Impromptu fuel subsidy reform decreases effort by tuna longliners in the Gulf of Mexico

GCFI - Name of session here

Aubriana Rhodes & Juan Carlos Villaseñor-Derbez

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Agenda

- Motivation & Goals

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- What are fuel subsidies?

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- Results & discussion

Motivation

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- Subsidies that encourage overfishing are a key driver of overcapacity in the fishing industry
- Subsidization is economicaly inefficient

Goals

- Understand how fishing behavior changes in response to policy

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- Provide a reference for actions that decrease fishing effort

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- Many fisheries are not profitable without subsidies

Previous Work

- Revollo-Fernández et al. (2024) estimated economic and marginal product value to establish a direct relationship between subsidies and extraction

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- Sumaila et al. (2019) establishes the bulk of global subsidies to still be within the category of "capacity-enhancing" subsidies

Relevant Policy Reform

Impromptu Mexican subsidy reform

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- Understand how Mexico's subsidy reform has caused a shift in effort, landings, and catch-per-unit-effort
- Focus: tuna longline fleet in the Gulf of Mexico, heavily subsidized prior to 2020

Data sources

Subsidy data

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Vessel-level landings

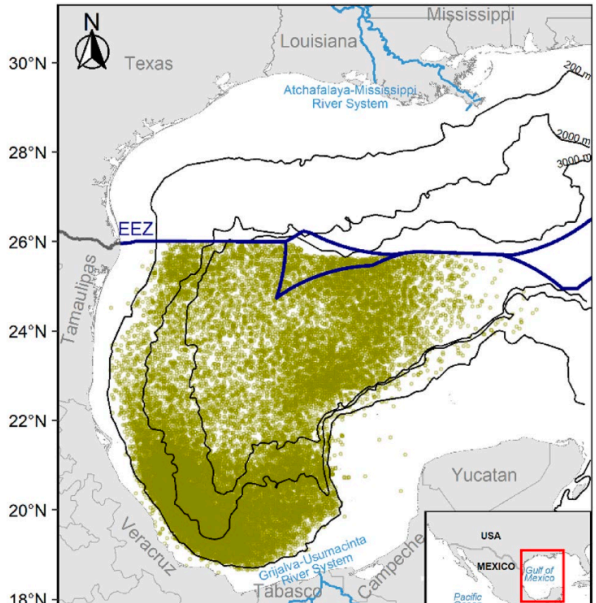
- From National Commission of Aquaculture and Fisheries (CONAPESCA)
- Target species and annual weight of live catch (kg)
- 2000-present

Vessel status data

- Mexican vessel registry including vessel characteristics, gear type, and home port

Methods

Focus Area


N
Texas
Louisiana
Mississippi
Atchafalaya-Mississippi River System
200 m
2000 m
3000 m
EEZ
Tamaulipas
Veracruz
Tabasco
Campeche
Yucatan
Grijalva-Usumacinta River System
30°N
28°N
26°N
24°N
22°N
20°N
18°N
USA
MEXICO
Gulf of Mexico
Pacific

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  - 26 longline vessels (81.3% of total fleet)
  - 2016-2024
  - Depth $>$ 50m, Distance from shore $>$ 500m
- Merged with subsidy and landings data
- Calculated annual effort (hours), total catch (kg) and catch-per-unit-effort (kg/hr) by vessel

Data analysis

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- β: Effect of subsidy reform on outcome variable

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- We used a linear regression model to analyze the differences in effort, catch, and catch-per-unit-effort before and after subsidy reform

