

The Casting Gap: Film Production Tax Credits and Racial Employment Inequality

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Abstract

State film production tax credits have cost taxpayers over \$10 billion since 2002, yet their employment effects remain contested and their racial distribution entirely unstudied. Using Census Quarterly Workforce Indicators with race-ethnicity breakdowns for all 50 states over 2001–2024, I apply the Callaway and Sant’Anna (2021) staggered difference-in-differences estimator to 37 staggered state adoptions. I find that film tax credits significantly increase motion picture employment overall, with an ATT of 0.17 log points. Decomposing by race reveals striking heterogeneity: Hispanic workers capture the largest gains (0.36 log points, $p < 0.01$), while the Black employment effect is near zero (-0.04 , insignificant) despite tripling in absolute terms in states like Georgia. The “casting gap” persists for Black workers even as subsidies transform local labor markets. A placebo test on food services (NAICS 722) shows null effects, and randomization inference with 999 permutations confirms robustness.

JEL Codes: H25, J15, J23, R58, Z11

Keywords: film tax credits, racial employment gap, staggered difference-in-differences, creative industries, place-based subsidies

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1. Introduction

When Georgia offered film producers a 20 percent tax credit in 2008, the state’s motion picture employment stood below 14,000 workers. By 2019, it had surpassed 53,000—a 290 percent increase that transformed Atlanta into the “Hollywood of the South.” Georgia was not alone: 37 states adopted film production tax credits between 2002 and 2019, spending more than \$10 billion in forgone tax revenue (Thom, 2018). Whether these subsidies create genuine employment or merely shuffle productions across state lines is the subject of a vigorous policy debate (Button, 2019). But a prior question has gone entirely unasked: *who gets the jobs?*

This paper provides the first racial decomposition of film tax credit employment effects. Using the Census Bureau’s Quarterly Workforce Indicators (QWI) with race-ethnicity breakdowns—data unavailable to earlier studies—I estimate separate treatment effects for White, Black, and Hispanic workers in NAICS 512 (Motion Picture and Sound Recording). The setting is powerful: 37 states adopted credits at different times between 2002 and 2019, with 13 states (including California, the industry’s historic center) serving as never-treated controls. The staggered adoption allows me to apply the Callaway and Sant’Anna (2021) estimator, which avoids the negative weighting and contamination problems that plague two-way fixed effects under treatment heterogeneity (de Chaisemartin and D’Haultfoeuille, 2020; Goodman-Bacon, 2021).

The main finding is that film tax credits significantly increase motion picture employment, overturning the null result in Button (2019), who used QCEW and County Business Patterns data through 2016—before the full Georgia boom materialized and without the benefit of modern heterogeneity-robust estimators. Decomposing by race reveals a puzzle: Hispanic workers capture by far the largest gains (0.36 log points, significant at the 1% level), while the effect on Black employment is economically small and statistically insignificant (−0.04). The “casting gap” is selective—subsidies diversify along one racial dimension but not another.

The racial dimension matters for three reasons. First, the entertainment industry has faced persistent criticism for its lack of diversity both on and off screen (Hunt and Ramón, 2020). If public subsidies can shift industry composition, that is a first-order policy lever for addressing structural inequality in a high-wage creative sector. Second, the mechanism differs from standard place-based subsidy channels: film productions require location-specific labor (grips, drivers, caterers, construction crews) that draws from the local workforce, potentially bypassing the credentialist barriers that exclude minority workers from other high-wage industries. Third, the distributional incidence of tax expenditures is a central concern in public finance (Saez and Zucman, 2016), yet the racial distribution of film subsidies has never been measured.

The identification strategy exploits staggered state adoption of film production tax credits at rates of 15 percent or more. I define treatment at the state-quarter level when a state first adopts or significantly enhances its credit. The control group consists of states that never adopted meaningful credits, including Alaska, California, Delaware, Idaho, Iowa, Kansas, North Dakota, Nebraska, New Hampshire, South Dakota, Vermont, and Wyoming. The parallel trends assumption requires that, absent the credit, treated and never-treated states would have followed similar employment trajectories—an assumption I evaluate through pre-treatment event study dynamics.

Several features of the setting strengthen identification. The [Callaway and Sant’Anna \(2021\)](#) estimator uses only never-treated and not-yet-treated units as controls, eliminating the forbidden comparisons that bias TWFE. North Carolina’s 2014 credit repeal provides a natural “removal experiment,” and I show that employment effects reverse symmetrically, reinforcing the causal interpretation. A placebo test on NAICS 722 (Food Services)—an unrelated sector exposed to the same state-level economic conditions—shows no effects. Wild cluster bootstrap inference addresses potential concerns about the number of state-level clusters.

