts covering "delivered" new or original expressions of an idea protected by copyright. Moreover, delivering new or original expressions of an idea occur in areas other than "artistic originals", and further requires more than simply investment, or GFCF, to be delivered to consumers. In order to properly assess the role of copyright we need therefore to clearly identify value add data from those industries heavily reliant on the value created by new or original expressions of an idea – and therefore copyright. This is what the WIPO methodology does and the data we have analysed is based on an application of the WIPO methodology.

In conclusion, the Commission's claim that the most direct measure of the market value of copyright material for Australia is the gross fixed capital expenditure on 'artistic originals' is incorrect. At best, it measures investment in an activity related to copyright. In any event, gross fixed capital expenditure on 'artistic originals' share of GDP failed to grow as fast post 2001 as it did prior to 2001, suggesting that the Commission's hypothesis that growth in creative output accelerated after the advent and spread of the internet and digital technologies from 2001 is unsupported, even using what it claims (albeit incorrectly) is the most direct measure of the market value of copyright material.

4.0 Impact on the Australian Film Industry

Since 1993-94, the Australian Bureau of Statistics (ABS) has collected and released detailed data on film and video production in six financial years, 2011–12, 2006–07, 2002–03, 1999–2000, 1996–97 and 1993–94. This provides us with a consistent data series for a key industry dependent on copyright going back to before the spread of digitization and the internet, and is worth exploring further. As ABS itself notes: "Comparisons with results from earlier surveys are useful as an indication of the extent and direction of change over time."[36]

In this section we shall therefore we look at the following data:

- Industry value add from 1999-2000: Data on value-add in the film and video production industry has been collected since the 1999-2000 survey.
- Employment from 1993-94: Data on employment in the Film and Video Production industry has been collected in the all six surveys.

The data released by the ABS is collected through the Film and Video Production and Post-Production (FVPP) survey involving an ABS survey of businesses mainly engaged in film and video production and post-production services, which includes all employing and significant non-employing businesses classified on the ABS Business Register to the following classes of the Australian and New Zealand Industrial Classification 2006 edition (ANZSIC):

- ANZSIC class 5511 Motion Picture and Video Production, and

[36] ABS Film, Television and Digital Games 8679.0, 2002-03. p16

- ANZSIC class 5514 Post-Production Services and Other Motion Picture and Video Production Activities.[37]

The period covered by the data collection is generally 12 months with an ending date of 30 June. Although financial estimates relate to the full 12 months, employment estimates relate to the last pay period ending in June of the given year. The 2011–12 financial year collection was funded by Screen Australia.

Over time the ABS has also collected data on value add and employment in other elements of the "screen industry" including:

- commercial free-to-air and subscription television broadcasting services. Data on these activities were added to the releases on FVPP from 2002–03; [38] and
- digital game development which was added to the releases on FVPP from 2006–07. [39]

Since 2002-03, the scope of the commercial free-to-air and subscription television broadcasting services survey data has changed significantly. The 2011-12 survey involved significant changes to coverage on subscription television, meaning the data was no longer comparable to the earlier series. This prevents analysis of a consistent series on television broadcasting. In addition, a consistent series for digital game development is only available for the 2007-07 and 2011-12 surveys. Due to these data limitation, we shall therefore not examine the data on commercial free-to-air, subscription television broadcasting services or digital game development, because of the limited time period over which consistent data is available in both categories over the time period we are interested in.

In what follows, we focus our analysis on trends first in value add and then second on employment in the FVPP survey data. As we shall see, our analysis refutes the Commission's hypothesis that digital technologies have facilitated a dramatic increase in fortunes for the film industry which is clearly reliant on copyright.

4.1 Value Add

The value add of an industry measures the industries economic contribution to GDP. Table 8, second column, presents the estimated value add of film and video production and post-production services estimated in ABS Surveys in the four financial years that data is available on value add - 2011–12, 2006–07, 2002–03, and 1999–2000. The third column provides a GDP index, with a base of 100 in 1999-00, showing how GDP more than doubled during the period, growing 129%. The fourth column presents a counterfactual measure of what the value add of film and video production and post-production (FVPP) services would have been had it attained the same growth rate as GDP from 1999-00 to 2011-12. The final column presents the implied

