Examining the Effects of Fuel Subsidy on Unauthorized Fishing Activity: the Case of the Program Reforms in China on Large Trawler Fleets

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Abstract

In recent years, there has been significant discussion regarding the impacts of input subsidies on the sustainability of marine ecosystems, particularly in terms of promoting overexploitation through the marginal reduction of costs; moreover, Illegal, Unauthorized, and Unreported (IUU) fishing has significant implications for the sustainability of many fisheries worldwide. Using a newly released dataset, I examine the impact of the fuel subsidies provision on fishing activity and unauthorized fishing following a fuel subsidy program reform introduced in 2016 by Chinese government. The Chinese fishing fleet is the largest in the world, with its coverage extending globally. The Chinese government has been known for providing a wide variety of subsidies within its economy to bolster its economic position relative to other world economies. In 2016, China introduced a reform to its fuel subsidy program for fishing fleets due to high levels of subsidy expenditure, fuel consumption, and overfishing. By leveraging the discontinuities introduced by the reform, I identified that access to input subsidies created distortions in the benefit function of fisheries. This was evidenced by an increase in distant water fishing activity and in unauthorized fishing hours.

Key words: Fuel Subsidies, Fisheries Management, Commercial Fishing, Unauthorized Fishing.
JEL Classification: H23,O13,Q22,Q28

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1 Introduction

Input subsidies have been widely used as an instrument for capacity-enhancement across various sectors of the economy (Sumaila et al., 2019). In the fisheries sector, in particular, there has been considerable debate about the implications of subsidies in contributing to the overexploitation of marine resources and the depletion of natural products (Sumaila et al., 2021, 2019). In 2018, approximately 22 million dollars were distributed in subsidies to global fisheries, representing 15% of total fishing revenue. This has generated overcapacity leading to overexploitation problems in scenarios with low controls (Wang et al., 2023, Sumaila et al., 2019). The provision of subsidies is particularly concerning because it enables vessels to fish outside their own countries, venturing into the high seas or the waters of other nations (Englander et al., 2023), generating rents that would not have been possible without the subsidies (Sumaila et al., 2019). Moreover, this creates distortions in national budgets, complicating the management of other fiscal objectives and increasing the opportunity cost for governments and society (Davis, 2014).

Currently, the World Trade Organization (WTO) has been promoting negotiations to eliminate input subsidies in fisheries to ensure the reduction of overfishing levels. According to Englander et al. (2023), 16 out of 18 FAO regions are experiencing overfishing, putting the sustainability of marine natural resources at risk.

Although recent literature has presented causal evidence on the implications of subsidy provision on fishing capacity (Wang et al., 2023) and overfishing (Englander et al., 2023), there is a lack of causal empirical evidence on the incentives that access to subsidies can generate for unauthorized fishing activity. Unauthorized fishing is understood as fishing activity conducted by a vessel in foreign waters where it does not have an access agreement. Such practices fall under the concept of environmental injustice, where the provision of subsidies reduces marginal costs and increases the benefits of national fishing fleets at the expense of exploiting the natural resources of other nations. This has been shown to contribute to other social problems such as piracy (Phayal et al., 2024, Mitchell and Schmidt, 2024, Denton and Harris, 2021).

In this article, I utilize a newly released dataset containing individual-level information on trawler fishing vessels compiled by Wang et al. (2023) from the Marine Fishing Vessel Dynamic Management System of Zhejiang province, which has the largest fishing fleet in the East China Sea. Additionally, I use information from Global Fishing Watch to measure real-time fishing behavior. To characterize the type of fishing according to authorization status, I use data from the Fishing Access Agreements database provided by the Sea Around Us platform. With this information, I evaluate the effect of the subsidy program reform implemented in China in 2016 on unauthorized fishing activity. The reform introduced multiple discontinuities in subsidy allocation: one based on vessel size (Wang et al., 2023) and another based on gross tonnage and engine power (Englander et al., 2023). Given the composition of the dataset, the

second discontinuity does not allow differentiation between binding and non-binding vessels, so I use the discontinuity introduced by vessel size. Vessels just over 30 meters in length received approximately 19% more in subsidy payments than those under 30 meters.

The redesign of China's subsidy allocation program motivates the implementation of a regression discontinuity model. However, the reform impacted not only the margin around the cutoff but also the continuum of vessels. For some, the subsidy reduction compared to the previous year was much greater, but it decreased for all. Thus, a difference-in-differences (DiD) estimation can capture more information than a regression discontinuity (RD) model, given that RD estimates are local and concentrated around the cutoff point. Considering these factors, I prefer to use a DiD model to obtain more generalizable estimates, differentiating the vessel population by size in accordance with the program's design; comparing vessels over 30 meters with those under 30 meters.

The estimates suggest that access to subsidies increases the number of fishing hours in international waters while decreasing domestic fishing hours. Consequently, a higher number of fishing hours in distant waters leads to an increased of unauthorized fishing activity. The estimates clearly indicate that the mechanism explaining these results is greater access to fuel subsidy payments. This article thus contributes to the discussion on the detrimental effects of subsidy provision in the marine context, given the distortion in incentive formation among fishermen.

The remainder of the article is structured as follows: Section 2 provides a description of the fuel subsidy program reform introduced in China in 2016. Sections 3 and 4 describe the data and the empirical model used, respectively. Finally, Section 5 presents the results, and Section 6 discusses the findings and concludes the article.