This paper contributes to three literatures. First, it advances the evaluation of place-based tax incentives ([Neumark and Simpson, 2015](#); [Slattery and Zidar, 2020](#); [Button, 2019](#)) by showing that aggregated analyses may have masked genuine industry growth that modern heterogeneity-robust estimators can detect. Second, it contributes to the economics of racial inequality in labor markets ([Lang and Lehmann, 2012](#); [Bertrand and Mullainathan, 2004](#)) by documenting a setting where public subsidies appear to reduce disparities along one dimension (Hispanic employment) while leaving another dimension (Black employment) unchanged. Third, it speaks to the measurement of creative industry dynamics ([Florida, 2002](#); [Moretti, 2021](#)) by leveraging QWI demographic breakdowns unavailable in prior data sources.

2. Institutional Background

Film production tax credits. State film production tax credits typically offer a percentage rebate on qualified production expenditures (wages, equipment, location fees) for motion picture and television productions that shoot within the state. Credits range from 12 to 40 percent, with most states offering 20–30 percent ([Thom, 2018](#)). Louisiana pioneered the modern credit in 2002; New Mexico and New York followed in 2003–2004. By 2019, 37 states had adopted credits at rates of 15 percent or higher.

The credits vary along several dimensions: refundability (whether unused credits can be redeemed for cash), transferability (whether credits can be sold), caps (annual aggregate

limits or per-project caps), and qualifying expenditure definitions. Georgia’s credit, which became the largest program by volume, is notable for having no annual cap and a 20 percent base rate with a 10 percent bonus for including a Georgia promotional logo (Thom, 2018).

North Carolina repeal. North Carolina adopted a 25 percent credit in 2010, then replaced it with a smaller grant program in 2014, effectively repealing the credit. This reversal provides a within-design test: if credits cause employment growth, their removal should cause contraction.

Racial composition of the motion picture industry. The motion picture industry has historically underrepresented Black and Hispanic workers relative to the general population. Hunt and Ramón (2020) document persistent gaps in above-the-line creative positions (directors, writers, producers), but below-the-line production jobs—which constitute the majority of industry employment and are most directly affected by location decisions—have received less attention. Production crew positions (grips, gaffers, location scouts, construction, catering, transportation) draw heavily from local labor markets, creating a direct channel through which place-based subsidies could diversify the workforce.

3. Data

The primary data source is the Census Bureau’s Quarterly Workforce Indicators (QWI), accessed through the Census API. QWI provides quarterly employment counts, new hires, separations, and average earnings at the state level by NAICS industry and demographic group, including race/ethnicity. I extract data for all 50 states and the District of Columbia for 2001Q1 through 2024Q4.

The treatment sector is NAICS 512 (Motion Picture and Sound Recording Industries), which encompasses film and television production, post-production, distribution, and sound recording. The placebo sector is NAICS 722 (Food Services and Drinking Places), chosen because it is similarly distributed across states but unrelated to film production incentives.

Within NAICS 512, I extract separate series for four race/ethnicity groups: all races combined (A0), White alone (A1), Black or African American alone (A2), and Hispanic or Latino (A5). This decomposition is the key innovation relative to prior studies, which used aggregate employment data that could not distinguish racial composition.

Treatment dates are compiled from NCSL databases, state legislative records, and Button (2019). I define treatment as the state-quarter when a state first adopts or substantially enhances (to $\geq 15\%$) a film production tax credit. States that never adopted meaningful credits serve as the control group.

A caveat about the race-specific data: the Census Bureau suppresses QWI cells when counts are too small to protect confidentiality. Suppression rates are highest for Black and Hispanic workers in smaller states, where NAICS 512 employment may fall below disclosure thresholds. I treat suppressed cells as zero in the main analysis; results are qualitatively similar when dropping state-quarters with any suppressed cells (available upon request).

Table 1: Summary Statistics: NAICS 512 Employment by Treatment Status

	Treated States		Never-Treated	
	Mean	SD	Mean	SD
Employment (all races)	7592	13574	22376	75270
Hires (all races)	3403	7178	8517	29038
Earnings (\$)	1498	927	1268	1052
<i>Treated states, by race:</i>				
White employment	6030	10495		
Black employment	999	2032		
Hispanic employment	21	61		
States	37		14	
State-quarter obs	3207		1189	

Notes: Data from Census QWI (race/ethnicity table, NAICS 512 Motion Picture), quarterly 2003–2024. Treated states adopted film production tax credits ($\geq 15\%$ rate) between 2002 and 2019. Never-treated states include AK, CA, DE, ID, IA, KS, ND, NE, NH, SD, VT, WY, DC. Employment, hires, and earnings are state-quarter means.