[37] See ABS Film, Television and Digital Games 2011-12 8679.0 Explanatory Notes
[38] The ABS notes that the 2002-03 ABS "Television Film, and Video Production 8679.0" release combined the results of Television Services and Film and Video Production for the first time. Television Services results were previously published in catalogue no. 8559.0. See ABS 2002-03 p2 The ABS notes in the 2002-03 release that "Historical data are not comparable for commercial free-to-air broadcasters". P23 and that "Public and community television broadcasting businesses were however excluded from this category."
[39] This additional data was collected as part of the Television Broadcasting, and Television Channel (TBTC) survey involving an ABS census of businesses mainly engaged in television broadcasting, and television channel provision. The scope of the census of broadcasters and channel providers was a subset of all businesses classified, on the ABS Business Register, to the following classes of the Australian and New Zealand Industrial Classification 2006 edition (ANZSIC): ANZSIC class 5621 FREE-TO-AIR TELEVISION BROADCASTING. ANZSIC class 5622 CABLE AND OTHER SUBSCRIPTION BROADCASTING. Digital game development (DGD) was included in 2006–07 and in 2011–12 See ABS Film, Television and Digital Games 2011-12 8679.0 Notes p2

annual deficit, or difference, between the actual value add of FVPP services and the value add it would have been at had it attained the same growth rate as GDP. The final column in the last row indicates FVPP services value add in 2011-12 would have been 25% greater, or $277 million more, had FVPP service value add growth kept up with GDP growth.

The rate of growth in the deficit in column 5 also seems to be increasing from survey to survey as broadband internet spreads. The deficit was around $50-53 million by the end of both the 2002-03 and 2006-07 time periods, implying growth in the deficit on average of between $12 and 18 million per annum. However, in the 5 years from 2006 to 2011, the deficit grew by $175m in total – or on average grew by $35 million per annum, two to three times faster than earlier. This is consistent with the data on changes in value add in copyright industries more generally presented in Figure 1 and Table 1. As discussed, contrary to the Commission's hypothesis, the negative impact on copyright industries due to increasing digital piracy generally started early around 2000 and expanded from 2004 as BitTorrent and broadband technology enabled piracy of larger files, such as films.

Table 8: Value Add: Film and Video Production and Post-Production Services ($m)

(1)	(2)	(3)	(4)	(5)
Financial Year	Value Add 2016$$	GDP Index 2016$$	Counterfactual	Deficit
1999-00	606.8	100	606.8	-
2002-03	690.2	122	743.1	-52.9
2006-07	886.0	163	988.5	-102.5
2011–12	1,110.7	229	1,388.0	-277.3

Thus, since the advent of digitization and spread of the internet FVPP value add growth failed to keep up with growth in GDP, indeed it has fallen behind faster over time, with the growth gap widening over time. The above result indicates that value add data for the film industry seems inconsistent with the Commission's hypothesis that the spread of digital technologies post 2000 had a net positive effect on copyright related industries like film. The Commission's hypothesis tends to predict that growth in value add in the film industry post 2000 would have exceeded the general level of growth of the economy. The analysis presented in Table 8, however, suggests the opposite. Growth in value add in the film industry post 2000 was below the general level of growth of the economy, with the growth gap widening over time.

The extent to which FVPP failed to match normal economic growth in the economy was quite large, with significant consequences for the Australian economy. Table 9 below, in column 2, uses the observations for FVPP services value add for the years 1999-00, 2002-03, 2006-07 and 2011–12 (shown in Table 8 above), and estimates FVPP services value add for each intervening year from 1999-00 to 2011-12 by linear interpolation, or by using a straight line to connect successive data points for FVPP. Column 3 presents data on GDP using the same method as column 2; however, rather than using actual GDP figures in intervening years, we interpolate the value of GDP to enable the same basis for comparison. Table 9, column 4, presents the annual counterfactual measure or what the value add of FVPP services would have been each year had it maintained the interpolated growth of GDP from 1999-00 to 2011-12. The fifth column identifies the implied annual shortfall or difference between the estimated annual value add of FVPP

services (column 2) and what that value add might have been had it kept up with GDP growth (column 4). Column 6 presents this shortfall (column 5) as a cumulative deficit, which suggests a cumulative shortfall of 1.5 billion compared to the actual value add had FVPP service growth matched GDP growth.

