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Replication study of Cook et al.(2023): The Evolution of Access to Public Accomodations in the United States

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Abstract

This is a replication study of Cook et al.(2023), a paper that investigates the determinants of access to nondiscriminatory public accommodations for African-Americans before the 1964 Civil Rights Act. They utilize the Negro Motorist Green Books and World War II casualty data to examine the impact of demographic shifts caused by wartime casualties on the prevalence of nondiscriminatory establishments. Using a difference-in-differences approach, they show that a 10% increase in white casualties led to a 0.6% increase in nondiscriminatory businesses. Further, an instrumental variable strategy indicates that a 10% rise in the Black population share correlated with increased nondiscriminatory services. Our replication study shows that the difference-in-differences estimates remain stable even after excluding states with the highest average white World War II casualties or Southern states. However, the instrumental variable estimates become sensitive to the use of robust standard errors. The reproduction of the figures and tables of the paper is mostly accurate, with a minor discrepancy in Table 3 Panel A column 3, where the original coefficient is stated as 0.0191, and the replicated coefficient is found to be 0.0263.

1 Introduction

In the present report prepared for the Institute for Replication (Brodeur et al., 2024), we replicate the paper by Cook et al. (2023). Their paper explores the factors affecting access to nondiscriminatory public accommodations for African-American clientele prior to 1964, preceding the Civil Rights Act. Ending discrimination in accessing public accommodations was a primary objective of the civil rights movement. Discrimination in the provision of equal services to African American clientele was largely driven by discriminatory preferences of the majority White American customer base. White-owned businesses were unlikely to cater to Black consumers if serving them resulted in losses due to white consumers reverting to discriminatory businesses. During these times, African American consumers were likely to be in discomfort, at best, or in danger, at worst, at discriminatory businesses.

Cook et al. (2023) utilize the Negro Motorist Green Books, a travel guide published from 1936 to 1966 that helped Black travellers navigate friendly businesses across many states in the United States. The establishments included lodging, gasoline providers and eating and drinking. They also use World War II casualty data from Ferrara (2022) at the county level.

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They use a difference-in-differences identification strategy, using World War II white casualties as an exogenous shock that altered county-level demographic distributions. They show that reductions in white populations resulted in a greater number of non-discriminatory businesses. In addition, they employ an instrumental variable strategy to show that World War II casualties changed the share of Black customers which in turn affected the number of nondiscriminatory businesses.

Cook et al. (2023) stated the main finding on pp.42 as follows: "Our baseline difference-in-differences estimate is that a 10% increase in white casualties resulted in a 0.6% increase in the number of nondiscriminatory establishments in a county." Secondly, they stipulate "we use World War II casualties as an instrument for changes in the Black share of the population, and find that a 10% increase in the share of the Black population is related to a 2.2% increase in the share of nondiscriminatory hotels, a 0.6% increase in the share of nondiscriminatory restaurants, and a 0.2% increase in the share of nondiscriminatory gas stations." It can be noted that while the standard errors are clustered at the county level for the difference-in-difference estimation, the instrumental variable estimation does not cluster standard errors or correct for heteroskedastic errors.

We explore the reproducibility of the results of Cook et al. (2023) and further test the robustness of the main results by performing specification checks. We test the stability of the difference-in-difference estimates by dropping top four states with highest average white World War II casualties, and further by dropping Southern states. In addition, we test the stability of the Instrumental Variable estimates by correcting for robust standard errors and, trimming the sample size by dropping counties from the top and bottom white World War II casualties percentile distribution. We could successfully reproduce all the figures and tables using the replication package provided by the authors in the Harvard Dataverse repository. We could not reproduce the same estimates for Table 3, Panel A column 3. While the original estimated coefficient is stated as 0.0191, we could reproduce it as 0.0263. However, this did not put the conclusions drawn from this table to any disadvantage.