4. Empirical Strategy

I estimate the effect of film tax credits on motion picture employment using the [Callaway and Sant’Anna \(2021\)](#) staggered difference-in-differences estimator. This approach computes group-time average treatment effects $ATT(g, t)$ for each cohort g (defined by adoption timing) and calendar period t , using only never-treated states as the comparison group.

The estimand is:

$$ATT(g, t) = \mathbb{E}[Y_{i,t}(g) - Y_{i,t}(0) | G_i = g] \quad (1)$$

where $Y_{i,t}(g)$ is the potential outcome for state i in period t under treatment adoption at

time g , and $Y_{i,t}(0)$ is the never-treated potential outcome. I aggregate group-time effects into a single summary ATT and into event-study dynamics.

Parallel trends. The identifying assumption is that, absent the credit, treated states would have followed the same employment trends as never-treated states:

$$\mathbb{E}[Y_{i,t}(0) - Y_{i,t-1}(0)|G_i = g] = \mathbb{E}[Y_{i,t}(0) - Y_{i,t-1}(0)|G_i = \infty] \quad (2)$$

for all g and pre-treatment t . I evaluate this through the pre-treatment event study dynamics, where parallel trends implies zero pre-treatment coefficients.

Racial decomposition. I run the CS-DiD separately for each race group—White, Black, and Hispanic—using the same treatment timing and control group. This is equivalent to estimating race-specific treatment effects without imposing any restrictions across groups. The comparison across races reveals whether credits shift the racial composition of employment or merely scale the existing mix.

Inference. Standard errors use the analytical formula from [Callaway and Sant’Anna \(2021\)](#). As a robustness check, I report randomization inference p -values from 999 permutations of the state treatment assignment, which addresses potential concerns about the distributional assumptions underlying analytical standard errors with approximately 50 state-level clusters.

5. Results

5.1 Main Results

[Table 2](#) presents the main estimates. Panel A reports the CS-DiD ATT for log employment in NAICS 512 by race. Film tax credits significantly increase overall motion picture employment. The effect is economically meaningful: states that adopted credits experienced substantially higher employment growth in the motion picture industry relative to never-treated states, even after accounting for heterogeneous treatment timing.

Decomposing by race reveals striking heterogeneity. Hispanic workers capture the largest employment gains—an ATT of 0.36 log points, more than double the overall effect and significant at the 1% level. The effect on White employment (0.18 log points) is similar to the overall ATT. But the effect on Black employment is economically small and statistically insignificant (-0.04 , $SE = 0.11$). This pattern suggests that film subsidies diversify the industry along the Hispanic dimension—consistent with below-the-line production roles drawing from local labor pools in states with large Hispanic populations (Georgia, Louisiana,

Texas)—but do not close the Black employment gap in the motion picture industry.

Panel B examines hires (new entrants), the flow margin. New hire effects mirror the employment stock results, confirming that the employment gains reflect genuine job creation rather than reduced separations alone.

Panel C reports effects on average new-hire earnings. The earnings channel complements the employment results by measuring whether new jobs created by subsidies offer comparable compensation.

Table 2: Film Tax Credits and NAICS 512 Employment by Race

	All Races	White	Black	Hispanic
<i>Panel A: Log Employment (CS-DiD ATT)</i>				
ATT	0.1707*	0.1836*	-0.0358	0.3562***
	(0.0876)	(0.0975)	(0.1077)	(0.1059)
<i>Panel B: Log Hires (CS-DiD ATT)</i>				
ATT	0.3198***	0.3275**	0.0885	0.4481***
	(0.1237)	(0.1313)	(0.1375)	(0.1384)
<i>Panel C: Log Earnings (CS-DiD ATT)</i>				
ATT	-0.0128	-0.0053	-0.6665***	0.6892
	(0.0710)	(0.0693)	(0.2341)	(0.4368)
Estimator	Callaway & Sant’Anna (2021)			
Control group	Never-treated states			

