Cost-Benefit and Fiscal Impact Analysis of Hawai‘i’s Film Tax Credit in 2021

Image by Gerd Altmann from Pixabay

Research and Economic Analysis Division

Department of Business, Economic Development and Tourism

STATE OF HAWAII

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This report was produced by the Research and Economic Analysis Division (READ) of the Department of Business, Economic Development & Tourism (DBEDT). It was prepared by Dr. Rene Kamita, Economist, and Naomi Akamine, Economist, under the direction of Dr. Eugene Tian, the Economic Research Administrator.

Hawaii Department of Business, Economic Development & Tourism

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Executive Summary

Hawai‘i offers tax incentives to encourage the growth of the film industry in the state through the Motion Picture, Digital Media, and Film Production Income Tax Credit (“film tax credit”). In 2021, the film tax credit program was allocated up to $50 million in tax incentives. Once the $50 million aggregate figure has been reached, film productions may claim any excess credits in the subsequent year. This study assesses the film tax credit program from two perspectives: (1) an economy-wide cost-benefit analysis based on gross domestic product (GDP) and earnings; and (2) from the State government cost-benefit perspective as measured by state tax revenues. Earnings are the sum of wage and salary disbursements, supplements to wages and salaries, and proprietors' income. Earnings are imbedded in GDP and state taxes are imbedded in earnings and GDP. These measures cannot be added up since they are different indicators from different perspectives.

Production expenditures by category in 2021

(in millions of dollars)

1. Wages & salaries to local workers	$86.8
2. Wages & salaries to out-of-state workers	$92.0
3. Spending on goods & services in Hawai‘i	$121.9
Construction	$4.2
Equipment rentals	$31.1
Purchase of materials	$15.0
Warehouse/storage	$2.8
Business/professional service	$35.9
F&B catering	$7.3
Hotel/accommodation	$15.3
Others	$10.5
4. Spending on out-of-state goods & services	$4.3
Total qualified production expenditures	$305.0

The analyses were based on the granular data collected by Hawai‘i Film Office through the Hawai‘i Production Report (HPR) forms. In 2021, 32 productions qualified and submitted claims for $64.1 million in film tax credits, with their qualified expenditures amounting to $305.0 million. Hawai‘i residents received $86.8 million in wage and salary payments, accounting for 28.5 percent of total qualified expenditures. About thirty percent, or $92.0 million was spent on wage and salary payments to non-resident cast and crew. Expenditures on goods and services paid to Hawai‘i-based businesses was $121.9 million (40 percent) of the total qualified expenditures, while out-of-state purchases accounted for 1.4 percent, or $4.3 million. Out of the $305.0 million in total qualified expenditures, the total leakage of film production spending is estimated to be $72.3 million, which is the sum of wage and salary payments to non-resident workers and spending on out-of-state goods and services minus out-of-state workers’ spending in Hawai‘i.

An economy-wide cost-benefit analysis looks at how direct spending by film productions has multiplier impacts throughout the economy and increases earnings and GDP. Meanwhile, it also takes into account the opportunity cost, or the foregone benefits if the amount of the film tax credit were spent on other government projects. The fiscal impact analysis evaluates how the film tax credit results in additional tax revenues and expenditures for the state. These two analyses are conducted under two scenarios.

Scenario #1 Assumptions:

1. All of the film productions that received the credit would not have filmed in Hawai‘i in the absence of the tax credit. This assumption illustrates the maximum economic benefit of the film tax credit.
2. Without the film tax credit, the State government would spend the same amount either on capital improvement projects (CIP) or supporting other industries. Given the complexities of state budgets, this study assumes that the State would spend the same amount on CIP.
3. Although it is documented in the literature that major motion pictures are influential in drawing visitors to the locations where they are filmed, the impact of film-induced tourism is not included in this study due to the lack of data.
4. Out-of-state below-the-line workers stay in Hawai‘i through the entire filming period and their daily spending followed the same pattern as U.S. visitors in 2021.
5. Above-the-line workers' local expenses – including in-state travel, food, lodging, entertainment, and ancillary expenses – are included in the spending categories of vendor and services.
6. Charitable contributions such as education and workforce development contributions and other non-qualified expenses by film producers are not included in the calculations.

Scenario #2 Assumptions:

1. The redundancy assumption: a portion of the film production expenditures would have occurred even without the tax incentives and are thus subtracted from the calculation of the economic and fiscal impacts. This study assumes that the redundant portion equals to the 10-year average of expenditures from 1987 to 1996 before the film tax credit was introduced in 1997. Adjusting for inflation, it amounts to $91.7 million in 2021 dollars.

2-6.: Same as in Scenario #1.

Results:

Indicators	Scenario #1: without the redundancy assumption		Scenario #2: with the redundancy assumption	
	Net increase	Per dollar tax credit	Net increase	Per dollar tax credit
GDP	$174.4 million	$2.72	$100.4 million	$1.57
Earnings	$160.6 million	$2.51	$100.0 million	$1.56
State tax revenues	$33.5 million	$0.52	$23.4 million	$0.37

I. Introduction

Effective for taxable years beginning January 1, 1997, Hawai‘i enacted tax incentives for motion picture and television film production, creating a 4 percent income tax credit of the costs incurred in the State in the production of motion picture or television films and a 6 percent credit of actual expenditures for transient accommodations[1]. The film tax credit is refundable; in other words, if the tax credit exceeds the taxpayer's income tax liability, the excess of credits over liability shall be refunded to the taxpayer. Since then, Hawai‘i's film tax credit was codified in section 235-17, Hawai‘i Revised Statutes (HRS), as part of Hawai‘i's income tax law. In 1999, the film tax credit increased from 6 percent to 7.25 percent of actual expenditures for transient accommodations[2].

Several key features of the film tax credit were amended in 2006.[3] The amendments significantly increased the tax credit to 15 percent of the qualified production costs incurred on Oahu, and to 20 percent of the qualified production costs on the neighbor islands (Big Island, Kaua‘i, Lana‘i, Maui, Molokai), effective beginning on July 1, 2006. To qualify for the tax credit, a production was required to have qualified production costs totaling at least $200,000 and to make reasonable efforts to hire local talent and crew. An $8 million per production credit cap was set on total tax credits claimed per qualified production. In addition, the tax credit was renamed the Motion Picture, Digital Media, and Film Production Income Tax Credit ("film tax credit"). In 2013, the film tax credit was further raised to 20 percent on Oahu and 25 percent on the neighbor islands[4]. The per production credit cap was increased to $15 million. In 2017, a $35 million annual spending ceiling was also established for the total amount of tax credits that could be claimed in any particular year; once the $35 million aggregate figure was reached, the excess could be claimed in the subsequent year.[5] When making a claim for products or services acquired or rendered outside of Hawai‘i, a production is required to provide evidence that reasonable efforts were unsuccessful to procure comparable products or services within Hawai‘i.[6] The sunset date for the film tax credit was extended to January 1, 2026. On July 10, 2019, Senate Bill 33 became law without Governor's signature and increased the $35 million annual rolling cap to $50 million.[7]

Act 89, SLH 2013 requires the Department of Business, Economic Development and Tourism (DBEDT), which administers the film tax credit through the Hawai‘i Film Office[8], to submit a

[1] See Act 107, Session Laws of Hawai'i (SLH) 1997.
[2] See Act 156, SLH 1998.
[3] See Act 88, SLH 2006.
[4] See Act 89, SLH 2013.
[5] See Act 143, SLH 2017.
[6] See Section 235-17(d), HRS, for a full list of qualifications.
[7] See Act 275, SLH 2019. Effective January 1, 2023, the film tax credit was raised to 22% of qualified production costs on Oahu and 27% of qualified production costs on the neighbor islands. The per production tax credit cap was also increased to $17 million and the sunset date for the tax credit was extended to January 1, 2033. See Act 217, SLH 2022. Hawaii Film Office | Incentives & Tax Credits.
[8] The Department of Taxation (DoTAX) and DBEDT, through its Hawai‘i Film Office, are jointly responsible for the administration and implementation of the film tax credit program in the state.

cost benefit analysis of the tax credit, including but not limited to "(1) the total number of full-time, part-time, and contract personnel on the payroll necessary to administer the motion picture, digital media, and film production income tax credit; and (2) the average wage of each of the above listed personnel groups and total earnings for the year." The Office of the Auditor further recommended that the Film Office "collaborate with READ[9] to identify the specific production information READ needs to prepare a comprehensive cost benefit analysis and/or economic output estimates that account for the different categories of jobs created, salaries and wages of resident and non-resident production hires, and any other relevant information"[10].

The rest of the report is structured as follows. Section 2 describes the film productions' expenditures, employment, and average earnings. Sections 3 and 4 provide the economy-wide cost-benefit analysis of the film tax credit and a Hawai'i State government fiscal impact analysis, respectively. Section 5 concludes.