Table 9: Shortfall in Value add in Film and Video Production and Post-Production services

(1)	(2)	(3)	(4)	(5)	(6)
Year	Film and video production services $M	GDP Index Interpolated	Counterfactual FVPPS $M	Shortfall	Cumulative Shortfall $M
1999	***606.8***	***100***	***606.8***	***0.0***	***0.0***
2000	634.6	107	652.2	-17.6	-17.6
2001	662.4	115	697.7	-35.3	-52.9
2002	***690.2***	***122***	***743.1***	***-52.9***	***-105.8***
2003	739.2	133	804.4	-65.3	-171.1
2004	788.1	143	865.8	-77.7	-248.8
2005	837.1	153	927.2	-90.1	-338.9
2006	***886.0***	***163***	***988.5***	***-102.5***	***-441.4***
2007	930.9	176	1,068.4	-137.5	-578.9
2008	975.9	189	1,148.3	-172.4	-751.4
2009	1,020.8	202	1,228.2	-207.4	-958.8
2010	1,065.8	216	1,308.1	-242.3	-1201.1
2011	***1,110.7***	***229***	***1,388.0***	***-277.3***	***-1478.4***

Once again the above result indicates that the Commission's hypothesis was not only wrong, but potentially very seriously wrong. The above suggests the cumulative negative effect on Australian film industry and therefore Australian GDP was nearly $1.5 billion. By 2011 GDP was around 280 million less than it might have been by 2011, had film industry growth kept up with the average economic growth of the economy - and this shortfall is further continuing to increase by around 30 million each year.

The Commission's hypothesis would lead one to predict that growth in value add in the film industry post 2000 might have exceeded the general level of growth of the economy, given Australian dependence on less IT sensitive industries generally. The analysis presented in the tables above however suggests the opposite. Growth in value add in the film industry post 2000 was very seriously depressed below the general level of growth of the economy, and as a result value add in film keeps continuing to fall further behind what it might have been if it were able to keep up with just the average economic growth of the economy.

4.2 Employment in Film and Video Production and Post-Production Services

As was just presented with value add, a similar pattern emerged with employment. Table 10 presents ABS figures on employment in FVPP services for available years from 1993-94 to 2011-12. This covers an 18-year period during which one observes the spread of digitization and the internet, enabling one to test the Commission's hypothesis. Employment in FVPP increases rapidly after 1993-94, growing by 173% in nine years to 2002-03, it then however declines in the following nine years through to 2011-12 by 4%. The final column of Table 10 compares the

compound annual growth rates (CAGR) for employment, which was 10% during the first nine year period, 1993-94 to 2002-03, and -0.4% in the last nine years.

Table 10: Employment in Film and Video Production and Post-Production Services

(1) Financial Year	(2) Employment	(3) % Change	(4) Cumulative % Change from 1993-94	(5) CAGR in each ten year period
1993-94	5,998			
1996-97	9,591	60%	60%	
1999-00	15,195	58%	153%	
2002-03	16,360	8%	173%	10.6%
2006-07	13,844	-15%	131%	
2011-12	15,760	14%	163%	-0.4%

Whereas employment in FVPP nearly doubled in the initial nine years of the presented data, employment in FVPP shrank by 0.4% in the nine years after 2002-3. It is further important to note that the fall in employment post 2002-3 was not driven by the global financial crisis, indeed it largely occurred prior to the onset of the global financial crisis in 2008-09, with employment in FVPP collapsing by 15%, from 2002-03 to 2006-07and then only recovering slightly from 2006-07, but never attaining its original height attained in 2002-03.

Table 11 shows the counterfactual level of employment, a figure that would have been obtained in FVPP services if employment had grown at the same pace in the last nine-year period as in the first nine years. As shown, employment would have been 79% higher in 2011-12, reaching 28,263 instead of the 15,760 it attained, an indication any employment surge in FVPP occurred prior to the advent of the Internet - not afterwards.

Table 11: Employment in FVPP compared to Counterfactual

	Employment in FVPP
Actual 2011-12	15,760
Counterfactual	28,263
Difference	79%

Figure 5 further confirms the above result. It compares an index of FVVP employment based on 1993-94 at 100, to an Index of Australian wide employment similarly based on 100 in 1993-94. Figure 5 clearly shows how employment in FVPP grew considerably faster than economy wide employment from 1992-2001, and then failed to maintain this high growth relative to economy wide employment growth post 2001. Indeed, in the nine years from 2002-03 to 2011-12 employment in FVPP declined with a compound average growth rate (CAGR) of -0.4%, while economy wide employment grew by 2.2% CAGR.