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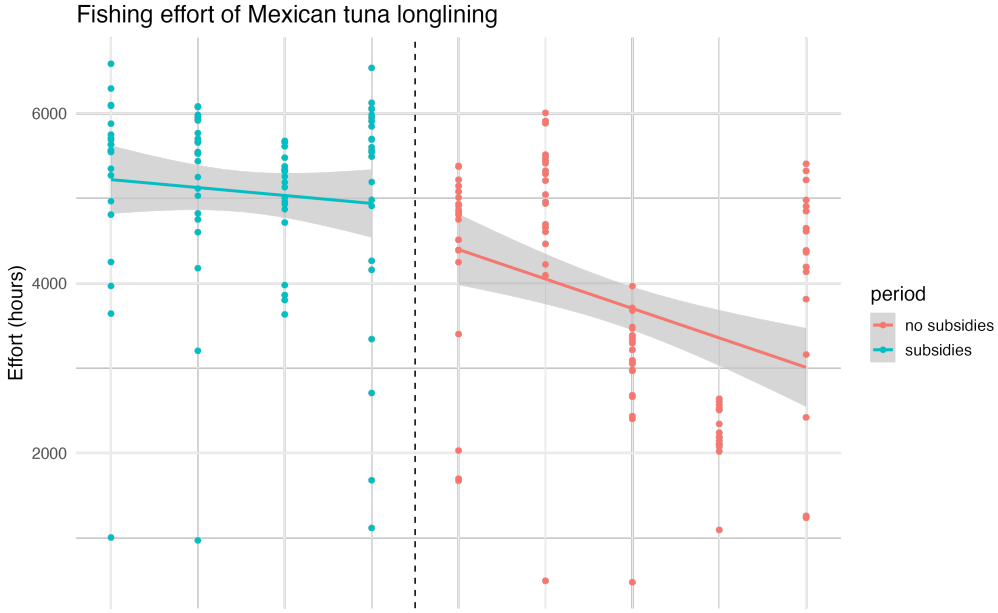
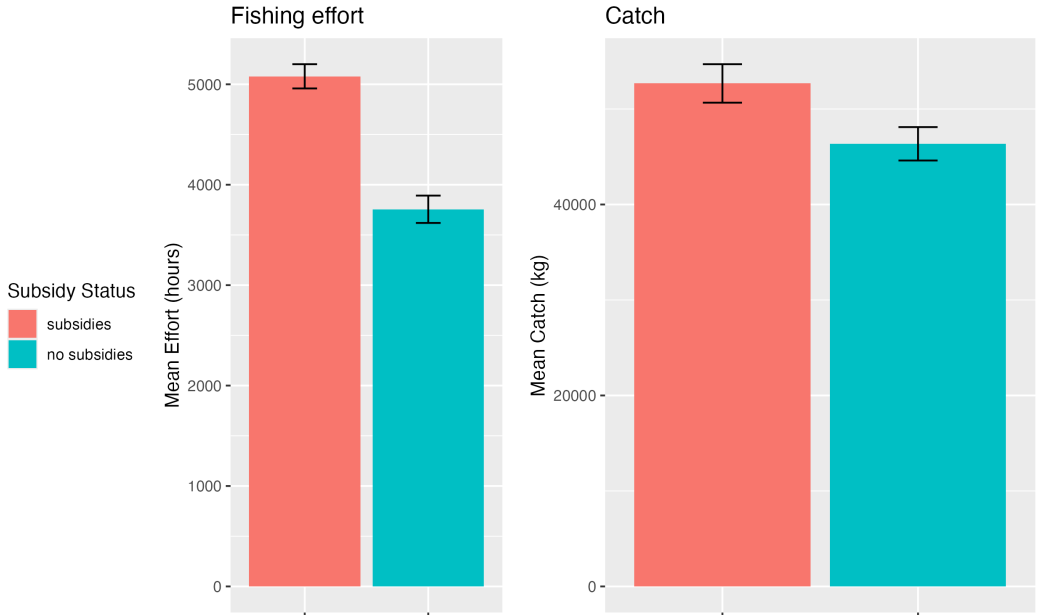
- This allows for an understanding of vessel-level differences in fishing behavior and productivity

Patterns- effort



Patterns- effort, catch, and catch-per-unit-effort



Results

Table 1: Impact of Subsidy Reform on effort, catch, and catch-per-unit-effort (cpue)

Dependent Variables:	effort (hours)	catch (kg)	cpue (kg/hr)
Subsidized period	5,079.47	52,678.63	10.35
No subsidy period	-1,361.4***	-8,540.4***	2.19***
Standard Error	(190.9)	(2,285.2)	(0.617)
Observations	187	187	187
R^2	0.311	0.422	0.345
*** p<0.01			

- 26% decrease in effort

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- 16% decrease in catch
- 20% **increase** in catch-per-unit-effort

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- Long-term impacts of reforms require further investigation to ensure sustainable fisheries management