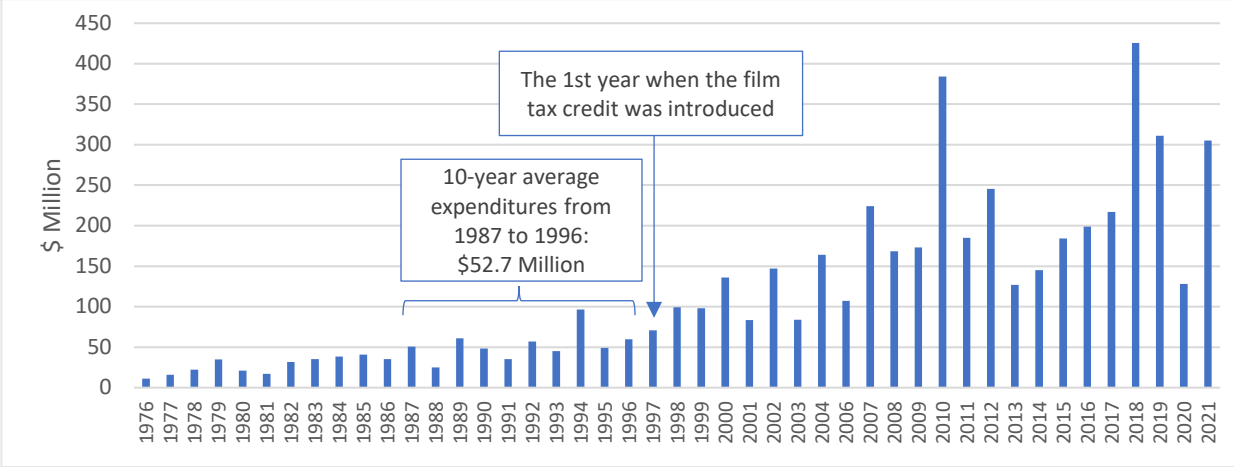
[9] Research & Economic Analysis Division, Department of Business, Economic Development & Tourism.
[10] Office of the Auditor. (2016, November). *Audit of Hawai'i's Motion Picture, Digital Media, and Film Production Income Tax Credit: A Report to the Governor and the Legislature of the State of Hawai'i* (Special Report No. 16-08).

II. Film Productions' Expenditures and Employment

This report relies on the granular data collected by Hawai'i Film Office through the Hawai'i Production Report (HPR) forms. In order to claim the tax credit, film productions are required to submit the HPR forms after qualified production costs were expended. The HPR form is completed on a calendar year basis and includes qualified production costs incurred during the calendar year[11]. After reviewing the HPR form and the independent third-party CPA review of agreed upon procedures, DBEDT sends a certification letter, with which the film production files corporate income tax returns and film credit forms with the Department of Taxation. The Department of Taxation may audit and adjust the tax credit amount to conform to filed information. As such, the amount of expenditures reported on the HPR form may not be the same as the final amount of tax credits received by the film production in the form of reduced income tax or refund. Nevertheless, to the extent that these reported expenditures are close to the final certified amount and that they were already expended and thus made impacts on the state's economy, this report terms the reported amount on the HPR forms as "qualified expenditures." The first year for which granular data of film productions' expenditures became available was 2019.

Hawai'i qualified expenditures of film productions and claimed tax credits

Figure 1. Hawai'i film production expenditures: 1976 – 2021



Source: DBEDT, Hawai'i State Data Book, Hawai'i Film Office's annual reports to the Legislature.

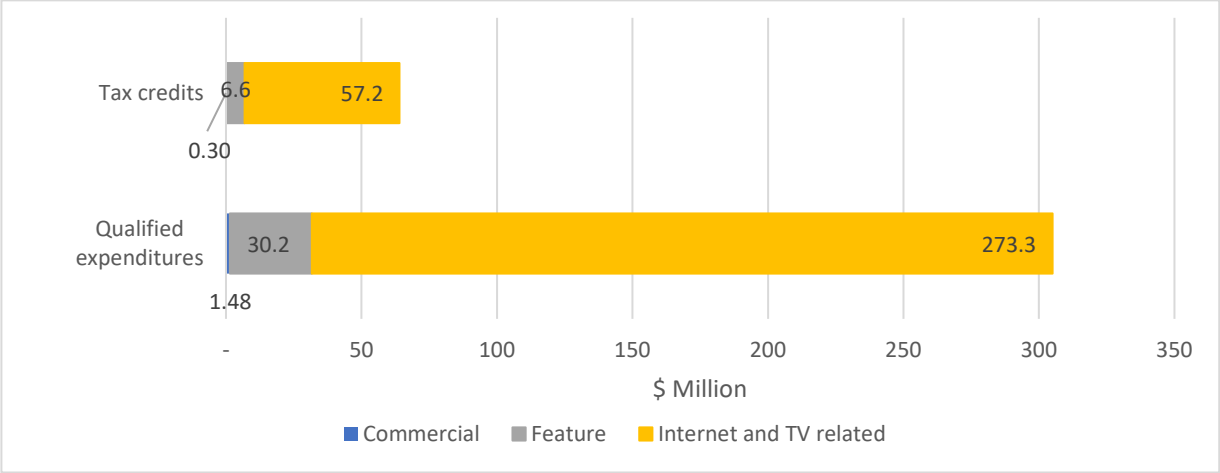
Before the film tax credit was introduced in 1997, Hawai'i film production expenditures remained under one hundred million dollars, with the 10-year average of expenditures from 1987 to 1996 at only $52.7 million. The annual production expenditures began to take off after 1997; and the film industry's growth accelerated when the tax credit was significantly increased in

[11] If a film production spans two or more years, all fillings and expenditures must be submitted by the calendar year in which they were expended.

2006. Since then, the film production expenditures maintained a fluctuating but steady growth and peaked at $425.5 million in the year of 2018.

According to the granular data of the HPR forms, 32 productions qualified for the film tax credit in 2021. With qualified expenditures totaling $305.0 million, the total amount claimed for the tax credit is $64.1 million (21 percent of total qualified expenditures). Almost 90 percent of expenditures were spent by internet and television related programs and close to ten percent were spent by feature films. The ratio of claimed tax credit to qualified expenditures was 21 percent on average, ranging from 20 percent to 21.9 percent across the types of productions.

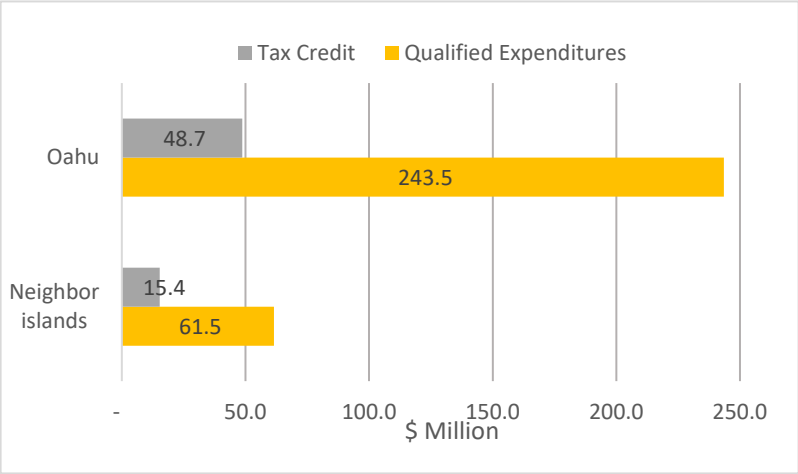
Figure 2. Total qualified expenditures and film tax credits claimed by production type in 2021



	Qualified expenditures ($ Million)	Tax credits ($ Million)	Ratio of tax credits to qualified expenditures	Count
Short Film/Music Video/Commercial	1.48	0.03	20.0%	5
Feature Film	30.2	6.6	21.9%	11
Internet and TV related	273.3	57.2	20.9%	16
All productions	**305.0**	**64.1**	**21.0%**	**32**

As shown in Figure 3, filming for productions that claimed tax credits is largely concentrated on Oahu. Seventy-six percent ($48.7 million) of the tax credits claimed are for productions that filmed on Oahu. In contrast, productions that filmed on the neighbor islands claimed $15.4 million of tax credit altogether.