Figure 5
Employment in Film Vs Total Employment in Australia
1993/94 to 2011/12 (Index = 100 in 1993/94)

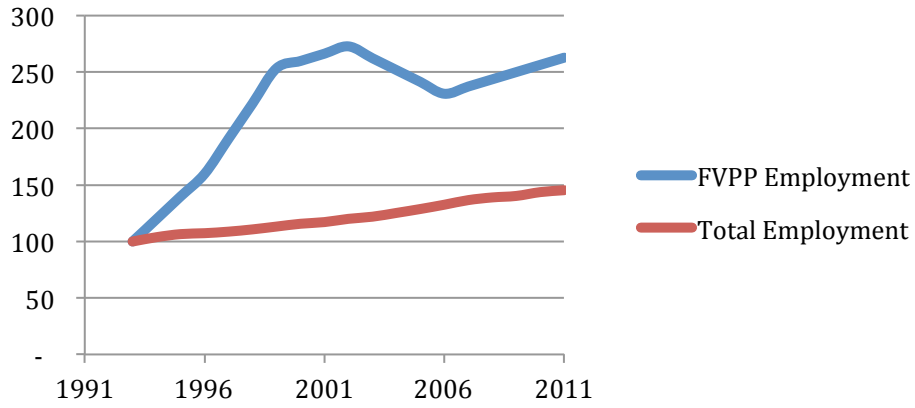


Figure 6 and Figure 7 below highlight more starkly the change in employment growth in film compared to total employment growth from the year 2000 by presenting the comparison of the pre and post 2000 indices separately. As shown in Figure 6 below, pre 2000, the employment index for FVPP employment (based on 100 in 1993/94) grew considerably faster than the equivalent index for general employment growth. By comparison, as shown in Figure 7 below post 2000, the employment index for FVPP employment (based on 100 in 2000/01) grew considerably slower on average than the equivalent index for general employment growth.

Figure 6
Employment in Film compared to Total Employment 1993/94 to 1999/2000 (Index = 100 in 1993/94)

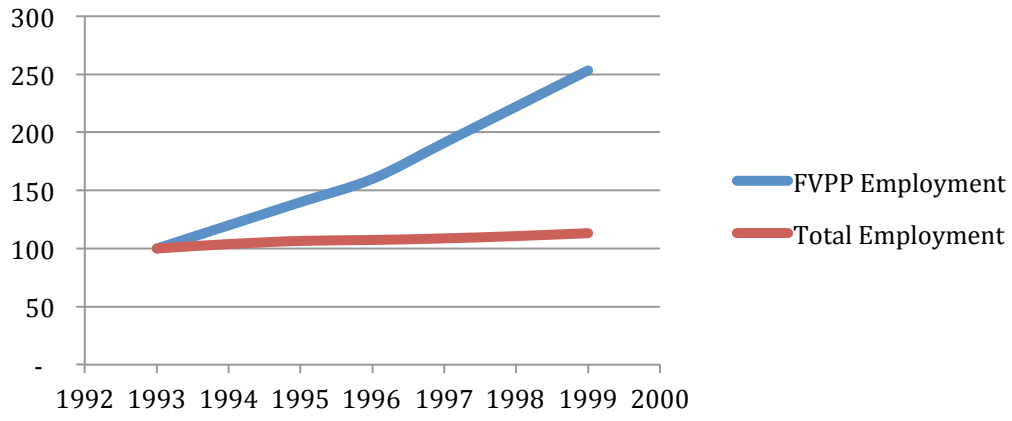
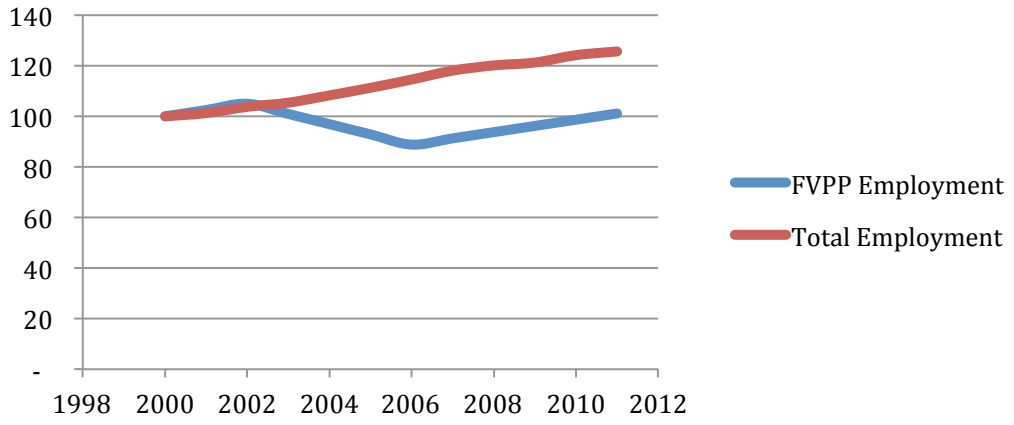