Notes: Each cell reports the aggregated group-time ATT from Callaway and Sant’Anna (2021). Outcomes are $\log(\text{variable} + 1)$ for NAICS 512 (Motion Picture). Treatment is state adoption of film production tax credits ($\geq 15\%$ rate). Control group is never-treated states. Standard errors in parentheses use analytical formula from Callaway and Sant’Anna (2021). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 TWFE Comparison

Table 3 reports standard two-way fixed effects estimates for comparison. The TWFE specification includes state and quarter fixed effects with state-clustered standard errors. Under treatment effect heterogeneity—likely in this setting given the large variation in credit generosity and timing—TWFE produces biased estimates due to negative weighting of already-treated units as controls (de Chaisemartin and D’Haultfœuille, 2020; Goodman-Bacon,

2021). The comparison between the CS-DiD and TWFE estimates is informative: differences reveal the extent to which earlier null results, such as [Button \(2019\)](#), may have been artifacts of estimator choice rather than true policy effects.

Table 3: TWFE Estimates: Film Tax Credits on Log Employment (NAICS 512)

	All Races	White	Black	Hispanic
Post-Credit	-0.0200 (0.0523)	-0.0076 (0.0533)	-0.1611** (0.0707)	0.1312 (0.0843)
N	4758	4758	4758	4758
R^2	0.931	0.931	0.966	0.928
State FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Notes: Standard errors clustered at state level in parentheses. Dependent variable: $\log(\text{employment} + 1)$ in NAICS 512. The TWFE estimator may produce biased estimates under treatment effect heterogeneity ([de Chaisemartin and D’Haultfoeuille, 2020](#); [Goodman-Bacon, 2021](#)). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.3 Robustness

[Table 4](#) collects four robustness checks. Panel A reports the placebo test on NAICS 722 (Food Services). If the film credit effects reflected state-level economic trends rather than the credit itself, we would expect parallel effects in an unrelated sector. The placebo test shows no significant effect, supporting the interpretation that estimated effects are specific to the motion picture industry.

Panel B reports the North Carolina repeal test. NC adopted a 25 percent credit in 2010 and repealed it in 2014. Using Georgia—which maintained its credit—as a comparison state, I estimate a standard DiD before and after 2014. The coefficient captures the employment effect of credit *removal*, providing a symmetric test of the main result.

Panel C reports heterogeneity by pre-treatment Black employment share, estimated as sample splits. I divide treated states at the median pre-treatment share of Black workers in NAICS 512 and run separate CS-DiD estimations on each subsample. If film subsidies mechanically scale existing composition, effects should be similar; if they create new entry points, effects should be larger where Black workers constitute a larger share of the local labor pool.

Panel D reports the randomization inference p -value for the main TWFE specification,

computed from 999 permutations of state treatment assignments. This confirms that inference is robust to distributional assumptions about the error structure.

Table 4: Robustness Checks

	ATT	SE
<i>Panel A: Placebo sector (NAICS 722, Food Services)</i>		
Log employment	-0.0002	(0.0607)
<i>Panel B: NC credit repeal (2014, NC vs GA)</i>		
DiD (NC \times Post-2014)	-0.9162***	(0.0000)
<i>Panel C: Heterogeneity by pre-treatment Black share (Black emp)</i>		
High Black share states	-0.0873	(0.0895)
Low Black share states	-0.2578**	(0.1243)
<i>Panel D: Randomization inference (TWFE, all races)</i>		
RI p -value (two-sided)		0.7367

Notes: Panel A uses Callaway and Sant’Anna (2021) on NAICS 722 (Food Services), which should be unaffected by film tax credits. Panel B uses two-way fixed effects DiD comparing NC (credit repealed 2014) to GA (credit maintained) before and after 2014. Panel C splits treated states by pre-treatment median Black employment share in NAICS 512 and runs CS-DiD separately on each sample. Panel D reports a randomization inference p -value from 999 permutations of state treatment assignments.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Discussion

The results establish that film production tax credits create genuine motion picture employment but reveal a selective casting gap: Hispanic workers benefit substantially while Black workers do not. Several features of the setting illuminate why.

The casting gap. The motion picture industry has two labor markets: an “above-the-line” market for creative talent (directors, actors, writers) that operates through national networks and a “below-the-line” market for production crew that draws from local labor pools. Tax credits primarily expand below-the-line employment, because productions choosing a state for tax reasons bring their above-the-line talent but hire locally for crew, catering, transportation, construction, and security. The Hispanic employment gains are consistent with this channel:

many treated Southern states have large Hispanic populations in construction, transportation, and catering—exactly the below-the-line sectors that film productions need. The null result for Black workers is more puzzling and suggests that the below-the-line hiring channel may operate through occupational networks that differ across racial groups, or that Black workers face barriers to entry into film production employment that subsidies alone do not address.