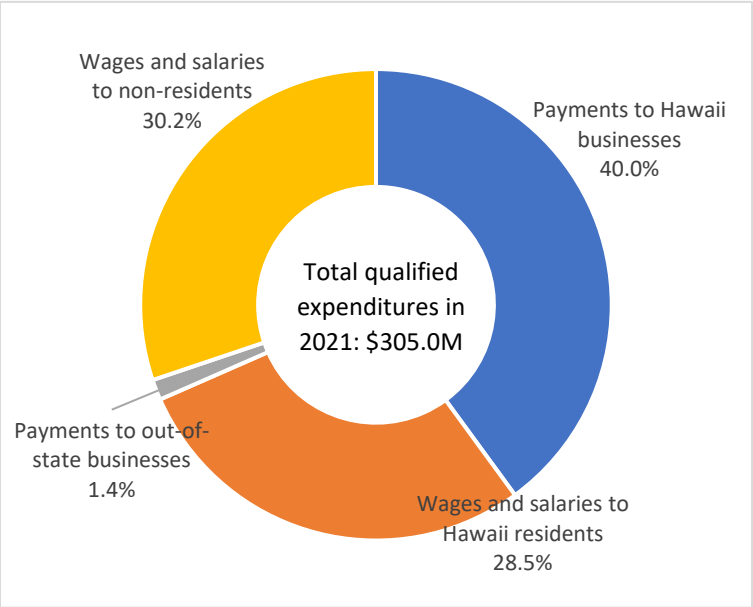
Figure 3. Total Hawai‘i qualified expenditures and claimed tax credits by island in 2021 (in millions of dollars)



Qualified film production expenditures consist of wages and salaries to cast and crew, as well as spending on goods and services. Under Hawai‘i law, film production expenditures do not have to be payments to Hawai‘i residents or purchases from Hawai‘i-based businesses in order to qualify for the film tax credit. As long as payments and purchases are subject to Hawai‘i income or general excise tax and are directly associated with a Hawai‘i-based production, they are considered as Hawai‘i spending and eligible for the 20% - 25% film tax credit. To the extent that out-of-state spending has very different economic impacts than expenditures paid to Hawai‘i residents and businesses, it is important to distinguish those out-of-state costs. This distinction is critical to establish a spending base for the following impact analyses.

As shown in Figure 4, about 30 percent of total qualified expenditures, or $92.0 million was spent on wage and salary payments to non-resident cast and crew. Hawai‘i residents received $86.8 million, accounting for 28.5 percent of total qualified expenditures. Unlike wage payments, the majority of expenditures on goods and services, $121.9 million, or 40 percent of production expenditures, were paid to Hawai‘i-based businesses, while out-of-state purchases only accounted for 1.4 percent, or $4.3 million. Altogether the total spending on wage payments to non-residents and out-of-state goods and services amounted to 31.6 percent of total qualified spending. This percentage is relatively low compared with other states.

Figure 4. Composition of qualified film production expenditures in 2021
(in millions of dollars)



Wages & salaries	Hawai‘i Residents	Non-Residents	**Total**
	86.8	92.0	**178.9**
Goods & services	Hawai‘i businesses	Out-of-state businesses	
	121.9	4.3	**126.2**
Total	**208.7**	**96.3**	**305.0**

Qualified expenditures on goods and services

Table 1 shows the breakdown of qualified production expenditures on goods and services, with in state and out-of-state purchases reported separately. Not surprisingly, almost all expenditures on warehouse, storage, food and beverage, catering, and accommodations were incurred locally. Two categories which had the lowest ratios of Hawai‘i in-state purchases were material purchases (90.5 percent) and construction (90.7 percent). This may be consistent with the boom in Hawaii's construction industry and supply chain disruptions making local resources relatively difficult to retain, and that substitutes for certain equipment or materials are difficult to source locally and therefore had to be imported. That said, over 90 percent of purchases in these categories were from Hawaii businesses, and overall imports and out-of-state purchases only made up 3.4 percent of total production expenditures on goods and services.

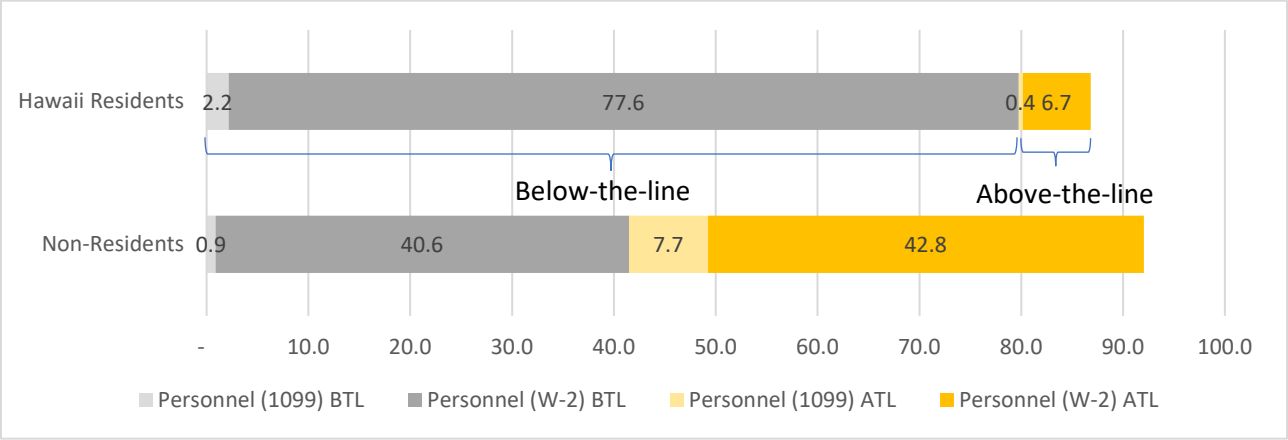
It noteworthy that for highly compensated actors, directors, producers, writers (above-the-line personnel), and their staff, local expenses – including in-state travel, food, lodging, entertainment, and ancillary expenses – are likely to be included in the production expenditures on goods and services. This is an important factor to estimate the local spending of these out-of-state workers in order to gauge the level of the actual spending added to the local economy and to determine a spending base for the impact analyses later.

Table 1. Production expenditures on goods and services by category in 2021 (in thousands of dollars)

	Hawai‘i businesses		Out-of-state businesses		Total	% of total	Ratio of Hawai‘i purchase
Construction	4,193	3.4%	428	10.0%	4,621	3.7%	90.7%
Equipment rentals	31,058	25.5%	1,575	36.8%	32,633	25.9%	95.2%
Purchase of materials	15,006	12.3%	1,584	37.0%	16,590	13.1%	90.5%
Warehouse/storage	2,695	2.2%	45	1.0%	2,740	2.2%	98.4%
Business/professional Service	35,923	29.5%	264	6.2%	36,187	28.7%	99.3%
F&B/catering	7,273	6.0%	1	0.0%	7,274	5.8%	100.0%
Hotel/accommodations	15,264	12.5%	-	0.0%	15,264	12.1%	100.0%
Other	10,474	8.6%	386	9.0%	10,860	8.6%	96.4%
Total paid out:	**121,886**	**100.0%**	**4,283**	**100.0%**	**126,168**	**100.0%**	**96.6%**

Qualified expenditures on wage and salary payments

Figure 5. Production expenditures on wage and salary payments by category in 2021 (in millions of dollars)



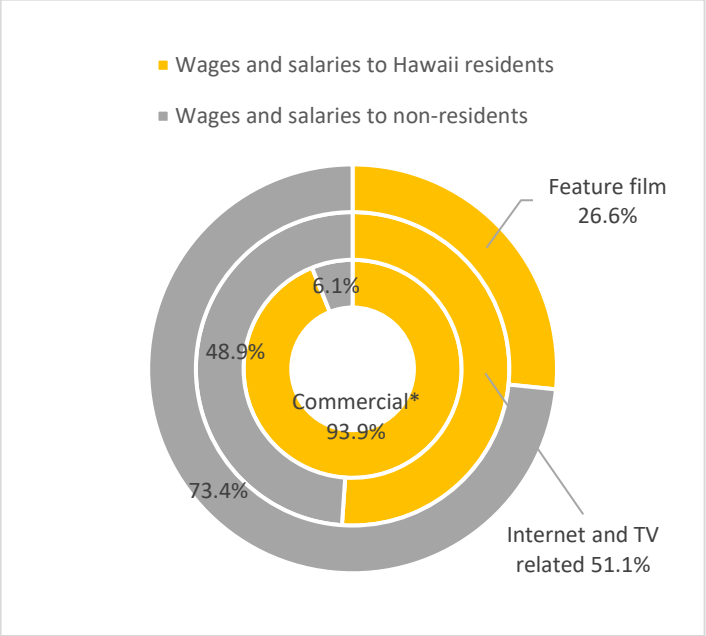
	Above the Line			Below the Line			Total		
	Hawai‘i Residents	Non-Residents	Hawai‘i ratio	Hawai‘i Residents	Non-Residents	Hawai‘i ratio	Hawai‘i Residents	Non-Residents	Hawai‘i ratio
1099 Contractors	0.4	7.7	5.0%	2.2	0.9	71.1%	2.6	8.6	23.0%
W2 employees	6.7	42.8	13.5%	77.6	40.6	65.6%	84.2	83.4	50.3%
Total Paid Out:	**7.1**	**50.5**	**12.3%**	**79.7**	**41.5**	**65.8%**	**86.8**	**92.0**	**48.5%**

Payroll of a film production is divided into “above-the-line” and “below-the-line.” Above-the-line (ATL) workers include directors, producers, writers, and principal cast; below-the-line (BTL) workers refers to the rest of the crew. In 2021, wages and salaries paid to Hawai‘i resident cast and crew were $86.8 million, nearly half of the total wage payments. However, looking at the above-the-line workers, which is the highest-compensated group, Hawai‘i residents only received about 12 percent, or $7.1 million, of total above-the-line wage payments, while non-

residents received $50.5 million of above-the-line wages and salaries. This is not surprising as above-the-line positions are highly skilled and it would be difficult to find local substitutes. ATL personnel also often provide training and mentoring opportunities for Hawai‘i residents so that local residents can advance in their fields of expertise.