2 Institutional Framework

2.1 Fuel subsidy program reform

China has distinguished itself as one of the nations with the largest fishing fleets in the world. The dynamics of its fishing activities have had a global impact, driven by the high domestic demand for seafood products. Consequently, for decades, the Chinese government has promoted policies aimed at strengthening its fishing exploitation capacity.

During the 1980s, the Chinese government insulated its economy from fuel price fluctuations through the provision of subsidies. The Chinese Communist Party (CCP) purchased gasoline at high prices and sold it in the domestic market at lower prices. However, by the early 2000s, it began to experience significant budget deficits, which contributed to the decision in 2006 to re-expose the national economy to international fuel prices. This change created a shock in vulnerable sectors, including the fishing sector. Consequently, subsidies were provided only to these more vulnerable sectors according to a series of parameters. Re-

garding the fishing sector, the allocation of subsidy was based on fuel consumption, gear type, engine power, and vessel size.

In 2016, the CCP decided to reform its fisheries subsidy program in response to international pressures regarding the impacts of subsidies on ecosystem sustainability and in promotion of its new "Ecological Civilization" agenda. Additionally, the program, as it was designed, contributed to high levels of subsidy expenditure, fuel consumption, and overfishing. The reform was primarily based on classifying vessels larger than 12 meters into 12 groups according to their size. Then, based on the vessel's gear type, a subsidy coefficient was assigned that negatively weighted those gear types that were more harmful. Furthermore, the baseline fuel price standard was reduced by 18% per year. The subsidy payment follows the following formula:

$$\begin{aligned} \text{Subsidy} = &\text{ Baseline Fuel Price Standard} \\ &\times \text{ Average Engine Power per Length Class Bin} \\ &\times \text{ Revised Subsidy Coefficient} \end{aligned}$$

The reform introduced multiple discontinuities in subsidy allocation: one based on vessel size (Wang et al., 2023) and another based on gross tonnage and engine power (Englander et al., 2023). In terms of vessel size, the subsidy payments decreased for all vessels; however, the decrease was smaller for larger vessels compared to smaller ones (Figure 1).

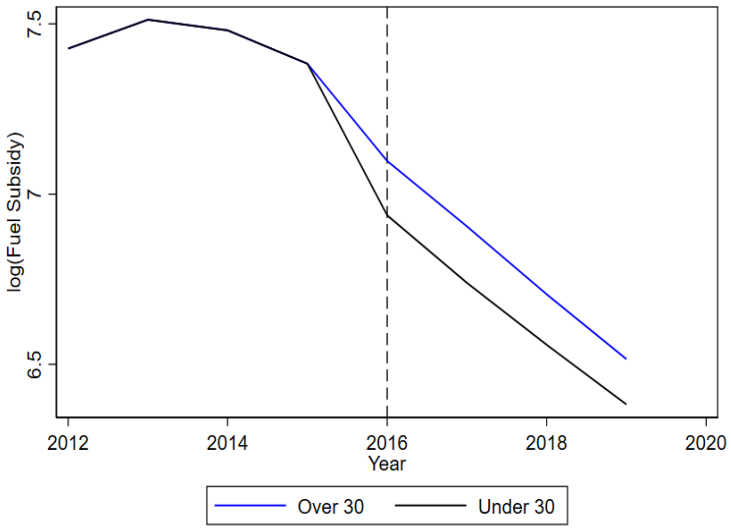


Figure 1. Fuel subsidy payments. Author, using information from Global Fishing Watch and Wang et al. (2023) database.

2.2 Quota management program and Vessel buyback program

The management context of the fishing sector in China is complex, involving the integration of various programs aimed at reconciling economic growth with sustainable sector development. Alongside the subsidy program, since 2002, the Vessel Buyback Program (VBP) has been implemented. This program provides funds to fishermen willing to exit the fishing market and transition to non-fishing activities, coupled with the relinquishment of the power quota granted for vessel operation.

The purpose of the VBP is to remove from the fishing industry those vessels that have a greater impact on the ecosystem, such as trawlers. This program is grounded in the Quota Management Program for fishing power, which operates in conjunction with the Licensing System. Under this system, each vessel must annually undergo registration, inspection, and management with the Ministry of Agriculture to obtain a fishing license. The Licensing System was introduced as a tool to curb the disproportionate growth in the number of vessels. New vessels could only be constructed by acquiring the licenses of outgoing vessels, thus creating a market for licenses. These programs collectively aim to achieve "negative growth."

Despite the CCP's efforts to control the environmental impacts of the fishing fleet size, these measures had limited effects due to the coexistence and poor design of the subsidy program, which encouraged fishermen to remain in the market. This situation changed with the 2016 reform. Savings from the redesign of the subsidy program allowed for an increase in the bonuses granted through the VBP, this increase was more significant in the province of Zhejiang as part of its own objective to reduce the size of its fishing fleet (Wang et al., 2023), contributing to the reduction of the fishing fleet's capacity through subsidy reductions. Given the structure and combination of the programs, trawler-type vessels were immediately impacted, as they were the primary target of the program due to their harmful nature (Figure 2).

