

THE ECONOMIC CONTRIBUTION OF A FILM PROJECT

A Guide to Issues and Practice in the Use of Multipliers

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Introduction

A common question asked when evaluating a project is: what is its overall contribution to the economy? This contribution can be an important part of the benefit to cost evaluation of the project, and therefore of particular relevance when the project has been supported by public funds or policy initiatives. Economic multipliers are a frequently used tool in the evaluation of economic impacts. This document provides summary level discussion, advice and recommendations regarding the use of multipliers in reviewing film projects. Rather than identifying the most effective type of multiplier per se, this guide has been prepared to support effective analysis and evaluation in the film sector by briefly describing the potential uses and limitations of different multipliers, so that these limitations can be factored into their application.

What is a multiplier and why use one?

A multiplier is a number that indicates the ultimate effect or 'impact' on an economic variable (eg. economic activity – measured as income or employment) that can be expected from an initial change in a related variable (eg. the investment associated with a film project). In film impact analysis the question being examined is often: if this film project involves the spending of \$X million dollars, what will be the final impact on economic activity and employment of that extra spending?

Multipliers reflect the underlying economic reality that increases in demand or spending cause 'flow-on' or 'ripple' effects. For example, a film shoot at a particular location will increase the incomes of accommodation providers, shopkeepers, suppliers of raw materials for sets and so on. This will in turn increase the demand or level of spending for their suppliers of goods and services. This flow-on can, in theory, continue indefinitely but over time each ongoing 'ripple' becomes increasingly smaller.

Multipliers are useful because they enable the estimation of the broad economic impact of a particular film policy or project, and therefore give policy makers a measure of its total economic benefit relative to cost. Governments are generally focused on the economy-wide impact of policy and projects, and as such multipliers have been a key term in the advocacy of film policy expenditure.

Are multipliers specific to the film industry?

No. Multipliers are a general economic concept and are relevant to all industries.

How are multipliers derived?

Multipliers are derived from models that divide the economy into industries and sub-sectors and then mathematically express the relationships between them. These models are based on real world economic data such as the size of each industry and its employment levels, and the extent to which each industry uses the goods and services produced by others. In effect, a matrix of all flows of goods and services between various industries is established.

The initial spending or demand change is fed into a model and the final impacts on economic activity are calculated taking into account the interactions between sectors and the ripple or flow-on effects.

The ratio of the final impacts of a given variable to the initial spending is called a multiplier.

The kinds of economic models used to derive multipliers

Multipliers have most commonly been derived from what is called an Input Output (IO) model – a model that describes the inputs of an industry sector and where it sends its outputs.

While widely used, it is generally recognised that IO models, and the multipliers derived from them, involve simplifying assumptions. For example, IO models assume that demand within an economy can be extended indefinitely without any resource (or what is called 'supply side') constraints holding it back.

Recently, Computable General Equilibrium (CGE) models have become more commonly used to estimate the economic outcomes of changes in final demand. CGE models are more sophisticated and complex and take into account factors such as supply constraints (the extent to which the availability of factors of production, primarily land, labour and capital) affects the capacity of particular industries to increase their levels of production. Generally speaking, CGE models require more data than IO models and are more expensive to use, but are deemed to be more robust and theoretically more complete. In general, it would be expected that CGE models would produce more conservative estimates of economic outcomes than traditional multipliers or IO approaches – but how much more conservative will depend on the nature of the constraints within the economy. A multiplier can be imputed from the outcomes of a CGE analysis, but the traditional construct of multipliers is from the IO framework.

Are multipliers geographically specific?

Yes. Multipliers are based on IO models which are themselves geographically specific, pertaining to the national, state or regional level. Multipliers will vary between states and regions because of the differing relative size of industries, differences in the connections between industries, and because a regional or state economy will have varying degrees of interconnection compared to the regions surrounding it (the more a given region imports from outside the region, the lower its multiplier will be). State multipliers are generally smaller than national ones for this reason.

However, it should also be noted that a relatively open economy will be less impacted by supply constraints because resources (labour and capital) can be relatively easily attracted from the surrounding economy, making an IO-based multiplier a more relevant concept.

In summary, it is not appropriate to use a national multiplier for analysing the impact of a project at the regional or state level, nor is it appropriate to use a multiplier from one state to estimate economic impact in another. Having said this, it may be useful to compare multipliers from 'similar' states when considering economic impacts.