Another way to categorize payroll cost production expenditures is by employees who are employed directly by the production company and issued traditional W2s, and independent contractors who use a 1099 form. Contractors earned a very small portion of wages and salaries, only $11.2 million in total. Of that amount, 7.7 million, or 69 percent, went to non-resident above-the-line contractors. In contrast, about $167.7 million of wages and salaries were earned by W2 employees, half of which went to Hawai‘i residents. Of all the W2 above-the-line wage and salary payments, 13.5 percent were earned by Hawai‘i residents, while 65.6 percent of all W2 below-the-line wage payments went to Hawai‘i residents. It is not clear how many full-time jobs the W2 payroll supported. Due to the short-term nature of most film projects, a substantial number of part-time jobs are likely on the W2 payroll.

Figure 6. Wage and salary payments by category and by production type in 2021 (in millions of dollars)



* Also includes documentaries, music videos, etc.

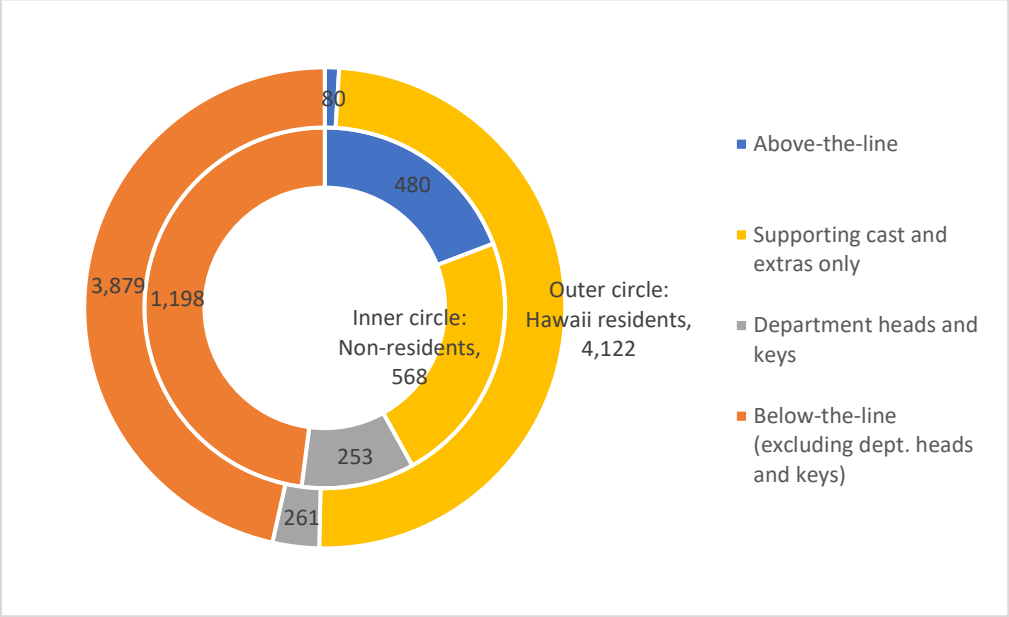
Ratios of wages and salaries paid to Hawai‘i residents to non-residents vary significantly across production types. For feature films, 26.6 percent of total wage payments went to Hawai‘i residents; for internet and television-related programs, 51.1 percent of payments went to residents. For other types of productions, including commercials, documentaries, music videos, etc., 93.9 percent of wage payments were paid to Hawai‘i residents. Feature film productions, which tend to be more heavily dependent on out-of-state cast and crew, are more likely to come to Hawai‘i for the film tax credit.

Hiring of film productions

Figure 7 shows the number of Hawai‘i resident and non-Hawai‘i resident hires by category, such as above-the-line directors, producers, writers, and principal cast; talent, including supporting cast and extras; department heads and keys; and other below-the-line crew. In 2021, film productions supported 10,841 jobs in total, 76.9 percent of which were filled by Hawai‘i residents. Out of that 76.9 percent, or 8,342 Hawai‘i resident jobs, only one percent, or 80, were in the above-the-line category; by contrast, 480 above-the-line jobs were filled by non-residents. There were similar numbers of department heads and keys between residents and non-residents.

Local hires of supporting cast and extras were predominantly more than out-of-state hires: 87.9 percent of supporting cast and extras, or 4,122 jobs were filled by Hawai‘i residents.

Figure 7. Hawai‘i resident and non-resident hires by category in 2021 (in number of jobs)



	Hawai‘i residents		Non-residents		Hawai‘i ratio
1. Above-the-line (directors, producers, writers, principal cast)	80	1.0%	480	19.2%	14.3%
2. Talent (supporting cast and extras only)	4,122	49.4%	568	22.7%	87.9%
3. Department heads and keys	261	3.1%	253	10.1%	50.8%
4. Below-the-line crew (excluding line 2 & 3)	3,879	46.5%	1,198	47.9%	76.4%
Total	**8,342**	**100.0%**	**2,499**	**100.0%**	**76.9%**

Table 2 further breaks down the number of local and out-of-state hires by department and ranks jobs by the ratio of Hawai‘i residents. Jobs with the smallest ratio of Hawai‘i residents were in storyboard artists, visual effects; post-production; producers, directors, and writers; and principal cast. Less than 20 percent of these jobs were filled by Hawai‘i residents. On the contrary, jobs filled by more than 90 percent of Hawai‘i residents were in animals, extras, medic, stand-ins, greens, special effects, and transportation. Despite the lack of information on the compensation rates of detailed jobs, it appears that most jobs with a higher ratio of Hawai‘i residents tend to be the lower paying jobs, and vice versa.

It is important to note that these job figures count each employee, regardless of the number of hours worked. Employment in film productions includes full-time, part-time, permanent and seasonal employees and the self-employed, and one employee may work on multiple productions. Without knowing the hours worked, the job count gains will tend to overstate the actual economic impact to the State in terms of job creation. For example, according to Table 2, 3,438, or about 41.2 percent of local jobs were production extras, whose impact on state employment may be relatively insignificant.

Table 2. Hawai‘i resident and non-resident hires by department in 2021 (in number of jobs)

	Hawai‘i residents	Non-residents	Hawai‘i ratio		Hawai‘i residents	Non-residents	Hawai‘i ratio
Storyboard Artist	0	6	0.0%	Animals	19	0	100.0%
Visual Effects	2	21	8.7%	Extras	3,438	136	96.2%
Post-Production	12	123	8.9%	Medic	143	6	96.0%
Producers, Directors, and Writers	39	285	12.0%	Stand-Ins	127	6	95.5%
Principal Cast	21	153	12.1%	Greens	43	4	91.5%
Animator/Digital Artist	1	3	25.0%	Special Effects	75	7	91.5%
Accounting	43	51	45.7%	Transportation	538	53	91.0%
Sound	67	61	52.3%	Set Decoration	225	27	89.3%
Assistant Directors	59	53	52.7%	Electric	291	45	86.6%
Supporting Cast	554	451	55.1%	Construction	312	56	84.8%
Art	74	60	55.2%	Locations	127	23	84.7%
Property	109	68	61.6%	Grip	296	55	84.3%
Camera	303	184	62.2%	Script Supervisor	26	7	78.8%
Casting	41	24	63.1%	Hair/Make-Up	150	46	76.5%
Stunts	236	133	64.0%	Other	146	48	75.3%
Costume	138	67	67.3%	Production	559	187	74.9%
Catering & Craft Service	128	50	71.9%				
				TOTAL	**8,342**	**2,499**	**76.9%**

Length of production duration by stage

Information about duration of production offers a glimpse into the features of production jobs in Hawai‘i and establishes a base to estimate Hawai‘i spending by out-of-state employees. The weighted average duration of an entire production was 141.3 days, while the average shoot period lasted 34.2 days. The shoot period is the stage when most personnel are employed, especially for out-of-state workers who come to Hawai‘i for the purpose of filming. By multiplying the number of out-of-state workers by the production’s shoot days, an estimate of total visiting days of out-of-state workers can be obtained, which forms the basis to calculate their spending in Hawai‘i.