Thus, the Chinese case represents a valuable opportunity to evaluate how fishing incentives and decisions are affected by changes in subsidy provision and opportunity costs, as measured by the offer of exit bonuses from the fishing market. This scenario also allows for an assessment of the impact on the dynamics of unauthorized fishing activities. By removing fishing incentives, the likelihood of engaging in such activities, particularly in the context of Distant-Water Fleets, is expected to decrease. There is evidence that reductions in subsidies lead to vessels traveling shorter distances to fish (Englander et al., 2023).

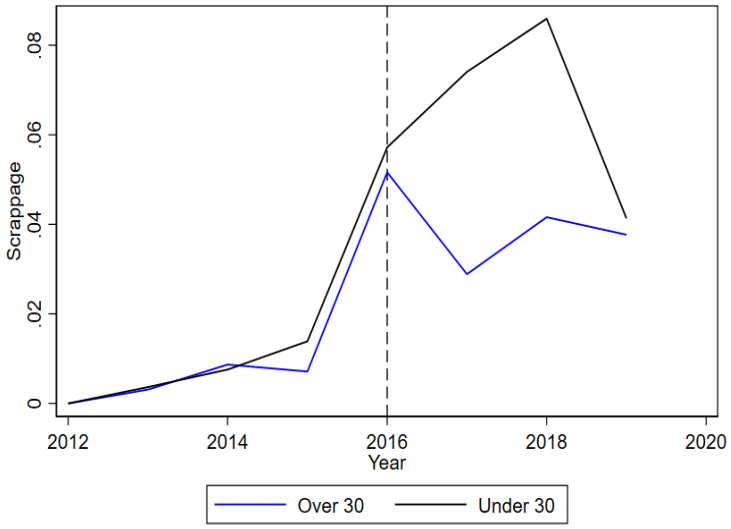


Figure 2. Exit probability. Author, using information from Global Fishing Watch and Wang et al. (2023) database.

3 Data

3.1 Descriptive and Sources

To examine the relationship between access to fuel subsidies for industrial fishing vessels and fishing activity, I utilize data from two primary sources: i) a newly released database compiled by Wang et al. (2023) that contains individual-level administrative data on fishing vessels registered in the Marine Fishing Vessel Dynamic Management System of the Zhejiang provincial government. This administrative platform comprises five modules corresponding to each section of the vessel management activities: engine power quota, vessel name, vessel inspection, vessel registration, and fishing license; and ii) data from Global Fishing Watch (GFW), which provides information on the number of fishing hours conducted by each vessel at a resolution of 0.01 degrees per pixel on a daily basis.

The database from Wang et al. (2023) contains reports from 7,592 vessels constructed between 1988 and 2011. A total of 3,354 vessels, representing 44% of the sample, were successfully matched with GFW data.

3.2 Summary of Data

The resulting database comprises fishing activity in hours per day/pixel for 3,354 trawler vessels from Zhejiang province in China for the period 2012-2019. The database also includes the characteristics of the vessels, records of the fuel subsidy payments received, and records

of exits through the vessel buyback program.

Table 1: *Summary Statistics of the main outcome variables*

	Min	**25%**	**50%**	**Mean**	**75%**	**Max**	**Obs**
Total fishing hours	0	0	0	1.25	1.03	45.39	5,076,734
Total fishing hours (Without 0)	0.00	0.93	2.07	3.63	4.57	45.39	1,752,344
Authorized fishing hours	0	0	0	1.31	1.15	45.39	4,829,814
Authorized fishing hours (without 0)	0.00	0.93	2.07	3.63	4.57	45.39	1,737,399
Unauthorized fishing hours	0	0	0	0.25	0	39.06	246,920
Unauthorized fishing hours (without 0)	0.00	0.70	2.03	4.16	5.30	39.06	14,945
Fuel subsidies (RMB/kW)	331	959.19	1608.48	1375.44	1774.08	1830.72	5,076,734
Authorization status	0	-	-	95.1%	-	1	5,076,734
Scrappage	0	-	-	2.27%	-	1	5,076,734

Note: Fishing hours are presented as total hours per pixel/day. Fuel subsidies are expressed as the annual payment in Chinese Yuan (RMB) per Power (KW).