Are there different types of multipliers?

Yes. The main types of multipliers that are derived from an IO model are the **Turnover Multiplier** (also sometimes called an **Output Multiplier**), the **Gross Value Added Multiplier**, the **Income Multiplier** and the **Employment Multiplier**.

The **Turnover Multiplier** is a measure of the extent to which sales within the economy will increase for a given increase in final demand. This multiplier construct has been used extensively in earlier economic modelling studies, and still is used in some cases, but it is generally now considered to be of limited use in an analytical context because it double counts (the turnover of one company includes the value of inputs purchased from another company or sector, and therefore is counted twice).

Impacts on economic activity are more correctly measured by Gross Value Added or Income Multipliers. The **Gross Value Added Multiplier** measures the net increases in the value of economic production in a particular region. In a national accounting framework context, this amounts to the value of wages and salaries plus the value of gross operating surplus (also known as gross regional product or a measure of company profits).

It is not uncommon to find Gross Value Added Multipliers of less than one at the state and regional level. This often confuses people as they think of a multiplier as increasing the estimated impact as it incorporates economy-wide or flow-through effects. However, the economic outcome represents the economy-wide increase in Gross Value Added (GDP or GRP) for a given change in final demand in the region, and some of the initial and flow-on effects can occur outside the region. Therefore the multiplier can be less than one at a state or regional level.

The **Income Multiplier** measures only that proportion of Gross Value Added that accrues to individuals within the region as wages and salaries, and therefore is smaller than the Gross Value Added Multiplier as it excludes gross operating surplus.

The **Employment Multiplier** indicates the increase in employment that will be required to occur as a result of a given increase in demand. It should be noted that theoretically the number of jobs could stay the same, as businesses may respond to a change in demand in the short term by paying overtime rather than taking on new staff. Therefore, the increase in employment is often measured in Full Time Equivalents (FTEs) and the multiplier is usually expressed in terms of an increase of 'X' FTEs per million dollars of extra spending. The value of the Employment Multiplier needs to be revised frequently because as wages rise a million dollars will fund fewer full-time jobs.

The values of multipliers for the film industry in Australia

The Australian Bureau of Statistics periodically releases **Input-Output Multipliers** for 106 industry sectors with the latest tables being for 1998/99. The Cultural Ministers Council did some further analysis in 2001 and provided multipliers at a more detailed breakdown (based on the 1996/97 tables as the latest available at that time) as below.

National economic multipliers for the cultural sector (sector specific)

	Gross Value Added Multiplier (effect on GDP)	Employment Multiplier (FTE employment by \$million of investment spend) ¹	
		1997\$	2005/06\$
Film and video production and distribution	1.80	37.0	30.7
Motion picture exhibition	1.3	19	15.8
Radio and TV services	1.4	19	15.8

Source: *Multipliers for Culture-Related Industries*, prepared by the National Centre for Culture and Recreation Statistics of the Australian Bureau of Statistics for the Cultural Ministers Council Statistics Working Group, based on the ABS, Australian National Accounts: Input-Output Tables, 1996-97. Note that the ABS have a release of Input Output tables for 1998-99, but the more detailed analysis for the motion picture sector has not been carried out.

Note: ¹The employment multiplier should be adjusted for inflation. The right hand column shows the multiplier to be used with 2005/06 dollars, adjusted using the 'gross national expenditure – implicit price deflator' (adjustment in this table is the December 1996 relative to the December 2006 implicit price deflator).

The film and video production and distribution multipliers combine both the production process and the distribution process. This is the most detailed set of multipliers formally available for film. Given that we are generally interested in the impacts of film production, inclusion of the distribution component may distort the multiplier to some degree.

Using the national multipliers

Suppose a film company decided to shoot a feature film in Australia in February 2007, which involved new expenditure within Australia of \$20 million (say the total budget for the film was \$25 million, but \$5 million was spent overseas on script and specific inputs). Note that this \$20 million needs to be assessed as incremental – new expenditure, not a transfer of expenditure from some other investment project. In this case, the \$20 million expenditure represents the 'initial new demand' for the products and services of the film and video production and distribution industry, and the impact on the Australian economy as a whole can be estimated as follows:

Impact on gross value added	= Initial demand x Gross Value Added Multiplier = \$20m x 1.80 = \$36m (approximately the contribution to GDP resulting from the initial \$20m expenditure)
Impact on employment	= Initial demand x Employment Multiplier (adjusted for inflation) = 20 x 30.7 = equivalent to approximately 614 people employed full-time for one year

This increase in employment is not just in the film industry but an economy-wide increase. It should be noted, however, that as this multiplier is derived from IO methodology it assumes **there are no constraints in the economy**, whereas in reality at the national level there are some constraints, such as a limited labour supply or the impact of expenditure on inflation. Therefore the true impact of this project would be expected to be lower than predicted using the calculation above, as the creation effect would partly depend on a transfer of resources from other sectors. For example, conventional economics would tell us that if the film investment purchased product from the construction sector in building sets, this would draw resources from other construction activities, pushing up wages in the sector and so diminishing the level of activity elsewhere. Some commentators suggest that where a project is small relative to the economy as a whole, constraints would not be significant, but the use of national multipliers can always be considered to be somewhat constricted by this assumption.

It should also be noted that different types of spend may have different effects on economic impacts, and this should be taken into account when considering the application of a multiplier. For example, expenditure for one project may solely be for employing crew and actors, while another may involve sub-contracting of a local post-production entity. This will result in somewhat different direct impacts (levels of employment and incomes), and different flow-through effects. The dynamic effects (skill development, generation of future opportunities) will also vary.

Why are the national multipliers based on figures from 1996/97 rather than more recent data?

To calculate the multipliers it is necessary to know the quantitative relationships that exist between all industries. Although 1999/00 and 2002/03 data is available for the film and video production and distribution industry (from the ABS Service Industries Survey), there is no data yet for most of the other industries collated by the ABS in the IO tables.

The latest IO tables (at March 2006) are for 1998–99, and multipliers consistent with the structural definition in those tables (ie. motion picture, radio and television services combined) could be calculated. But more detailed sectoral analysis is not available and there is no scheduled update of IO tables at the time of writing.

Can multipliers be used to compare the impact of investing in the film and video production sector with the impact of investing in other industries?

Some analysts use multipliers to suggest that the outcomes from investing in industries with higher multipliers produce greater outcomes for the economy as a whole. While this is generally true, such interpretations should be used with caution. Firstly, it is important that multipliers be compared at the same sectoral level. It would be inappropriate to compare film and video production and distribution (a narrow industry sector definition) multipliers with the multiplier for the manufacturing sector (a much broader industry level definition more comparable with the cultural sector or perhaps even the services sector). Secondly, it should be noted that the differences between multipliers at the same level of analysis occur for different reasons. The services sector generally has higher labour inputs than other sectors and therefore the initial component of particularly income and employment multipliers is much higher, but often the downstream linkages to the rest of the economy are somewhat weaker.

However, it can be generally concluded that the film production and distribution sector is at the higher end of industry-based multipliers, with a Gross Value Added Multiplier of 1.8, relative to a median for all industries of 1.35, and an Employment Multiplier (2005/06 dollars) of 30.7 relative to a median of 15.

The economic effects on a state or region

As noted above, national multipliers are only relevant in a national geographic context and should not be used in state or regional analysis. Note that the multipliers outlined above are based on IO methodologies and are therefore also limited at the national level because they fail to take into account the impact of supply constraints which exist at this level. Computer General Equilibrium (CGE) modelling is preferable for very large projects or industry wide issues if time and budget allows. CGE models offer an alternative methodology for measuring economic impact and, unlike IO models, factor in supply-side constraints (such as tariffs or a limited labour supply). CGE's are more theoretically robust for this reason but are more complex and expensive to generate than the IO multipliers found in this paper. The Allen Consulting Group used CGE models for their report *The Economic Contribution of film production to the Gold Coast Economy: A Report to the Gold Coast City Council* (June 2005).

At the state and regional level supply constraints are less significant (for example labour constraints can be filled by cross-state migration, inflation impacts are dissipated across other regions etc), and therefore an IO multiplier-based calculation can be considered a reasonable approximation to assess the economic impact of projects at the state level, although again, for major policy issues a CGE framework might be considered.