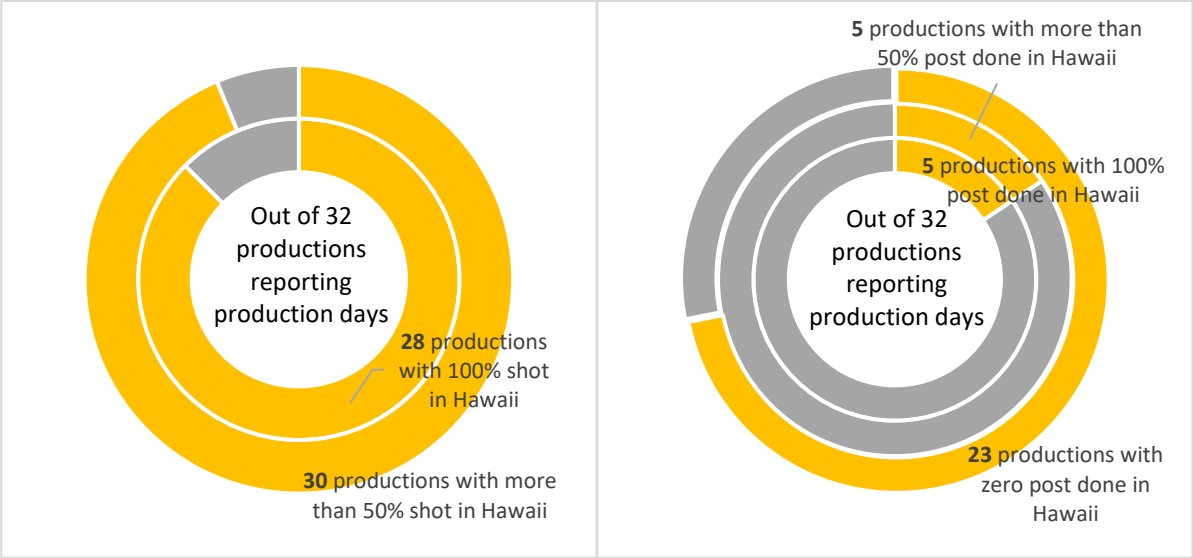
Table 3. Production duration by stage

	Total	Average	Shortest	Longest
Pre-Production Days	1,256	40.5	7	266
Shoot days	1,095	34.2	1	215
Wrap days	430	14.8	0	90
Post days	1,600	72.7 1/	0	312
Entire duration	4,381	141.3 2/		

Notes: 32 productions reported their production days.
1/ Only 17 productions reported post-production days.
2/ Weighted average.

Out of 32 productions which reported production days, 30 productions had more than 50 percent of filming completed in Hawai‘i; and 28 of these 30 productions filmed their projects completely in Hawai‘i. In contrast, only five productions had more than 50 percent of post-production in Hawai‘i; all of these five productions completed 100 percent their post-production in Hawai‘i. Twenty-three productions did post-production completely outside of Hawai‘i. On average, productions filmed 93.1 percent of their work in Hawai‘i but only 15.6 percent of productions did post-production in Hawai‘i.

Figure 8. Number of productions with filmed and completed post-production in Hawai‘i



Average earnings of the film production jobs incentivized by the film tax credit

A key component to evaluate the benefits of the film tax credit is the average earnings of film production jobs which were incentivized by the tax credit. Average earnings are calculated as the ratio of total wage and salary payments to the number of jobs for each category. Average earnings of local above-the-line jobs were $88,467, which is lower than the average earnings of non-resident above-the-line jobs at $105,308. Average earnings of below-the-line jobs were much lower, at only $20,548 for non-residents and $9,652 for Hawai‘i residents.

Table 4. Average earnings by residency in 2021

	Hawai‘i Residents			Non-residents		
	Jobs	Wages ($ Million)	Average earnings ($)	Jobs	Wages ($ Million)	Average earnings ($)
Above-the-line	80	7.1	88,467	480	50.5	105,308
Below-the-line	8,262	79.7	9,652	2,019	41.5	20,548
Total	**8,342**	**86.8**	**10,408**	**2,499**	**92.0**	**36,828**

As noted above, on average, each production ran 141.3 days and the filming period only lasted for 34.2 days (Table 3). The majority of below-the-line jobs are short-term or temporary jobs, which do not last throughout the entire production duration; for example, 70.4 percent of below-the-line jobs are extras, which may be on-site for a few days, if not hours. If employment is

measured on a job-count basis regardless of the number of hours worked, the actual impact on employment is likely to be overstated and the estimate of average earnings will tend to be biased significantly downward.

III. An Economy-Wide Cost-Benefit Analysis of the Film Tax Credit

When assessing the benefits, or the economic impacts of the film tax credit, this study evaluates how much economic activity is created due to the production spending induced by the tax credit. Film and television production, for example, require expenditures to be made on a variety of goods and services, including cast and crew, production facilities, equipment rental, catering, etc. This initial "direct" spending will in turn stimulate so-called "indirect" impacts through the supply chain. For example, when the production companies spend money on catering, catering companies make purchases across the supply chain of the food service industry. In addition, payments to employees increase personal income and spending, resulting in additional "induced" impact. For instance, wages paid to a supporting actress are spent to purchase food, housing, apparel, etc. Those expenditures in turn become wages in another layer of economic activity, where they are spent again. Total impacts, or the sum of direct, indirect, and induced impacts, are measured by multipliers. The multiplier represents the proportional change of total economic activity generated by an injection of new spending. The multipliers used in this report are from The Hawai‘i State Input-Output Study: 2017 Benchmark Report[12]. Type II final demand multipliers measure the total impacts.

The film industry is a very mobile industry and can relocate production or parts of production easily. The film tax credit offsets one-fifth to one-quarter of the qualified film production costs and thus is an important consideration for film productions to choose to film in Hawai‘i. However, there are many other factors influencing production companies' location decisions, such as availability of studio space, the quality and supply of workers, climate, and appropriate scenery. Some productions may still choose to film in Hawai‘i even in the absence of the tax credit. To gauge the impact of the tax credit, this study is conducted under two scenarios. The first scenario assumes that *all* of the film productions that received the credit would not have filmed in Hawai‘i in the absence of the tax credit. Under this assumption, the film production expenditures represent new spending in the State, so this assumption illustrates the maximum economic benefit of the film tax credit. The second scenario uses an estimate of the portion of production expenditures which would have occurred even without the film tax credit[13], or the so-called redundant film production expenditures. According to the historical trend (see Figure 1), the 10-year average of Hawaii film production expenditures was $52.7 million from 1987 to 1996 before the film tax credit was introduced in 1997. Adjusting for inflation, this equals to $91.7 million in 2021 dollars. This study uses $91.7 million as the redundant portion and subtracts this amount from the alternative impact analysis.

[12] DBEDT. (2020, December). *The Hawaii State Input-Output Study: 2017 Benchmark Report*.

[13] This scenario was also discussed in DBEDT's report on the 2019 Hawaii film tax credit. DBEDT. (2021, March). Cost-Benefit and Fiscal Impact Analysis of Hawai‘i's Film Tax Credit in 2019. Film Tax Credit Report_2019.pdf (hawaii.gov)

It is important to note that the multiplier gives no thought to any activity outside of the local economy; it only measures additional demand generated by new spending *within* a region. Therefore, expenditures made outside the region are considered a "leakage" and do not contribute to the multiplier effect. As shown in Figure 4, 31.6 percent of film production spending was paid to non-Hawai'i cast and crew, as well as to out-of-state businesses. Non-resident talent are not likely to spend the majority of their earnings in Hawai'i; payment on imports and out-of-state businesses do not cycle back through the Hawai'i economy, however production must prove that the Use Tax is paid to the State of Hawai'i to qualify any imported goods or services brought to the state for production if they cannot be procured locally. As such, not making the distinction between out-of-state and in-state spending will overstate the benefits of the film tax credit. In the analysis below, efforts are made to evaluate the impacts of out-of-state spending separately.

In this report, the costs and benefits of the film tax credit are evaluated by two measures: gross domestic product (GDP) and earnings. Earnings are the sum of wage and salary disbursements, supplements to wages and salaries, and proprietors' income. As earnings are imbedded in GDP, these two measures cannot be added; they are different indicators from different perspectives. For non-resident workers, only their spending in Hawai'i is included in calculating the economic impacts.