The sensitivity analysis suggests that difference-in-difference estimates are robust to dropping states with the highest average white World War II casualties or Southern states. Furthermore, the instrumental variable estimates are sensitive to using White standard errors. More specifically, the instrumental variable coefficients for "Black migration" are no longer significant after correcting for robust standard errors. It can be noted that the coefficients for the primary instrument, "white World War II casualties" remains significant. In addition, trimming the sample by dropping counties from the distribution of white World War II casualties does not alter the effects of the instrumental variable until 30 percentile from the top and bottom of the sample is dropped. Moreover, the IV estimate remains robust to dropping observations from Southern states.

2 Reproducibility

We utilize the replication provided by the authors in Harvard Dataverse. We were able to reproduce all the tables and figures in the paper, with a minor issue with Table 3. This table reports results with varying types of controls, with the chosen specification provided in column 4. In Panel A column 3 the paper reports an estimate of 0.0191 significant at 10%. In our reproduction, we find an estimate of 0.0263 significant at 10% (See table A1, column 3) . This column is reported to be estimated with a full set of county-level controls and year fixed effects. However, the Stata code for Table 3, Panel A column 3 includes state fixed effects. We re-estimated Panel A column 3 without state fixed effects; however, this does not change the

estimated coefficient (from 0.023).

This small change in the coefficient value does not alter the conclusions drawn from the results; in fact, it may be an improvement. Our reported estimate is a smaller decrease than originally suggested in the paper. The statement put forth by Cook et al. (2023) stands: after controlling for a rich set of factors, there is a significant relationship between the exogenous population change and growth of nondiscriminatory businesses.

3 Replication

We also performed a robustness replicability of the main econometric analysis of the paper (estimates provided in tables 3 and 4), which tests the sensitivity of the results. These are explained in the following subsections:

3.1 Dropping States

We check the robustness of the main results from the preferred specification provided in Table 3 column 4 Panel A (Main specification). The resulting estimates from this exercise are provided in table 1. We drop states with high levels of white World War II casualties to check if any of these specific states drive the results, since it is possible that these states have higher average World War II casualties compared to the full sample. Column 1 reports the original results from the table in Cook et al. (2023). Columns 2 to 4 exclude states with the highest average white World War II casualties and with at least 100 observations. All four of these states are in the Northeast region of the United States. Column 2 drops the state of New York; column 3 drops New York and Pennsylvania, and column 4 drops New York, Pennsylvania, New Jersey, and Massachusetts. Lastly, we exclude all Southern states in column 5 as the Southern region had the highest number of Green Book listings. We use the same specification as the original results; that is, we use county-fixed effects and clustered standard errors by counties.

The reported estimates in columns 2 to 5 are all significant at the 1% level and close to the original estimate of 0.0650. This indicates that the main conclusions drawn from the difference-in-difference estimation are not driven by changes occurring in any particular state or region.

3.2 Using robust standard errors

Table 4 in Cook et al. (2023) reports the coefficients of an IV estimation that instruments white World War II casualties for the change in the composition of the consumers without correcting for heteroskedastic error terms or, clustering the standard errors. We estimate the same equations but use the robust variance estimator (White standard errors). Using robust standard errors can improve the reliability of regression estimates as it corrects for heteroskedastic errors. Our results for the instrumental variable estimation are provided in table 2. We provide the coefficients using the layout of Table 4 in the paper: Columns 1 to 3 reports coefficients where we instrument white World War II casualties and use the full sample while columns 4 to 6 instruments Black migration and excludes counties in the South.

In Panel A (OLS estimates), the estimate in column 1 is significant at the 10% level instead of 1%. Moreover, there is an increase in significance of column 3 estimate to 5%, and decrease in significance of column 4 to 5%. Column 5 estimate is no longer significant, yet column 6 is now significant. Panel B (First stage) columns 4 to 6 estimates do not remain statistically significant after correcting for robust standard errors. Panel C (reduced form) column 1 is significant at

the 10% level instead of the 5% level. Columns 4 and 5 estimates are not significant while column 6 is now significant at the 5% level. Panel D, which reports the main IV results, also changed after correcting for robust standard errors: Column 1 estimates are significant at the 10% level instead of 5% level and columns 4 and 5 are no longer significant. These changes also hold when standard errors are clustered at the county level (Table A2).