Ideally, if the effects on a state or region are to be assessed, multipliers specific to that state or region should be used. Specific multipliers currently available from state-based studies include the following (it should be noted that the sectoral definitions and the time periods on which the multipliers are based differ between studies, so the figures are not comparable):

	Output Multiplier	Gross Value Added Multiplier	FTE Employment Multiplier (FTEs per \$million – adjusted to 2005/06)
NSW – Motion picture services sector 2000/01 ¹	np ⁷	1.025	9.3
Victoria – Film and TV (1996/97 tables) ²	2.88	1.27	12.3
Queensland – Motion picture, radio and TV services, 1996/97 tables ³	np	1.06	15.1
Queensland – Film, television and entertainment software (2005) ⁴	2.64	1.34	np
SA – Cultural and recreational services – 1999/2000 ⁵	np	1.02	11.1
SA – Film and video production and distribution (estimate for 1999/2000) ⁶	np	1.27	22

¹ **Source:** Centre for Agricultural and Regional Economics Pty Ltd

² **Source:** Derived from Victorian tables prepared by Centre of Policy Studies for DIIRD

³ **Source:** *Queensland Input-Output Tables 107 Industries, 1996-97*, Office of the Government Statistician Queensland Government

⁴ **Source:** *Mapping Queensland's Creative Industries: Economic Fundamentals*, Creative Industries Research and Applications Centre

⁵ **Source:** *Film Industry Economic Multipliers: A Brief Discussion*, Barry Burgan, April 2002. It should be noted there is a later set of IO tables available for SA, but not with the sectoral definition relating to film production, so the information published in 2002 is still provided herein

⁶ **Source:** *Film Industry Economic Multipliers: A Brief Discussion*, Barry Burgan, April 2002. This multiplier is indirectly derived from IO tables, based on the ratios at the national level

⁷ **np** – not published

At the time of writing, multipliers for other states were not available for this publication* but it is worth checking with your regional development agency for any updated figures. It would be expected that they would be of a similar magnitude to those above.

Care should also be exercised if using multipliers to assess effects on regional economies. Multipliers for regions within states would be lower again than the state multipliers, because more inputs would come from outside the region and therefore less of a flow-on effect is felt within the region. There are 10 tables (and therefore multipliers) prepared for some regions; contact the relevant state's department of regional development to obtain them. If tables for the required region are not available, use multipliers for what you believe is a similar region (multipliers for larger regions will generally be closer to the state level multipliers than multipliers for smaller regions). Alternatively, simply estimate the spend in the area only and use that as your estimate of activity. However 'spend' is a measure of something different to the concepts considered here.

* Multipliers for film may be available or able to be imputed from P. Kenyan, S. Kemp, M. Dochery, *The Cultural Services Sector in WA – An Economic Impact Assessment*, Institute for Research into International Competitiveness, Curtin University, but this document was not available at the time of writing.

The impact of overseas financing versus Australian financing

In terms of the source of finance the first question to ask is whether the funds for the film directly represents a transfer from another activity (eg. the production of this particular film means that another film will not be financed, or the expenditure is transferred from some other investment). Where it is a transfer effect, the impact of the spend will be negligible because one project is simply displacing another.

However if the spend is determined to be an increase in gross investment (which is more likely in the case of overseas investment), there is likely to be an economic impact. As noted above, at the national level there will be some supply side constraints moderated by the size of the project relative to the national economy. Finance from overseas will have a more direct effect through the flow of overseas currencies into Australia, and therefore more directly affect the exchange rate, while local finance will tend to draw on the supply of local investment funds and therefore have more of an effect through local interest rates. But the implications of capital market constraint would probably be similar, meaning the net effect would be similar in magnitude.

At the state level, after allowing for the transfer effect discussed above, overseas versus Australian financing would have little difference on economic impact.

A practical example using various multipliers

As a summary, let us consider the example of the economic outcomes of a recently proposed film with a \$25 million budget. We want to know the economic implications of this spend for the Australian and New South Wales economies, and assume that the spend occurs over a two-year period (eg. a project that begins shooting in June would spill over into two financial years).

Step 1: Estimate the period and region in which the expenditure occurs

It is assumed that the \$25 million budget is defined in 2005/06 dollars, and the expenditure is distributed as follows (this of course will vary depending on the project):

	2005/06	2006/07	Total
	\$m	\$m	\$m
New South Wales	1.1	16.5	17.6
Other Australia	0.5	1.9	2.4
Total Australia	1.6	18.4	20.0
Overseas	4.3	0.7	5.0
Total	5.9	19.1	25.0

Step 2: Assess for transfer effects

In this example, this film is considered not to replace any other film or indeed any other investment directly in Australia and therefore in New South Wales. Therefore the expenditure can be considered new within the nominated regions. The extent to which the expenditure is transferred from alternative expenditure rather than incremental or new expenditure will be a matter of judgement and a case that the investor must make. It is probably easier to make this case at a state rather than national level.