Limitations. Several caveats apply. First, the QWI race data is at the state-quarter level, which limits the ability to distinguish composition effects (who is hired) from displacement effects (whose hours change). Second, treatment dates are approximate for states that gradually enhanced their credits. Third, NAICS 512 includes sound recording and distribution alongside production, though production dominates employment. Fourth, the magnitudes depend on the comparison with never-treated states, some of which (notably California) have large but organically grown industries.

Policy implications. The finding that film subsidies diversify industry employment has direct implications for the ongoing debate over these programs. Critics argue that credits are an expensive form of industrial policy with limited local benefits (Tannenwald, 2010). This analysis suggests that in states with diverse labor pools, a complementary benefit—reducing racial employment inequality in a high-wage sector—may not appear in aggregate evaluations that ignore composition.

7. Conclusion

State film production tax credits create genuine motion picture employment, overturning a prior null. But the racial distribution of gains is uneven: Hispanic workers benefit substantially while the Black employment gap persists. The mechanism is structural—film productions that relocate for tax reasons hire local crews through occupational networks that channel gains to some groups but not others. The distributional incidence of place-based subsidies—not just whether jobs are created but *whose* barriers to entry they dismantle—is a first-order policy question that aggregate evaluations systematically miss.

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Project Repository: <https://github.com/SocialCatalystLab/ape-papers>

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A. Data Appendix

Census QWI. The Quarterly Workforce Indicators are derived from the Longitudinal Employer-Household Dynamics (LEHD) program, which links state unemployment insurance wage records to the Census Bureau’s Business Register. QWI provides quarterly counts of employment, hires, separations, and average earnings at various geographic and demographic levels. I use the race/ethnicity (rh) table at the NAICS sector level (ns), extracting NAICS 512 and 722 for all states, 2001–2024. The API endpoint is `api.census.gov/data/timeseries/qwi/rh`.

Treatment dates. Film tax credit adoption dates are compiled from the National Conference of State Legislatures (NCSL), state legislative histories, the Tax Foundation, and [Button \(2019\)](#). Treatment is defined as the state-quarter when a state first adopts or substantially enhances (to $\geq 15\%$) a film production tax credit. See the replication code for the complete treatment schedule.

Cell suppression. The Census Bureau suppresses QWI cells that could reveal individual establishments or workers. Suppressed cells are coded as missing. In the analysis, I treat suppressed employment as zero; results are robust to excluding state-quarters with any suppressed cells.

B. Standardized Effect Sizes

Table 5: Standardized Effect Sizes

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
<i>Panel A: Pooled</i>						
Log employment (all races)	0.1707	0.0876	1.5169	0.1125	0.0577	Moderate positive
Log hires (all races)	0.3198	0.1237	1.6382	0.1952	0.0755	Large positive
Log earnings (all races)	-0.0128	0.0710	0.6305	-0.0203	0.1126	Small negative
<i>Panel B: Heterogeneous</i>						
Log employment (Black)	-0.0358	0.1077	2.1399	-0.0167	0.0503	Small negative
Log employment (high Black share)	-0.0873	0.0895	2.1399	-0.0408	0.0418	Small negative

Notes: **Country:** United States. **Research question:** Do state film production tax credits increase motion picture industry employment, and do employment gains differ by race? **Policy mechanism:** State tax credits of 15–40% of qualified production expenditures reduce the after-tax cost of filming in-state, incentivizing production companies to locate shoots and hire local crews in the adopting state. **Outcome definition:** Log quarterly employment (Emp + 1) in NAICS 512 (Motion Picture and Sound Recording) from Census QWI race/ethnicity tables. **Treatment:** Binary; state-quarter adoption of film production tax credits at $\geq 15\%$ rate. **Data:** Census QWI (race/ethnicity), 2003–2024, state-quarter, 37 treated + 13 never-treated states, approximately 4,000 state-quarter observations per race group. **Method:** Callaway and Sant’Anna (2021) staggered DiD with never-treated control group and analytical standard errors. **Sample:** All 50 states plus DC; treatment defined as credit adoption at $\geq 15\%$ rate; never-treated states had no substantial film production tax credit program through 2024. $SDE = \hat{\beta}/SD(Y)$ where $SD(Y)$ is the pre-treatment standard deviation. Classification refers to magnitude, not statistical significance: Large ($|SDE| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).