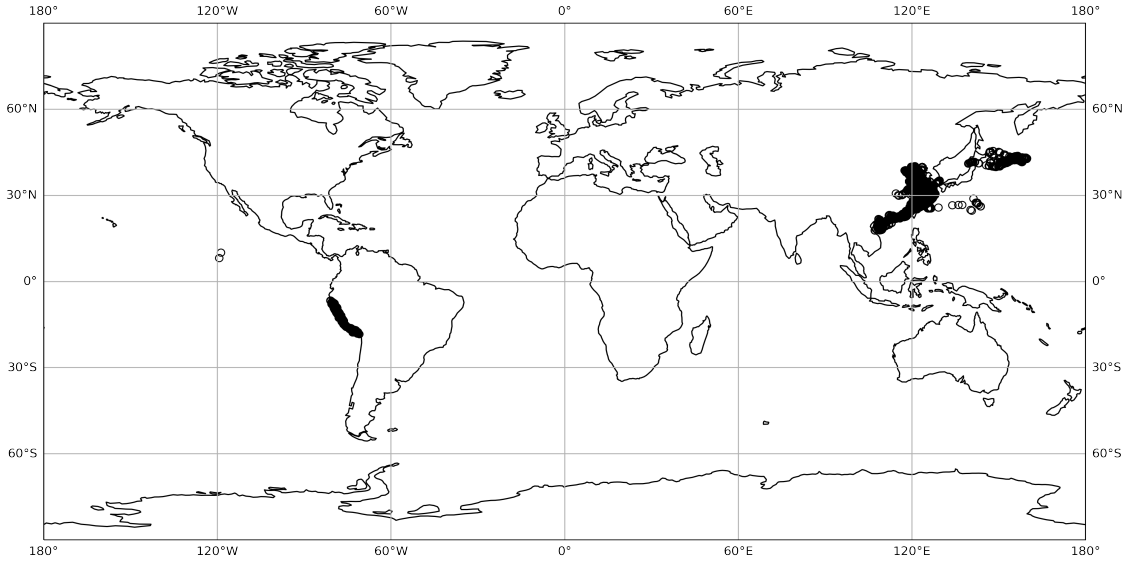


Figure 3. Coverage of Chinese Trawler Vessel's Fishing activity. Author, using information from Global Fishing Watch and Wang et al. (2023) database.

Table 2: *Chinese Fishing Activity by Countries and Sovereign*

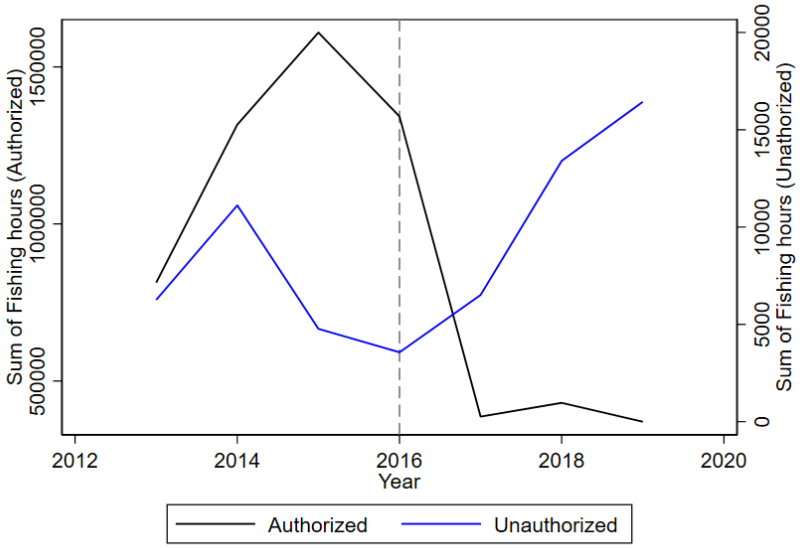
Country	Sovereign	Agreements	Fishing Hours		
			Obs	Mean	SD
China	China	-	4,823,308	3.63	4.25
South Korea	South Korea	Yes	4,466	3.34	4.06
Taiwan	Taiwan	No	4,100	4.79	5.40
Conflict Zone	Disputed	No	3,209	3.79	4.76
Japan - Korea	Joint Regime	No	3,092	4.34	5.35
Peru	Peru	Yes	2,036	2.13	1.91
Japan	Japan	No	2,034	3.69	4.30
Southern Kuriles	Disputed	No	15	2.02	-
Vietnam	Vietnam	No	4	0.98	0.68

Note: The agreements were defined according to the internal fishing access agreements dataset from Sea Around Us. The existence of an agreement is determined by whether a formal agreement was signed between the parties for the years under analysis (See Appendix B).

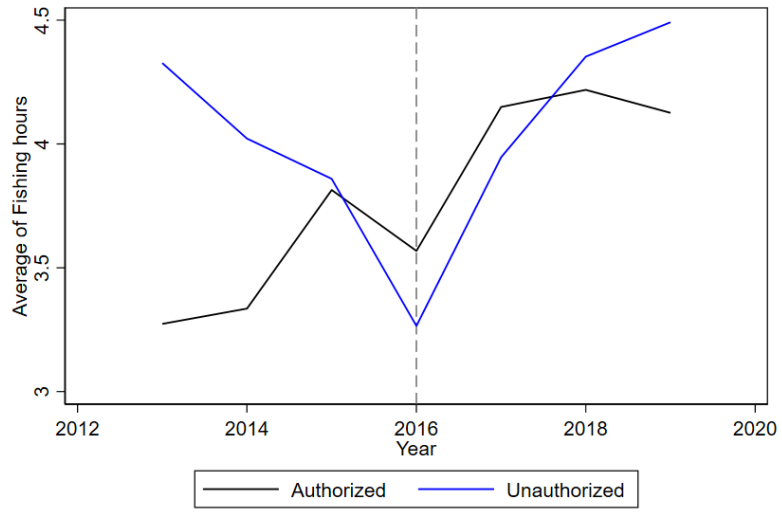
The descriptive statistics for the outcome variables are presented in Table 1. On average, vessels spend 1.25 hours/day/pixel on fishing activities (3.64 hours/day/pixel for positive fishing hours). In terms of authorization status, vessels average 1.31 hours/day/pixel in authorized fishing and 0.25 hours/day/pixel in unauthorized fishing. For positive fishing hours, the averages are 3.63 and 4.16 hours/day/pixel, respectively. No-positive fishing hours refers to the pixels where fishing vessels passed through but did not engage in any fishing activity. This indicates the transit from one fishing location to another.