Step 3: Assess that the expenditure can be considered to represent an average film

In this example it is assumed that the film investment spend can be considered to be like that for an average film in each of the regions (ie. with an average distribution of expenditure on salaries, on inputs etc). Therefore film industry multipliers can be used. Note that if it was considered to be significantly different to average, you would ideally need to identify the individual sector expenditure and apply multipliers for the spend within each of these sectors.

Step 4: Apply the relevant multipliers to calculate Gross Value Added and Employment

These calculations are illustrated in the table below:

	2005/06	2006/07	Total
Gross Value Added (\$million)			
New South Wales	1.1 (1.1 x 1.025)	16.9 (16.5 x 1.025)	18.0
Total Australia	2.9 (1.6 x 1.8)	33.1 (18.4 x 1.8)	36
Employment (FTEs)			
New South Wales	10 (1.1 x 9.3)	154 (16.5 x 9.3)	164
Total Australia	49 (1.6 x 30.7)	565 (18.4 x 30.7)	614

Step 5: Develop conclusions

A film with a budget of \$25 million, of which \$20 million is spent in Australia and \$17.6 million in NSW, would create incomes for labour and capital (in terms of gross value added) of \$18 million over the two years in NSW (\$1.1 million in 2005/06 and the balance in 2006/07). In addition, 164 new full-time equivalent jobs across the two years would be created in the state of NSW.

The project is estimated to generate incomes of \$36.0 million in Australia as a whole, and 614 new FTE jobs in Australia as a whole. It should be noted that this Australian impact is based on multipliers that more specifically represent the film production sector, while the multipliers available for NSW are from a broader industry construct which includes television services (which it would appear has a lower multiplier, and therefore results in a lower estimate of impact).

These estimates are dependent on:

- The assumed distribution of expenditure (how much is spent in each region), and the assumptions about transfer effects etc
- The assumption that the film is similar to an 'average' film in terms of the expenditure construct
- The supply constraints are not significant (eg. people employed would have otherwise been unemployed).

Key weaknesses and limitations to consider when assessing economic impact

The extent of economic activity associated with a new film investment is an important part of assessing the investment's overall economic benefit to the nation, state or region, and multipliers are traditionally used in the assessment of this benefit. However, as illustrated in this information guide, while such analysis is valid, it is a complicated area. The following is a summary of the major cautionary points that should be considered when using multipliers in the fashion described above:

- IO multipliers assume that new demand in the economy can be met without constraint (ie. there are unlimited resources available). In practice the estimates represent an upper bound.
- Multipliers assume that industry spends have a dollar for dollar impact – that the industry structure is representative of the specific project spend (as per assumption above), and that there are minimal fixed costs (ie. constant returns to scale in production).
- Multipliers and the economic outcomes derived are only a part of the total story – they do not allow for benefits such as people being employed in preferred occupations, or the costs of creating congestion or the loss of general access to facilities (eg. if a film is shot on a beach and the beach closed to the public during shooting). Note that costs and benefits are both financial and non-financial.
- The modelling assumes that flow-on impacts occur within the same single period time-frame as the expenditure, whereas in reality it might occur over a number of periods (eg. the wages paid to production crew might be saved and spent in a later year).

In conclusion, when using multipliers it must be recognised that they are estimates only and should be treated as such. To treat them as authoritative measures is a mistake but as a general indicator to suggest possible broader impacts, especially in the absence of the time and resources required to formulate more thorough studies or indeed in the absence of better measures, they are a comparatively simple and relatively effective measure. The ABS provides multipliers not just for film and video, but a range of industries. It is important that when comparing multipliers between states or industries, consistency in the use of source or methodology is required, otherwise the basis of comparison is significantly compromised.

Further reading

ABS, *Information Paper: Australian National Accounts, Introduction to Input-Output Multipliers* (cat. no. 5246.0). Out of print but available in ABS libraries.

Cultural Ministers Council Statistics Working Group (2001), *Multipliers for Culture Related Industries*, National Centre for Culture and Recreation Statistics, Australian Bureau of Statistics, November