Figure 7
Employment in Film Compared to Total Employment 2000/01 to 2011/12 (Index = 100 in 2000/01)



The Commission's hypothesis could lead one to predict that growth in employment in the film industry post 2000 might have exceeded the general level of employment growth of the economy. The analysis presented above suggests the opposite. Growth in employment in the film industry post 2000 was not only very seriously depressed below its trend growth pre 2000, but also fell below the general level of growth of economy-wide employment. Not only value add but also employment in film continued to fall further behind what it might have been if it had kept up with just the average economy-wide growth.

Our analysis of the above Film and Video Production and Post-Production (FVPP) survey data refutes the Commission's hypothesis that digital technologies have facilitated a dramatic increase in fortunes for the film industry, which is reliant on copyright. We show that the cumulative shortfall or deficit in FVPP services value add was nearly $1.5 billion by 2011 compared to what it would have been had it kept up with GDP growth from 2000. Similarly, employment growth in FVPP failed to keep up with employment growth attained in FVPP prior to 2000 and also failed to keep up with general employment growth in the economy.

Thus, at this stage, a review of the evidence is inconsistent with the Productivity Commission's hypothesis, and more consistent with the need to restore the effective rate of copyright protection to deter piracy, limit market bypass, and instead enhance the extent of market transactions in copyright, and therefore the total reward and incentive for creativity to the benefit of the Australian community in the future.

5.0 Conclusion

This paper has reviewed the evidence related to the Productivity Commission's peak hypothesis, and find that the evidence does not support its recommendations. We analysed relevant data on trends in, value add,[40] employment, and investment in copyright dependent industries from multiple reliable and relevant sources which were ignored in the Commission's study. Quite simply, the data is inconsistent with the Commission's hypothesis that digital technologies have facilitated a dramatic increase for any aspect of the creative sector. A more balanced view would have more likely yielded more balanced recommendations.

Our detailed review of the evidence from Australian Bureau of Statistics (ABS) National Accounts Statistics finds:

- Copyright industries' value add growth in Australia failed to keep up with economy-wide growth, amounting to a nearly $170 billion cumulative shortfall in value add for core copyright industries between 2000 and 2014; the estimated shortfall is even higher, $332 billion, when compared against earlier copyright industry value add growth rates;
- Copyright industries' employment growth in Australia also failed to maintain pre-2000 levels, resulting in a shortfall of around 260,000 industry jobs by 2011;
- The estimated shortfall in Film and Video Production and Post Production value add compared to GDP growth was $1.5 billion as of 2011-2012, the latest year available, with employment similarly failing to keep pace; and
- Gross fixed capital formation in artistic originals as a percentage of GDP would have been 36% higher had it maintained its 1992-2001 growth rate.

The empirical results all refute the Commission's hypothesis that the new millennium has created a peak for copyright industries, even when using their own preferred data measure, gross fixed capital formation in artistic originals. These results in turn undermine the Commission's policy recommendations, calling into question the quality and perhaps the objectivity of the analysis relied on by the Commissioners in charge of the Inquiry. Contrary to the Commission's claims, the data is consistent with the need to move to stronger copyright in Australia to restore the effective rate of copyright protection and stem the loss of value add, employment and investment. More advanced empirical work, of course, is justified, but at this stage an evidence-based approach to policy requires strengthening copyright protections to deter piracy, limit market bypass, and instead enhance the extent of market transactions in copyright, and therefore the total reward and incentive for creativity to the benefit of the Australian community in the future.

[40] Value added is the value of gross outputs of a particular industry less the value of inputs from other industries. The sum of all industries' value add is the nation's gross domestic product (GDP). Thus, looking at the value add of copyright industries provides a measure of the relative importance of the copyright industries.

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