3.3 Trimming the sample

We trim the sample for columns 1 to 3 in Table 4 Panel D in the paper to test the sensitivity of the results of the IV estimation. We do this by dropping counties at the top and bottom of the distribution of white casualties [1]. This sensitivity analysis can address any concern with the instrumental variable estimation being driven by counties with extremely high or low white casualties. We drop the top and bottom 5 percentiles in panel A of Table 3, leaving the middle 90 percentiles. Panels B and C report estimates after dropping the top and bottom 10 and 15 percentiles, respectively. Trimming the sample renders the IV coefficient for the share of black consumers statistically insignificant for formal lodging (column 1) and, eating and drinking establishments (column 2). The direction of effect is still positive as the original results until we drop the top and bottom 15 percentiles (panel C). Here, the estimated coefficient for column 1 becomes negative. Overall, while trimming the sample can weaken the instrumental variable (white World War II casualties in this case), it does not alter the conclusions drawn in the paper. On the contrary, the IV estimate coefficient for the sample of gasoline services (Column 3) are now statistically significant at the 5% level in Panels B and C.

As an additional step we drop all Southern states from the full sample in Table 3 Panel D. The coefficient for the instrumental variable remains statistically significant for the sample of formal lodgings (Column 1). Dropping counties from the Southern states does not alter the conclusions about the role of white World War II casualties on the share of Black consumers in the market.

4 Conclusion

To conclude, the robustness replicability exercises show that the results from the difference-in-difference estimation of the paper are vastly qualitatively similar after changing the sample under different assumptions. The results are stable after making certain changes to the sample, which includes dropping observations by states with the highest average World War II casualties or states situated in the Southern region. Our robustness checks recommend the use of White standard errors in case of the Instrumental Variable results. In addition, there is evidence that trimming the sample by the percentile distribution of World War II white casualties does not affect the original conclusion of the paper that explains the mechanism of the effect of white casualties on the market composition of consumers.

[1] This robustness exercise is used in the paper to test the stability of the results of table 3

5 Tables

Table 1: Robustness of Table 3 Column 4

	(1) Original results	(2) Drop New York	(3) Drop New York, Pennsylvania	(4) Drop 4 states	(5) Drop states in South
Asinh(# White Deaths)					
× Post-WW2	0.0650***	0.0579***	0.0645***	0.0627***	0.0616***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.012)
Observations	37248	36504	35700	35280	20244
Adjusted R^2	0.906	0.906	0.905	0.898	0.911
# clusters	3104	3042	2975	2940	1687

Standard errors clustered by county are in parentheses

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

Table 2: Table 4 results with robust standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
	Formal lodging	Eating	Gasoline	Formal lodging	Eating	Gasoline
Panel A: OLS results						
Asinh($\triangle ShareBlack$)	0.0656*	0.0234***	0.00643**	0.202**	0.158	0.00908***
	(0.034)	(0.009)	(0.003)	(0.100)	(0.115)	(0.003)
Adjusted R^2	0.003	0.010	-0.004	0.013	0.035	-0.009
Panel B: First stage results						
Asinh(white casualties)	0.00993***	0.00868***	0.00893***			
	(0.002)	(0.002)	(0.002)			
Asinh(Black migration)				0.385	0.318	0.316
				(0.349)	(0.284)	(0.284)
Panel C: Reduced Form results						
Asinh(white casualties)	0.00217*	0.000502**	0.000146			
	(0.001)	(0.000)	(0.000)			
Asinh(Black migration)				0.221	0.317	0.0175**
				(0.147)	(0.219)	(0.007)
Adjusted R^2	0.003	0.004	-0.005	0.000	0.026	-0.009
Panel D: IV estimates results						
Asinh($\triangle ShareBlack$)	0.219*	0.0579**	0.0163	0.573	0.995	0.0554
	(0.115)	(0.027)	(0.013)	(0.452)	(0.758)	(0.039)
Observations	1909	3050	3056	1235	1659	1654

Columns 1-3 use full sample and columns 4-6 restrict counties outside the South. Robust Standard errors in parentheses.

