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Table 1 | Pooled regressions showing average season decompression over US catch share fisheries

Model	Catch share region-post interaction: Coefficient	Catch share region-post interaction: Standard error	Standard error type	Cluster variable	*n*
Gini coef. (OLS)	−0.0913**	0.0281	Robust	None	504
Gini coef. (OLS)	−0.0913*	0.0385	Robust	Fishery pair	504
Gini coef. (OLS)	−0.0913*	0.0368	Newey-West	None	504
Gini coef. (FL)	−0.0902***	0.0198	Delta-method	None	504
Gini coef. (FL)	−0.0902***	0.0267	Delta-method	Fishery pair	504
Months to 70% (OLS)	0.8121**	0.2525	Robust	None	504
Months to 70% (OLS)	0.8121*	0.3380	Robust	Fishery pair	504
Months to 70% (OLS)	0.8121*	0.3301	Newey-West	None	504
Months to 80% (OLS)	0.9121**	0.2905	Robust	None	504
Months to 80% (OLS)	0.9121*	0.3928	Robust	Fishery pair	504
Months to 80% (OLS)	0.9121*	0.3820	Newey-West	None	504

*$P<0.05$, **$P<0.01$, ***$P<0.001$. Difference-in-differences models include year fixed effects, fishery pair fixed effects and year × fishery pair fixed effects. FL, fractional logit.

treatment–control analyses with multiple fisheries have quantified the effects of catch shares on biological outcomes but did not examine the race to fish[1,6,22].

We analyse 39 US fisheries treated with catch shares, where a fishery is defined as a unique target species in a region (or grouping of similar species). Our sample represents all federally managed commercial fisheries in the US that have adopted market-based management and for which publicly available landings data are reported at the monthly level (monthly data are used to analyse season lengths; Supplementary

a decrease in the Gini coefficient relative to change in the comparison fishery within the same period. We also test this hypothesis using alternative measures of season compression: the time (in months) taken to reach 70% and 80% of the total season's landings.

The statistical model is

$$G_{itk} = \alpha_i + \beta_1 \mathrm{POST}_{it} + \beta_2 \mathrm{TREAT}_{ik} + \beta_3 \mathrm{POST}_{it} \times \mathrm{TREAT}_{ik} + \theta_t + \theta_{it} + \varepsilon_{itk}$$

where G is the Gini coefficient on landings distribution across months, or months taken to land 70% or 80% of the annual total, for year t, fishery treatment–control pair i, and treatment status k. POST and TREAT are binary variables indicating that an observation occurs after catch share implementation and that it receives treatment, respectively. Fishery pair fixed effects (α_i) control for all unobserved, fishery pair-specific, time-invariant factors. Year fixed effects (θ_t) and year–fishery pair interactions (θ_{it}) control for all time-varying factors that influence both treatment and control fisheries. The average treatment effect of catch share implementation is the difference-in-differences (DID) estimator, β_3. We estimate ordinary least squares (OLS) models, as well as fractional logit models for the Gini coefficient outcome. Fractional logit explicitly models a response variable bounded by zero and one[23,24].

Pooling data across fisheries and regions, we find an average treatment effect (ATE) on the Gini coefficient ranging from −0.0902 to −0.0913 ($P<0.01$) (Table 1), indicating that catch shares substantially reduce the concentration of landings over time. The temporal distribution of landings for a given Gini coefficient is non-unique; however, examples can illustrate the magnitude of the treatment effect (Extended Data Fig. 1). For the average time taken to reach 70% and 80% of the catch, catch shares add 0.81 and 0.91 months, respectively.

Applying difference-in-differences to individual fisheries (Supplementary Table 2) yields significant ($P<0.05$) and negative Gini treatment effects (that is, season decompression) in 20 of 39 fisheries in fractional logit models (Fig. 2 and Extended Data Fig. 2). Two commonly lauded success stories in rights-based fisheries management, Alaskan halibut and Alaskan sablefish, have sizable treatment effects of −0.14 and −0.21, respectively ($P<0.01$). The average time to land 80% of the total harvest increased by 1.1 months for halibut and by

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