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Next steps

- Compare patterns of behavior to an unsubsidized fleet as a control group

Thank you

Thank you

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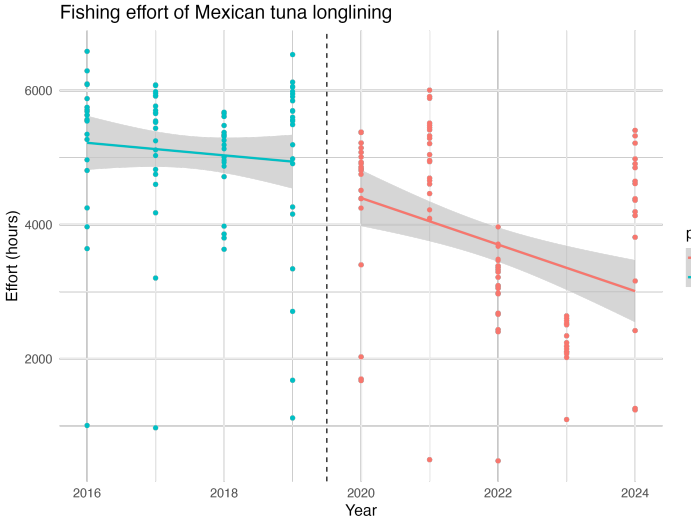
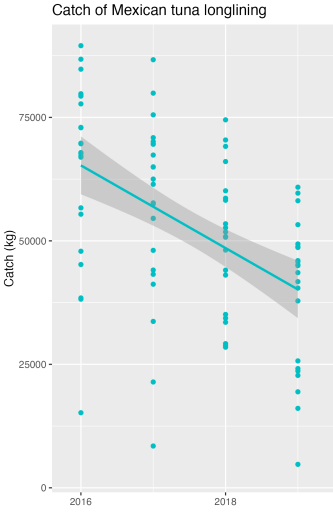
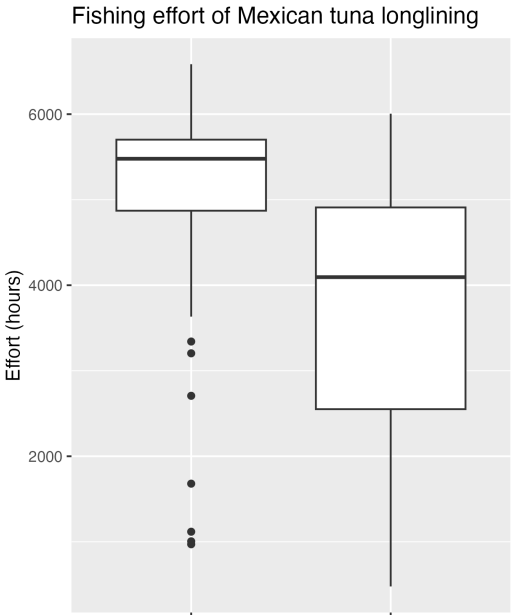
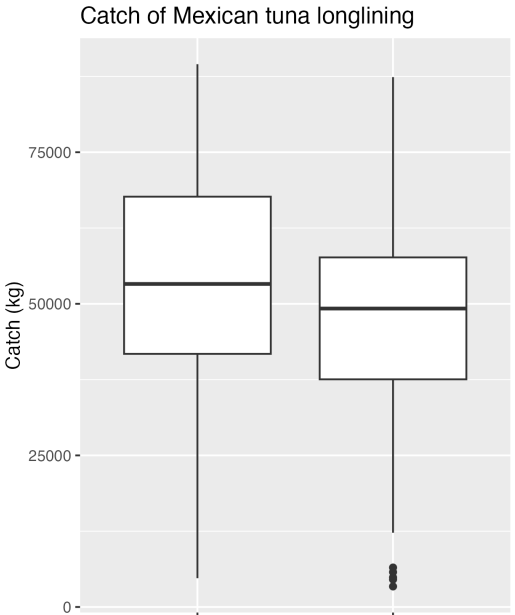
Scatter plots





Box Plots


Fishing effort of Mexican tuna longlining
Effort (hours)
6000
4000
2000


Catch of Mexican tuna longlining
Catch (kg)
75000
50000
25000
0

Effort box plots

Before and after subsidy removal