Figure 3 illustrates the extent of the fishing activity of the vessels in the database, primarily along the eastern coast of China. For positive fishing hours, vessels fished an average of 3.63 hours/day/pixel in national territory, 4.79 hours/day/pixel in Taiwanese territory, 4.34 hours in the joint regime area between Japan and Korea, 3.79 hours in disputed zones, and 3.69 hours in Japanese territory. Additionally, there was recorded fishing activity in the territories of South Korea, Peru, the Kuril Islands, and Vietnam (Table 2). Figure A2 shows the distribution of vessel length.

Regarding the authorization status of fishing activity, Figure 4 shows the evolution of fishing according to its type of authorization for the years 2012-2019. Panel (a) displays the total sum of fishing hours/day/pixel, indicating that vessels engaged in more authorized fishing hours before the subsidy program reform in 2016, but this trend reversed post-reform. Similarly, panel (b) presents the average fishing hours/day/pixel, showing the same pattern.



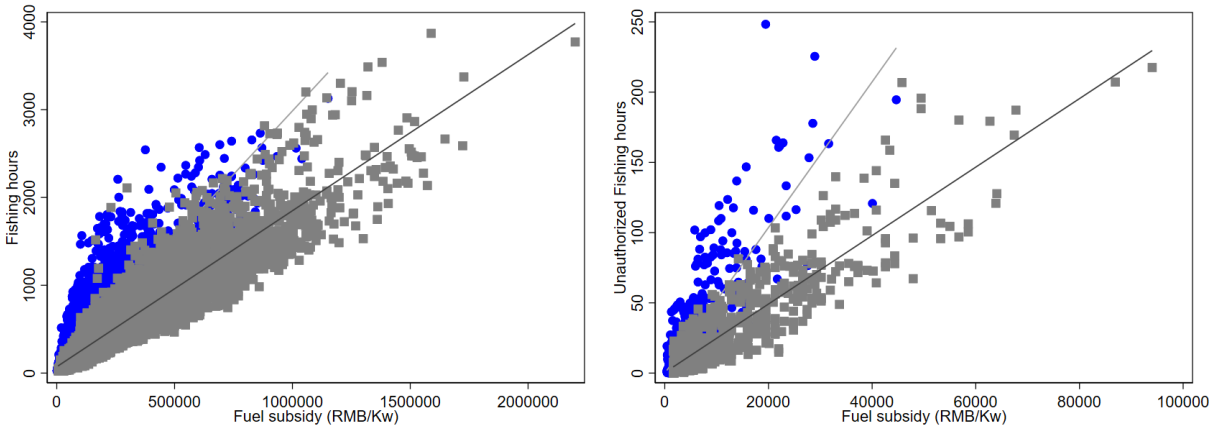
(a) *Total Fishing Efforts*



(b) *Average Fishing Efforts*

Figure 4: Fishing Efforts by authorization status. Note: Panel (a) shows the total fishing efforts for authorized and unauthorized fishing, and panel (b) shows the average total fishing efforts.

The hypothesis to be evaluated in this paper is linked to the role of access to subsidies as an incentive for increased development of fishing activity, greater capacity to fish in foreign waters, and in turn, increased development of unauthorized fishing activity.



(a) *Total Fishing Efforts* ***(b)*** *Unauthorized Fishing Efforts*

Figure 5. The relationship between fishing efforts and fuel subsidy payments before and after reform. Note: The figure show in blue the total and unauthorized fishing efforts after reform, respectively; and the results before reform are displayed in gray.

Figure 5 depicts the relationship between the number of fishing hours and payments for fuel subsidies before and after the reform. It can be observed that the correlation between the total number of fishing hours and payments for fuel subsidies was higher before the reform, being 94.79% before the reform and 91.73% after the reform. Similar patterns are observed for the number of unauthorized fishing hours, with a correlation of 93.61% before the reform and 88.71% after the reform. This result is explained by the lower access, in general, to subsidies for all vessels after the reform compared to the records before the reform, as will be further detailed later on. However, a high correlation between these variables is evident, suggesting the need to evaluate this relationship in greater detail.

4 Empirical Model

To estimate the effect of subsidy allocation on fishing activity and the probability that vessels engage in unauthorized fishing areas, I use a main specification of Difference-in-Differences (DiD) design according to the following specification:

$$y_{izt} = \beta D_i \times Post_{t_y} + \gamma_i + \phi_z + \rho_t + \epsilon_{izt} \tag{1}$$

Where y is the outcome variable of fishing efforts for vessel i at pixel z on the day t. The variable $D_i = \mathbb{1}\{\text{Vessel Length} \geq 30\}$ indicates whether the vessel has a length greater than 30 meters. This is an arbitrary threshold chosen based on the evaluation of subsidy access distribution by vessel size. $Post_{t_y}$ takes the value of 1from year $t_y = 2016$,when the subsidy program reform was implemented, and 0 otherwise. The variables γ_i, ϕ_z y ρ_t represent vessel

fixed effects, pixel fixed effects, and time fixed effects, respectively. The coefficient of interest is β which captures the effect of the reform to the fuel subsidy program by large vessels.