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

Table 3: IV results for the change in the share of non-discriminatory hotels

	(1)	(2)	(3)
	Formal lodging	Eating	Gasoline
Panel A: Dropping topbottom 5%			
Asinh($\triangle ShareBlack$)	0.0650	0.0256	0.00939
	(0.141)	(0.031)	(0.020)
Observations	1689	2708	2714
Panel B: Dropping topbottom 10%			
Asinh($\triangle ShareBlack$)	0.0930	0.00917	0.0281**
	(0.200)	(0.040)	(0.013)
Observations	1499	2423	2427
Panel C: Dropping topbottom 15%			
Asinh($\triangle ShareBlack$)	-0.0407	0.0598	0.0283**
	(0.254)	(0.036)	(0.014)
Observations	1294	2115	2117
Panel D: Dropping Southern States			
Asinh($\triangle ShareBlack$)	0.359***	0.0746	0.0274
	(0.121)	(0.057)	(0.052)
Observations	1235	1659	1654

Standard errors in parentheses

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

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Cook, L. D., M. E. Jones, T. D. Logan, and D. Rosé (2023) 'The evolution of access to public accommodations in the united states,' *The Quarterly Journal of Economics* 138(1), 37–102

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A Appendix Tables

Table A1: Main results from Table 3 Panel A (Effects of White Casualties on Number of Establishments)

	(1)	(2)	(3)	(4)	(5)	(6)
Asinh(# White Deaths)						
× Post-WW2	0.0650***	0.0650***	0.0263*	0.0650***	0.0884***	0.0488***
	(0.009)	(0.009)	(0.014)	(0.009)	(0.012)	(0.013)
Observations	37248	37248	37248	37248	37248	37248
Adjusted R^2	0.179	0.257	0.624	0.906	0.909	0.958
# clusters	3104	3104	3104	3104	3104	3104

Cluster robust standard errors in parentheses

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

Table A2: Table 4 results with cluster robust standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
	Formal lodging	Eating	Gasoline	Formal lodging	Eating	Gasoline
Panel A: OLS results						
Asinh($\triangle ShareBlack$)	0.0656*	0.0234***	0.00643**	0.202**	0.158	0.00908***
	(0.034)	(0.009)	(0.003)	(0.100)	(0.115)	(0.003)
Adjusted R^2	0.003	0.010	-0.004	0.013	0.035	-0.009
Panel B:First stage results						
Asinh(white casualties)	0.00993***	0.00868***	0.00893***			
	(0.002)	(0.002)	(0.002)			
Asinh(Black migration)				0.385	0.318	0.316
				(0.349)	(0.284)	(0.284)
Panel C: Reduced Form results						
Asinh(white casualties)	0.00217*	0.000502**	0.000146			
	(0.001)	(0.000)	(0.000)			
Asinh(Black migration)				0.221	0.317	0.0175**
				(0.147)	(0.219)	(0.007)
Adjusted R^2	0.003	0.004	-0.005	0.000	0.026	-0.009
Panel D: IV estimates results						
Asinh($\triangle ShareBlack$)	0.219*	0.0579**	0.0163	0.573	0.995	0.0554
	(0.115)	(0.027)	(0.013)	(0.452)	(0.758)	(0.039)
Observations	1909	3050	3056	1235	1659	1654

Columns 1-3 use full sample and columns 4-6 restrict counties outside the South. Standard errors in parentheses clustered by state.

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