Benefits of the Film Tax Credit

Section A of Table 5 and Table 7 summarize all of the economic benefits of the film tax credit in terms of state GDP and earnings.

Wages and salaries paid to local workers

As shown in Figure 5, film productions' total wage and salary payment to local workers in 2021 amounted to $86.8 million. As part of this amount of income was spent in the local economy, it increased GDP by $72.4 million, or by $31.3 million if measured by earnings (section A-1).

Hawai'i spending of out-of-state workers while filming in Hawai'i

As discussed earlier, the economic benefit of film productions' wage and salary payments to non-resident workers is limited by the fact that only a portion of their income was spent on Hawai'i's economy. As this portion is not reported on the HPR form, this study assumes that out-of-state workers stay in Hawai'i through the entire shooting period and that their daily spending followed the same pattern as U.S. visitors in 2021. This may be an upper bound of out-of-state workers' spending in Hawai'i for two reasons. First, not all out-of-state workers stayed through the entire shoot period. Secondly, to the extent that their expenses were included in vendor or services, their spending while working in Hawai'i would be overestimated. Thus, this study only accounts for the shoot days of non-resident below-the-line workers, as it is more likely that above-the-line workers' local expenses – including in-state travel, food, lodging, entertainment, and ancillary expenses – are already included in the film production budget. As shown in section A-2 of Table 5, out-of-state workers' spending in Hawai'i is estimated to be $24.0 million. This amount of spending generated an additional $26.6 million of state GDP or $12.2 million of earnings.

Table 5. A cost-benefit analysis of film tax credit (*measure: gross domestic product)*

(in millions of dollars)

	Without the redundancy assumption	With the redundancy assumption[1/]
Benefits		
A. GDP generated		
A-1. GDP generated from wages and salaries paid to local workers		
Total wage payments to local workers	86.82	60.73
GDP generated by local workers [2/]	72.37	50.62
A-2. GDP generated from out-of-state workers' spending while filming in Hawai'i		
Estimated spending while working in Hawai'i	23.99	16.78
GDP generated	26.63	18.62
A-3. GDP generated from production spending on goods and services in Hawai'i		
Construction	5.03	3.52
Equipment rentals	33.85	23.68
Purchase of materials	18.16	12.7
Warehouse/storage	3.94	2.75
Business/professional service	47.78	33.42
F&B/catering	8.65	6.05
Hotel/accommodations	18.32	12.81
Others	11.52	8.06
GDP generated	147.25	102.99
A-4. GDP generated from Film Office spending on managing the film tax credit		
Total payroll costs of film office employees who manage the tax credit	0.14	0.14
GDP generated by the spending of Film Office employees	0.11	0.11
Total benefits	**246.35**	**172.35**
Costs (opportunity costs)		
B. GDP lost		
B-1. GDP lost from tax credit [3/]		
Amount of total tax credit	64.08	64.08
GDP lost	71.77	71.77
B-2. GDP lost from managing the tax credit [3/]		
Total spending on Film Office employees who manage the tax credit	0.14	0.14
GDP lost	0.15	0.15
Total costs	**71.92**	**71.92**
Net benefits = A – B	**174.43**	**100.43**
Net GDP generated by $1 of tax credit	**$2.72**	**$1.57**

1/ The redundancy assumption means that the portion of film production expenditures which would have occurred even in the absence of the film tax is subtracted from the calculation of the impacts. This portion is estimated to be $91.7 million.

2/ Assuming 86 percent of local workers' income derived from working in film production were spent based on the estimate in the 2017 Hawai'i State Input-Output model.

3/ Assuming State would spend the same amount on CIP projects.

Shaded areas indicate the components of benefits/costs.

The total leakage of film production spending is the sum of wage and salary payments to non-resident workers and spending on out-of-state goods and services minus out-of-state workers' spending in Hawai'i. Using the estimate of out-of-state workers' local spending, total leakage of film production is estimated at $72.3 million or 24 percent of the total production expenditures. See Table 6.

Table 6. Estimate of production spending leakage (in millions of dollars)

Wage payments to out-of-state workers	92.0
– Out-of-state below-the-line workers' spending in Hawai'i	24.0
Spending on out-of-state goods or services	4.3
Total leakage	**72.3**

Production spending on goods and services in Hawai'i

To get a more accurate estimate of the multiplier impacts of production spending on goods and services in Hawai'i, generated state GDP and earnings are estimated by each spending category (section A-3). Goods and services spending for each spending category is obtained from Table 1. Total generated state GDP and earnings from production spending on all goods and services in Hawai'i amounted to $147.3 million and $71.2 million respectively.

Hawai'i Film Office spending on managing the film tax credit

The film tax credit is administered through the Hawai'i Film Office situated in DBEDT's Creative Industries Division. Total payroll costs of Film Office employees who manage the film tax credit are estimated to be $0.14 million. This amount of income increased state GDP by $0.11 million or earnings by $0.05 million.

Altogether, total economic benefits of the film tax credit were $246.35 million in additional state GDP or $201.7 million in additional earnings. This is a conservative estimate as the economic impact of film-induced tourism is not accounted. It is documented in the literature that major motion pictures are influential in drawing tourists to the locations where they are filmed. In a seminal 1998 study, Riley, Baker, and Van Doren found that the effect of the motion pictures was to increase tourist visits to the sites, on average, by 40 to 50 percent for at least four years following release. Hudson & Ritchie (2006) studied over thirty movies and found that the visitor numbers could increase by up to 300[14] percent after release. Based on survey findings, HR&A Advisors, Inc (2015) estimated that 14.5 percent of Louisiana visitors can be considered film-induced tourists. MNP, LLP. (2013) assumed 5 percent of visitors to Florida are influenced in whole or in part by film and/or television. The two best examples of how a successful film franchise and TV show dramatically increased film induced tourism are *Lord of the Rings* trilogy and *The Hobbit* in New Zealand and *Game of Thrones* in Northern Ireland. The later proved to be a game changer for Northern Ireland as it opened up the region to tourism by attracting zealous *GOT* fans to a region that was not attractive to visitors previously.

[14] This is the case with Braveheart filmed in Scotland.

Table 7. A cost-benefit analysis of film tax credit (*measure:* earnings*)*

(in millions of dollars)

	Without the redundancy assumption	With the redundancy assumption[1/]
Benefits		
A. Earnings generated		
A-1. Earnings generated from wages and salaries paid to local workers		
Total wage payments to local workers	86.82	60.73
Earnings generated by local workers [2/]	31.34	21.92
A-2. Earnings generated from out-of-state workers' spending while filming in Hawai'i		
Estimated spending while working in Hawai'i	23.99	16.78
Earnings generated	12.23	8.56
A-3. Earnings generated from production spending on goods and services in Hawai'i		
Construction	2.94	2.05
Equipment rentals	10.25	7.17
Purchase of materials	8.25	5.77
Warehouse/storage	2.48	1.73
Business/professional service	28.74	20.10
F&B/catering	4.80	3.36
Hotel/accommodations	8.85	6.19
Others	4.92	3.44
Earnings generated	71.23	49.82
A-4. Earnings generated from Film Office spending on managing the film tax credit		
Total payroll costs of film office employees who manage the tax credit	0.14	0.14
Earnings generated by the spending of Film Office employees	0.05	0.05
Total benefits	**201.67**	**141.07**
Costs (opportunity costs)		
B. Earnings lost		
B-1. Earnings lost from tax credit [3/]		
Amount of total tax credit	64.08	64.08
Earnings lost	41.01	41.01
B-2. Earnings lost from managing the tax credit [3/]		
Total spending on Film Office employees who manage the tax credit	0.14	0.14
Earnings lost	0.09	0.09
Total costs	**41.10**	**41.10**
Net benefits = A - B	**160.57**	**99.98**
Net Earnings generated by $1 of tax credit	**$2.51**	**$1.56**

1/ The redundancy assumption means that the portion of film production expenditures which would have occurred even in the absence of the film tax credit is subtracted from the calculation of the impacts. This portion is estimated to be $91.7 million.

2/ Assuming 86 percent of local workers' income derived from working in film production were spent based on the estimate in the 2017 Hawai'i State Input-Output model.

3/ Assuming State would spend the same amount on CIP projects.

Shaded areas indicate the components of benefits/costs.

Due to lack of data, this source of economic benefits attributable to the film tax credit is excluded from the analyses. In addition, charitable contributions and other non-qualified expenses by film producers are not included in the calculations.

Costs of the Film Tax Credit

If the amount of the film tax credits were not spent on film productions but on some other government projects instead, would this additional government spending have generated more economic benefit? This foregone benefit is the "opportunity cost" of the film tax credit. However, given the complexities of state budgets and the numerous factors that affect revenue and expenditures, it is quite difficult to identify the actual opportunity cost. Therefore, this study simply assumes that the amount of tax credits would have been spent on the state's Capital Improvement Projects (CIP) fund.