To avoid potential bias from manipulation of the treatment assignment rule, the database consists of vessels built before 2012. Given this, and considering that D_i is a characteristic that does not vary over time in the analysis period, there is no reason to believe that D_i is correlated with unobserved factors that determine the outcome variable. Therefore, it is not necessary to include additional covariates or fixed effects.

Taking into account the distribution of vessels by size, the regressions are estimated for vessels around the 30-meter threshold. As the main estimation, the regressions are conducted for vessels between 25 and 35 meters. After the reform, vessels larger than 30 meters received approximately 19% more subsidy payments compared to vessels smaller than 30 meters.

Building on equation (1), I made the following change: similar to Wang et al. (2023), I replaced $\beta D_i \times Post_{t_y}$ with $\beta_j D_i \times Post^j_{t_y}$ for $j = 2012, ..., 2019$, where $Post^j_{t_y} = \mathbb{1}\{t = j\}$. This allows me to obtain the treatment effect over the years, thus conducting an event study that shows the effect of the subsidy program reform over time.

To ensure the correct estimation of the causal effect of the change in subsidy access on unauthorized fishing activity using the difference-in-differences method, it is necessary to satisfy the following assumptions: i) *No anticipation.* This refers to the assumption that fishermen did not have the opportunity to adjust vessel characteristics to take advantage of the treatment assignment rule. To prevent any bias, only vessels built before 2016 are considered. ii) *Parallel trends.* This assumption presupposes that the fishing behavior of vessels that had access to more subsidies and those that had access to fewer subsidies follows parallel trends before the reform. Graphical representations of this assumption are presented in the Figure A1.

5 Results

5.1 Main findings

Table 3 presents the results of the impact of the reform of the fuel subsidy program on fishing activity variables. It is observed that on average, after the reform, vessels larger than 30 meters experienced a decrease of 1.53% in the total number of fishing hours compared to fishing conducted before the reform and by smaller vessels. Similarly, it is observed that these vessels decreased the total hours of fishing in national waters by 1.53% and increased fishing activity in foreign waters and open seas by 18.8%.

Table 3: *Average treatment effect of fuel subsidy program reform on fishing activity*

	Total fishing hours		National fishing hours		Fishing hours in foreign waters	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated*Post	-0.0347***	-0.0153***	-0.0363***	-0.0153***	0.0373***	0.1882**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.064)
Controls	No	Yes	No	Yes	No	Yes
Mean of Y	1.262	1.262	1.315	1.315	0.246	0.246
Obs	4,302,744	4,104,374	4,092,151	4,092,146	210,593	12,112

Note: The outcome variables are expressed in log. Vessel, year, month and pixel controls are included.

When looking at where these increases in fishing in foreign waters occurred, it is observed that fishing hours in countries without a fishing access agreement increased by 18.8% (Table 4). Following the reform, fishing activity by larger vessels began to migrate from national territory to foreign territory, explained by lower relative marginal costs due to access to subsidies. This increased foreign activity manifested in a significant increase in unauthorized fishing activity.

Table 4: *Average treatment effect of fuel subsidy program reform on unauthorized fishing activity*

	Unauthorized fishing hours	
	(1)	(2)
Treated*Post	-0.368***	0.188**
	(0.035)	(0.064)
Controls	No	Yes
Mean of Y	2.791	2.791
Obs	12,287	12,112

Note: The outcome variables are expressed in log. Vessel, year, month and pixel controls are included.

The effect of the reform on unauthorized fishing activity was consistent over time and intensified as the years passed. Figure 6 presents the estimates from equation (1) relative to the year of the reform. It can be observed that the number of unauthorized fishing hours increased from the first year, but it became significant from the year 2017 onwards, remaining so in the year 2019.

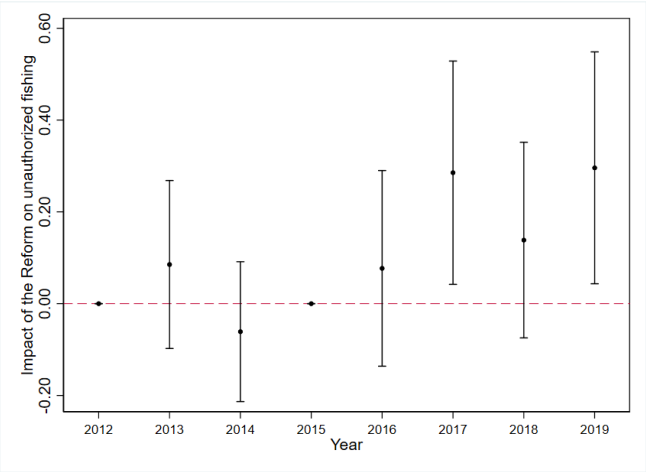
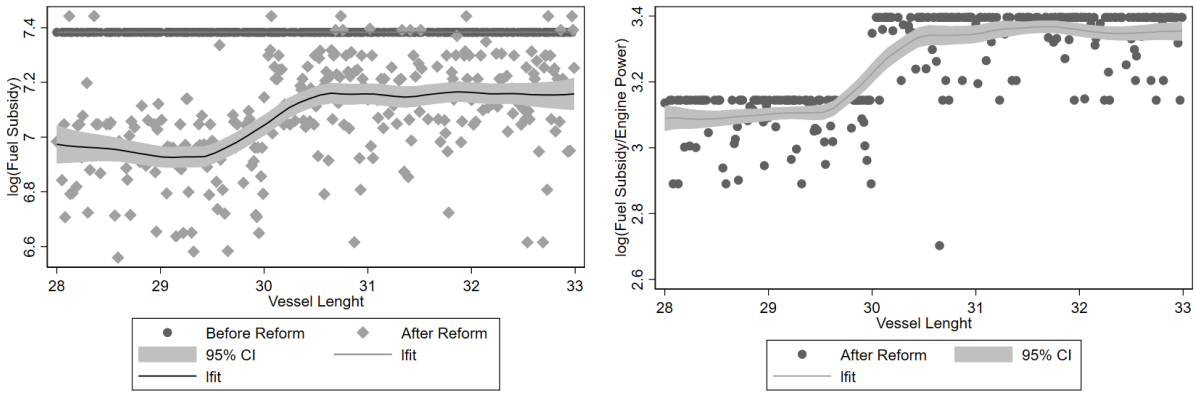


Figure 6: Event study of fuel subsidy program reform effect on unauthorized fishing hours.

5.2 Mechanism

The key factor explaining the findings is access to fuel subsidies, which contributes to vessels conducting a greater number of fishing hours and also incentives them to engage in unauthorized fishing activity due to lower opportunity costs.



(a) *Fuel Subsidy Access in 2015-2016* ***(b)*** *Fuel Subsidy Access in 2016*

Figure 7. The relationship of Fuel subsidy payments per KW and vessel length in 2015 and 2016. Note: Panel (a) shows the total fuel subsidy payments before and after reform, and panel (b) shows the total fuel subsidy payments per Kw of engine power after reform.

Figure 7 depicts the payments for fuel subsidies made before and after the reform. In panel (a), it is observed that before the reform, vessels received the same payments regardless of size, whereas after the reform was introduced, the total subsidies decreased (panel a) and this decrease was more pronounced for vessels smaller than 30 meters (panel b). Table 5 displays

the effect of the reform on subsidy access and the probability of exiting the fishing market. It is observed that after the reform, vessels larger than 30 meters received 15.8% more subsidies than vessels below 30 meters, and furthermore, larger vessels had a 2.49% lower probability of exiting the market. This is consistent with the results presented by Wang et al. (2023).

Table 5: *Average treatment effect of fuel subsidy program reform on fuel subsidy access and exit probability*

	Fuel subsidy		Scrappage	
	(1)	(2)	(3)	(4)
Treated*Post	0.141***	0.158***	-0.017***	-0.0249***
	(0.0004)	(0.0003)	(0.0003)	(0.0003)
Controls	No	Yes	No	Yes
Mean of Y	1,375.4	1,375.4	0.023	0.023
Obs	4,302,744	4,104,374	4,302,744	4,104,374

Note: The outcome variables in columns (1)-(2) are expressed in log. Vessel, year, month and pixel controls are included.

These results suggest that given the increased access to subsidies, vessels had a lower marginal cost of fishing, which allowed them to engage in fishing activities over longer distances. As a result, fishing hours in foreign waters increased, aligning with the findings of Englander et al. (2023). Additionally, unauthorized fishing activity increased due to lower relative opportunity costs.

6 Conclusion

The issue of illegal, unauthorized, and unregulated (IUU) fishing has significant implications for the sustainability of fisheries worldwide. Similarly, in recent years, awareness has grown regarding the implications of subsidies provided to inputs on natural capital in the maritime context. This article leverages a natural experiment in subsidy allocation within the fishing fleet of Zhejiang province to evaluate the impact of subsidy access on unauthorized fishing activity.

The main finding of this article shows that increased subsidy access increases the number of hours of unauthorized fishing activity by 18.8%. The reform contributed to vessels over 30 meters accessing 15.8% more in fuel subsidy payments compared to smaller vessels, which led to a decrease in fishing hours in national territory and an increase in fishing activity in foreign waters. These results are consistent with findings by Englander et al. (2023), which indicate that increased fuel subsidy access increases traveled distances and total fishing hours.

The results of this article contribute to the current debate on the impacts of input subsidy

provision in fisheries. With reduced subsidy provision, favorable outcomes for ecosystem sustainability are expected, reducing the likelihood of natural resource depletion through reductions in fishing effort and consequently decreasing disparities generated by IUU fishing.

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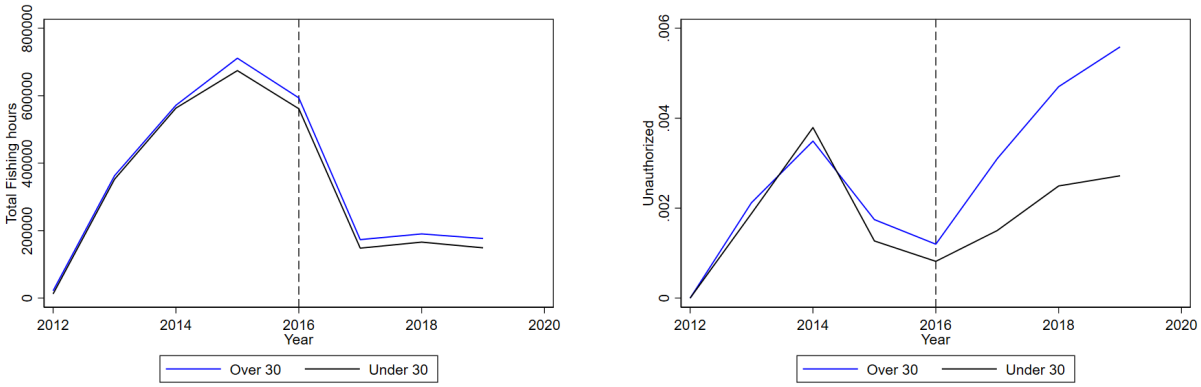
Appendix