In addition to the $64.1 million of tax credit claimed by film producers, there was a $0.14 million in spending by the Film Office to manage the film tax credit. The total cost amounted to $64.2 million. If this $64.2 million were not spent on the state's CIP fund to improve highways, airports, harbors, or public-school facilities, the lost GDP would be $71.9 million and lost earnings would be $41.1 million.

Combining both the benefits and costs, the net benefits of the tax credit were $174.4 million in increased state GDP or $160.6 million if measured by earnings. In other words, one dollar spent on the film tax credit generated $2.72 of state GDP, or $2.51 of earnings. The last columns of Table 5 and Table 7 recalculate the benefits under the redundancy assumption that $91.7 million of film production expenditures would have occurred regardless the film tax credit being in place. In that scenario, one dollar spent on the film tax credit is estimated to generate $1.57 of state GDP, or $1.56 of earnings.

IV. A Fiscal Impact Analysis of the Film Tax Credit

Film productions not only generate additional state GDP and earnings, but they also create tax revenue for the state government. At the same time, the funding of the film tax credit, the administration of the credit, as well as the cost of public services for non-resident film workers, all create additional cost to the state government. In this section, the fiscal impact analysis evaluates how the film tax credit results in additional tax revenues and expenditures for the state.

State Revenues from the Film Productions

When Hawai‘i local workers receive earnings from film productions, when producers purchase goods and services in Hawai‘i, and when out-of-state workers spend on the local economy, these new activities generate tax revenues for the state government. The magnitude of these state revenue changes is measured by state tax multipliers, which include individual income tax, GET, TAT, and other state taxes. While the indirect impact of out-of-state spending through the Hawai‘i economy is prevented, out-of-state spending still generates tax revenues to the state government. Compensation of out-of-state workers is subject to Hawai‘i income tax, because

Table 8. A fiscal impact analysis of film tax credit

(in millions of dollars)

	Without the redundancy assumption	With the redundancy assumption [1/]
State tax revenues generated		
A-1. State taxes generated from wages and salaries paid to local workers		
Total wage and salary payments to local workers	86.82	60.73
State tax revenues generated by local workers' income and spending [2/]	10.57	7.40
A-2. State taxes generated by out-of-state workers		
Estimated spending while working in Hawai'i	23.99	16.78
State tax revenues generated	2.78	1.95
Total wage and salary payments to out-of-state workers	92.0	64.37
State tax revenues generated	5.04	3.53
A-3. State taxes generated from production spending on goods and services in Hawai'i		
Construction	0.54	0.38
Equipment rentals	2.76	1.93
Purchase of materials	1.67	1.17
Warehouse/storage	0.39	0.27
Business/professional service	4.92	3.44
F&B/catering	0.92	0.65
Hotel/accommodations	2.59	1.81
Others	1.27	0.89
State tax revenues generated	15.06	10.53
A-4. State taxes generated from production spending on out-of-state goods and services		
Spending on out-of-state goods and services	4.28	3.00
State tax revenues generated	0.02	0.01
A-5. Film Office spending on managing the film tax credit		
Spending on Film Office employees who manage the tax credit	0.14	0.14
State tax revenues generated	0.01	0.01
Total state tax revenues generated	**33.49**	**23.43**
State spending		
B. State expenditures on tax credit		
Amount of total tax credit	64.08	64.08
C. State government spending on public services for out-of-state workers		
State government spending on airports, harbors, highways, public safety, and natural resources for out-of-state workers filming in Hawai'i	0.53	0.53
D. State expenditures on Film Office		
Spending on Film Office employees who manage the tax credit	0.14	0.14
Total state government spending	**64.75**	**64.75**
Net state tax revenues/spending = A – B – C – D	**-31.27**	**-41.33**
State tax revenues generated by $1 of tax credit	**$0.52**	**$0.37**

1/ The redundancy assumption means that the portion of film production expenditures which would have occurred even in the absence of the film tax credit is subtracted from the calculation of the impacts. This portion is estimated to be $91.7 million.

2/ Assuming 86 percent of local workers' income derived from working in film production was spent based on the estimate in the 2017 Hawai'i State Input-Output model. Shaded areas indicate the components of benefits/costs.

income taxes are paid in the state where they are earned, regardless of whether or where they are spent saved. Similarly, production spending on imports and out-of-state businesses is subject to Hawai‘i Use Tax. Each source of these additional tax revenues is discussed in order (Table 8).

Wages and salaries paid to local workers

Film productions' wage and salary payment to local workers amounted to $86.8 million. This amount of earnings was subject not only to income tax, but also to GET tax and other state taxes when part of Hawai‘i workers' earnings that are spent in the local economy. The state tax revenue generated was estimated to be $10.6 million (section A-1).

Wages and salaries paid to out-of-state workers

Out-of-state workers contribute to state tax revenues in two ways. First, when they spend part of their income while filming in Hawai‘i, their spending generates state tax revenues in the same way as U.S. tourists do. Second, out-of-state workers' earnings are subject to Hawai‘i state income tax. Combining the two, the state tax revenues generated from out-of-state workers was $7.8 million (section A-2).

Production spending on goods and services in Hawai‘i

Similarly, as in the cost-benefit analyses of production spending on goods and services, generated state tax revenue is estimated by each spending category (section A-3). Total generated tax revenues from production spending on all goods and services in Hawai‘i amounted to $15.1 million.

Production spending on imports and out-of-state services

Despite not contributing to the earnings, production spending on imports and out-of-state services are subject to state Use Tax, at the rate of 0.5 percent. The $4.28 million of out-of-state spending generated $0.02 million of tax revenues.

Hawai‘i Film Office spending on managing the film tax credit

The $0.14 million of total payroll costs of Film Office employees who manage the film tax credit also generated state tax revenues, which is estimated to be $0.01 million.

Taking all these together, total state tax revenues generated by film productions amounted to $33.5 million.

State Spending on the Film Tax Credit

In addition to the $64.1 million of film tax credit claimed by film productions in 2021, there is an administration cost of the tax credit through the Hawai‘i Film Office, which is estimated to cost the state $0.14 million. There is also a cost to the state when production companies film in Hawai‘i and consume public services. Highways, police and fire protection, natural resources, parks, and other public services consumed by film production are not free. The cost to state

government come primarily in the form of increased use of infrastructure and services[15]. Appendix C describes how to measure the cost of providing various public services.

The estimate of state government expenditures on public services consumed by film productions is $0.53 million. Overall, the film productions which claimed the film tax credit in 2021 cost the state government $64.7 million.

Net State Spending on the Film Tax Credit

On a revenue basis, film production activities generate state tax revenues to partially offset the cost of the tax credits, but the impact of those offsets did not result in a net increase in revenue to the State. In 2021, the $64.1 million of tax credits was estimated to have been offset by an increase in tax revenues of $33.5 million, leaving the State with a net revenue loss of $31.3 million. The Return on Investment (ROI) rate of Hawai‘i’s film tax credit was estimated to be $0.52 per dollar of tax credit. In other words, one dollar of Hawai‘i’s film tax credit generated 52 cents of state tax revenues in 2021. Under the redundancy assumption, the ROI rate is reduced to $0.37. As shown in Table A - 1, Hawai‘i’s ROI rate was in the middle of the range of ROI rates of other states. However, either $0.52 or $0.37 is relatively high among studies on film incentives which account for out-of-state spending.

V. Conclusion

In 2021, 32 film productions qualified for and claimed the Hawai‘i film tax credit. Their qualified production expenditures amounted to $305.0 million, with $64.1 million in claimed tax credits. About 30 percent of total qualified expenditures, or $92.0 million was spent on wage and salary payments to non-resident cast and crew. Hawai‘i residents received $86.8 million, accounting for 28.5 percent of total qualified expenditures. Hawaii-based businesses were paid $121.9 million, while out-of-state purchases accounted for $4.3 million. Altogether the total spending on wage payments to non-residents and out-of-state goods and services amounted to 31.6 percent of total qualified spending, or $96.3 million. After subtracting out-of-state workers’ local spending, total leakage of film production spending out of Hawai‘i’s local economy is estimated to be $72.3 million.