A Additional Figures and Tables



(a) *Total Fishing Efforts* ***(b)*** *Unauthorized Fishing Status*

Figure A1: Parallel Trend. Note: Panel (a) shows the total fishing efforts by treatment, and panel (b) shows the unauthorized probability.

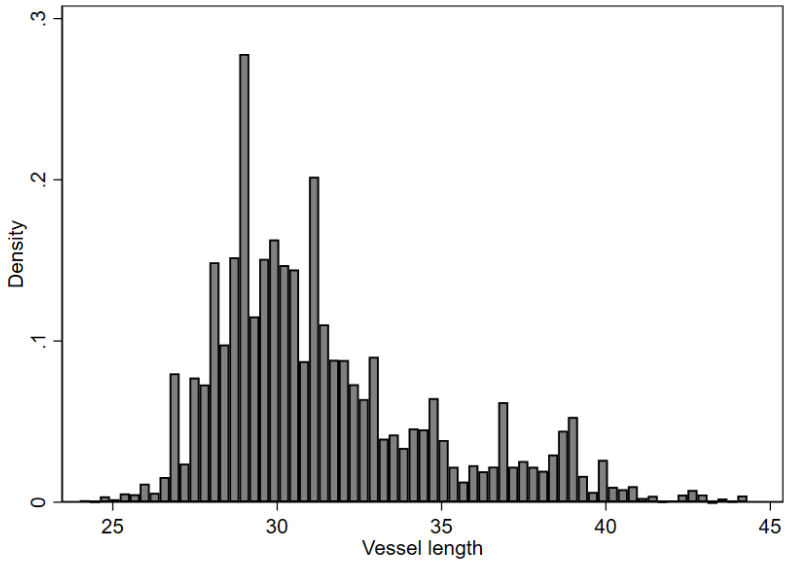


Figure A2: Distribution of Vessel Length.

B Additional Data Details

Considering the Sea Around Us (SAU) fishing access agreements database, activity will be considered authorized if there is a formal fishing agreement between the parties. This is because the SAU database contains vessel detection information based on Global Fishing Watch data, necessitating a distinction between the types of access contained in the database used. Table B1 shows the fishing agreements that China had during the analysis period. For agreements with unspecified end year, I assume that the agreement is still valid, which biases the authorization status towards authorized rather than unauthorized, therefore, the results obtained could be interpreted as a lower bound.

***Table B1**: Chinese Internal Fishing Access Agreements*

Country Owned	Country Access	Start year	End year
Angola	China	2016	9999
Argentina	China	2020	2020
Benin	China	2015	9999
Cameroon	China	2018	9999
Côte d'Ivoire	China	2015	9999
Equatorial Guinea	China	2018	9999
Fiji	China	2018	2021
French Polynesia	China	2014	2019
Ghana	China	2019	9999
Guinea	China	2018	9999
Guinea-Bissau	China	2017	9999
Guyana	China	1996	9999
Liberia	China	2018	9999
Madagascar	China	2019	2021
Micronesia (Federated States of)	China	2020	2020
Mozambique	China	2018	2019
Nauru	China	2020	2020
Nigeria	China	2018	9999
Oman	China	2018	2019
Palau	China	2018	2019
Papua New Guinea	China	2016	2019
Peru	China	2010	2018
Senegal	China	2017	9999
Seychelles	China	2017	9999
Sierra Leone	China	2018	9999
Singapore	China	2017	2019
Somalia	China	2015	2019
Suriname	China	2018	2019
South Korea	China	2001	2019
Togo	China	2013	9999
Tuvalu	China	2020	2020
Uruguay	China	2018	2019
Vanuatu	China	2020	2020
Viet Nam	China	2017	2019
Angola	China	2016	9999
Argentina	China	2020	2020
Benin	China	2015	9999
Cameroon	China	2018	9999
Côte d'Ivoire	China	2015	9999
Equatorial Guinea	China	2018	9999
Fiji	China	2018	2021
Ghana	China	2019	9999
Guinea	China	2018	9999
Guinea-Bissau	China	2017	9999
Guyana	China	1996	9999
Liberia	China	2018	9999
Madagascar	China	2019	2021
Micronesia (Federated States of)	China	2020	2020
Nauru	China	2020	2020
Nigeria	China	2018	9999
Peru	China	2016	9999
Senegal	China	2017	9999
Seychelles	China	2017	9999
Sierra Leone	China	2018	9999
Togo	China	2013	9999
Tuvalu	China	2020	2020
Vanuatu	China	2020	2020

Source: Internal Fishing Access Agreements - Sea Around Us. Note: Country owned relates the countries with which China has had fishing access agreements. Values of 9999 in End year indicate that there is no specified termination date for the agreement.