These 32 film productions supported 10,841 jobs in 2021, 76.9 percent of which were filled by Hawai‘i residents. However, out of that 76.9 percent, or 8,342 Hawai‘i resident jobs, about 41.2 percent were production extras, whose impact on employment may be relatively insignificant. Also, the 10,841 job count is prone to “multiple-counting” to the extent that the same workers work part time for multiple productions and are counted multiple times. Average earnings of above-the-line jobs among Hawai‘i local workers were $88,4567 but only $9,652 for local

[15] This additional spending on infrastructure and public services due to out-of-state film workers' visit also generates economic benefits, as the state would invest more in highways, airports, public safety, etc. However, this portion of economic benefits is excluded from our cost-benefit analysis, because if this additional spending were not used for infrastructure or public services for the above purpose, then the state would spend the money on infrastructure or services for other purposes, which would also generate economic benefits. Therefore, this additional government spending has an opportunity cost equal to its benefit and the two cancel each other out.

below-the-line jobs. The average earnings are underestimated because employment is reported on a job-count basis regardless of the number of hours worked.

The economy-wide cost-benefit analysis and fiscal impact analysis of this report takes into account two important factors which were often missed in earlier studies on film production incentives. One is the opportunity cost of the film tax credit; the other is the out-of-state spending which does not contribute to the local economy as much as expenditures spent in the state. In 2021, the net benefits of Hawai‘i’s film tax credit were $174.4 million in increased state GDP, or $160.6 million if measured by earnings. Thus, one dollar spent on the film tax credit generated $2.72 of state GDP, or $2.51 of earnings. On a state government’s tax revenue basis, the $64.1 million of tax credit is estimated to have been offset by an increase in tax revenues of $33.5 million. One dollar of Hawai‘i’s film tax credit generated 52 cents of state tax revenues.

Appendix A: Literature Review

There are quite a few state-specific reports studying the economic and fiscal impacts of film production incentives. The economic impact analysis looks at how direct spending of film productions has multiplier impacts throughout the state economy and results in new jobs, earnings, and economic output. These multiplier effects are calculated by input-output tables[16].

Measures of direct spending vary across reports. For example, Loren C. Scott & Associates (2017) uses certified spending, which include also "above-the-line" spending, that is salaries paid to principal cast, directors, producers, and writers. HR&A Advisors, Inc. (2015) excludes above-the-line spending from total qualified production spending in the calculation of multiplier effects, assuming that the majority of above-the-line wages are earned by non-residents. A much broader measure is adopted by Camoin Associates (2019), which uses both qualified and non-qualified spending. Substantial economic impacts are reported in these reports. For Louisiana in 2016, Loren C. Scott & Associates (2017) claims that film tax credit programs generated $1.2 billion in new sales at firms, $903 million in new household earnings, and 14,194 jobs. For New Mexico between fiscal years 2010 through 2014, MNP LLP (2014) estimates that film production spending associated with the tax credit programs created 15,848 full-time equivalent (FTE) jobs across all industries, generating $1.5 billion in economic output and $103.6 million in total tax revenues. For New York State over the two-year period of 2017 and 2018, Camoin Associates (2019) estimates the $8 billion of direct spending generated by the Film Production Tax Credit and the Post-Production Tax Credit programs resulted in 85,835 total jobs, $5.1 billion in earnings, and over $15.2 billion in total spending throughout the state economy.

Two other impact measures also take into account of the cost of film production tax credit programs. One is the cost per job to state. MNP LLP (2014) estimates for New Mexico, the net cost per FTE job created from film production was approximately $8,519. Loren C. Scott & Associates (2017) estimates the cost per job was $15,460 for Louisiana state in 2016. Some studies, however, report rather steep cost of tax credit programs. For instance, Zin (2010) estimates that each job costed $42,991 in the form of tax credit. Another more widely used indicator is a measure of fiscal impact, the return on investment (ROI) of tax credit programs, which is how much state tax revenue is raised by tax credit. It ranges from ten cents in

Table A - 1. Return on investment of film production incentive programs of other states

State	ROI	Source
Florida	1.18	MNP LLP (2013)
California	1.10	LAEDC (2014)
New York	1.08	Camoin Associates (2019)
Maryland	1.03	Irani et al. (2014)
Ohio	0.68	Clouse and Glazer (2015)
Mississippi	0.49	MS JLC PEER (2015)
New Mexico	0.43	MNP LLP (2014)
Virginia	0.20	VA JLARC (2017)
Michigan[1/]	0.18	Zin (2010)
Massachusetts[1/]	0.13	Massachusetts Department of Revenue (2011)
Maryland	0.10	Maryland Department of Legislative Services (2015)

1/ Studies subtract out-of-state spending from the calculating the fiscal impact.

[16] These studies generally used general equilibrium packages such as IMPLAN and BEA's REMI.

Maryland to $1.18 per dollar of tax credit in Florida (see Table A - 1).

Two considerations in the impact analyses of film production incentive programs are often missing and may likely result in overestimated impacts. One is the opportunity costs of the foregone revenue. Because film tax credits cost the state revenue, this lost revenue could have represented either tax reductions or state spending that would have benefited residents in another way (Robyn & David, 2012; Thom & An, 2017). The other factor is how much of the qualified film production expenditures are made *outside* the state and thus do not contribute to the local economy, or at least not as much as expenditures occurring in the state do (Luther, 2010; Zin, 2010). The multiplier impact is additional demand generated by a dollar of spending in an industry *within* a region. Expenditures made outside the region are considered as a "leakage" and do not contribute to the multiplier effect. Studies which take account of either or both of these two important factors tend to find much less impacts and higher costs associated with the film incentive programs. For instance, during 2009 and 2010, Michigan spent US$37.5 and US$100 million to generate just US$21.1 and $59.5 million in production activity (Zin, 2010). Massachusetts Department of Revenue (2011) shows that the cost to the state per Massachusetts resident job was as high as $133,055[17]. As shown in Table A - 1, studies which subtract out-of-state spending generally find relatively low ROI of the incentive programs, between 0.13 for Massachusetts and 0.18 for Michigan, less than those studies which fail to separate out-of-state spending.

In addition to state-specific studies, there are also multistate analyses of the impact of film production incentive programs on employment. These studies rely on quasi-experimental statistical analysis such as difference-in-differences techniques to control for counterfactual, or the economic activity that would have occurred in the absence of tax incentives. Their results do not provide compelling evidence that film production incentives increased employment in the film industry (Button, 2019; Swenson, 2017). However, it is noteworthy that these multistate analyses examine only *direct* employment in the film production industry and thus neglect that movie productions can result in more diffuse impacts on other industries, or the multiplier effects. Additionally, since these studies are done at the aggregate level, no significant net employment gains after incentives may just suggest a zero-sum game between states over time. In other words, some states experienced employment gains thanks to film production incentive programs and other decreased employment during the same time period, "amounting to a 'wash' in the aggregate" (Swenson, 2017).

[17] Massachusetts Department of Revenue (2011) estimates the cost per Massachusetts resident FTE job.

Appendix B: References

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Appendix C: The Cost of Providing Public Services to the State Government

The costs to state government are primarily in the form of increased use of infrastructure and services. Filming activities increase the costs of various public services such as highways, airports, harbors, police and fire protections, and natural resource. Thus, the costs of the film tax credit include the costs of providing these public services. In this section, the state government expenditures which directly benefit film productions are measured. These have been identified to fall into five categories: (1) public safety, (2) highways, (3) conservation of natural resources, (4) airports, (5) harbors.

The methodology used to calculate all costs is as follows. First, the direct expenditure by state government is estimated for each category. Table A - 2 shows the total expenditures in the above categories by the state government in 2021. Second, the expenditures are divided by the de facto population to get the average annual cost per user. De facto population[18] includes the daily visitors present in the state but excludes the daily number of residents temporarily absent. The average annual cost is further divided by 365 days to get the estimate for expenditures by the state government per user per day. Finally, the average daily cost per user is multiplied by total shoot days, which serve a proxy for total length of stay of all the film production personnel. Line 10 of Table A - 2 shows that total public expenditures by the state government spent on film productions were $ 0.53 million in 2021.

Table A - 2. State government spending on public services

Line 1	Total film-related expenditures (sum of line 2-6) 1/ ($M)	$2,137.9
2	- Public safety	$756.3
3	- Highways	$548.2
4	- Conservation of natural resources	$117.1
5	- Airports	$608.6
6	- Harbors	$107.7
7	De facto population	1,559,442
8	Film-related expenditure per person per day in 2021 (= line 1*1,000,000/line 7/366)	$3.76
9	Visitor days of non-residents in film productions	141,106
10	Cost to the state government due to non-resident film personnel stay ($M) (= line 8*line 9/1,000,000)	$0.53

1/ The average of fiscal year 2021 and 2022.
Source: Department of Accounting and General Services, *State of Hawai'i Comprehensive Annual Financial Report for the Fiscal Year ended June 30, 2022.*

[18] The de facto population is defined as the number of persons physically present in an area, regardless of military status or usual place of residence. It includes visitors present but excludes residents temporarily absent, both calculated as an average daily census.