# **BEYOND THE FLAG STATE PARADIGM:**

Reconstructing the World's Large-Scale Fishing Fleet through Corporate Ownership Analysis

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# Notes for the reader

- In this report, the terms 'flag state' and 'flag country' are used interchangeably. We generally prefer 'flag country' for its simplicity and generality. 'Flag state' is used when emphasizing legal or regulatory contexts, particularly a state's responsibilities and jurisdiction over vessels, or when the flag does not correspond to a sovereign country (e.g., French and British Overseas Territories, Isle of Man, Greenland, and others).
- The corporate entity that directly owns a fishing vessel is referred to as the 'registered owner', or, in Orbis terminology, the 'Immediate Shareholder' (ISH). The 'Global Ultimate Owner' (GUO) refers to the highest corporate entity in the ownership chain that is, the ultimate corporate owner of the vessel. For simplicity and clarity, we primarily use the abbreviations ISH and GUO, along with the term 'ISH/GUO country' to indicate the country of registration of the respective corporate entity.
- Our analysis is restricted to large-scale fishing (LSF) vessels. However, due to extensive gaps in vessel size data (e.g., vessel length and gross tonnage) in Seasearcher, we were unable to define our sample using common size thresholds (e.g., ≥ 24 m LOA). Instead, we considered any fishing vessel with an IMO number as 'large'. Further discussion on this methodological choice is provided in 'Methods' (section 2).
- The Supplementary Materials are published as a separate document alongside this report (see, APPENDIX). They provide additional figures, tables, and methodological clarifications that support the findings presented here. Readers are encouraged to consult Supplementary Materials for more detailed insights into sampling coverage, gear types, company-level ownership data, and other technical information. These materials are intended to enhance transparency, reproducibility, and the utility of the study for future research and policy analysis.

## **Executive summary**

The objective of this study was to demonstrate, for a global sample of Large-Scale Fishing (LSF) vessels, the extent to which the flag state of the vessels deviates from the country of incorporation of their registered and ultimate owners. This analysis is based on the premise that any change in the country of registration across hierarchical levels – the vessel, the registered owner, and the ultimate owner – reflects a geographic shift in the center of decision-making, control and – potentially – the flow of benefits accrued from fishing. The study aims to quantify and describe these country shifts ('mismatches'), both globally and by continent, while also identifying which countries concentrate the most foreign-owned fishing vessels, and which flag states are most commonly used by foreign companies.

#### Method and data

The method used for corporate ownership analysis, developed by Kinds et al. (2025), involves the bottom-up identification of controlling shareholders along a hierarchical ownership path that starts with the fishing vessel. We focus on two default hierarchical levels provided by the Orbis database (BvD, 2022): the Immediate Shareholder (ISH) (the registered owner of the fishing vessel) and the Global Ultimate Owner (GUO) (the highest corporate entity in the path). Consistent with the International Financial Reporting Standards (IFRS) definition of controlling shareholders, we define the GUO at the 50.01% threshold, meaning that each hierarchical layer in the ownership structure reflects a minimum of 50.01% control by the entity above. This definition also ensures that each fishing vessel is linked to a single GUO. The analysis of minority ownership and Beneficial Ownership (BO) is beyond the scope of this study (see 'Notes for the Reader').

The dataset was constructed through a stepwise process that ensured the inclusion of a comprehensive sample of LSF vessels while maintaining high data quality standards. Hence, the dataset was sourced from multiple databases, including Orbis, Lloyd's List Seasearcher, and Global Fishing Watch (GFW), and cross-verified for accuracy and robustness. The study scope was limited to vessels with an IMO number due to limitations in data availability. In total, 19,003 IMO fishing vessels were matched across Orbis and Seasearcher databases, representing a global estimate of the Large-Scale Fishing (LSF) fleet – referred to as 'the LSF population' throughout. As ownership information was lacking for 62% of IMO fishing vessels included in the Orbis database, the sample for ownership analysis covered 6,962 vessels. The analysis of country shifts was limited to 6,820 vessels with known flag registration, corresponding to 98% of the sample (see section 2.).2.5).

#### Sample description

This study presents a global analysis of corporate ownership of 6,962 LSF vessels flagged to 146 flag states in 134 sovereign countries, constituting 37% of the world's registered LSF fleet. Most sampled vessels are flagged to Europe (37%), followed by the Americas (25%), and Asia (20%). African and Oceanian vessels represent 13% and 3%, respectively. The top 10 flag states represent nearly half the sample, led by Russia (14.4%), the U.S. (7.9%), and China (4.9%).

Sample coverage – defined as the share of vessels in the LSF population for which ownership could be analyzed – varied by region: Africa had the highest, while the Americas had the lowest, with notable

under sampling of Mexican (6.1%) and Colombian (3.7%) LSF vessels. Coverage was also comparatively low for major fishing nations Spain (22.0% of the estimated Spanish LSF fleet), Japan (37.6%), Taiwan (36.4%), and China (29.4%). Coverage was high for Morocco (79.5%) and Namibia (81.6%). Finally, while the sample includes 37% of the global LSF fleet, the distribution of countries and continents within it broadly reflects that of the total population, thereby preserving a high degree of geographical representativeness.

#### Key results and strategic insights

Among the 6,962 vessels analyzed, 1,098 (16%) are ultimately owned by companies based in a different country than the vessel's flag. When (post-)colonial flag registrations are included (e.g., British and French overseas territories), this number rises to 1,208 vessels, or 17% of the global sample. Mismatches increase from 12% at the ISH level to 16% at the GUO level, underscoring the importance of subsidiary implantation as a complementary strategy to the use of flags of convenience and open registries. While the latter is welldocumented in the literature, the strategic deployment of foreign subsidiaries has received far less attention.

These mismatches are most prevalent for vessels flagged to the Americas (404 vessels; 33% of Flag-to-GUO mismatches globally), followed by Africa (294 vessels; 24%) and Europe (231 vessels; 19%). Spanish GUO companies stand out as major transnational actors, owning 250 foreign flagged vessels, mostly through local subsidiaries. Spanish GUOs alone account for 23% of all global mismatches, and their foreign vessel holdings more than triple when comparing the ISH and GUO levels – from 80 to 250 vessels, a relative increase of 213%. This pattern reflects a deliberate strategy by Spanish companies to consolidate and expand their operations across jurisdictions. This is consistent with findings by Kinds et al. (2025) in their analysis of vessel ownership in the Eastern Pacific Ocean tuna industry. By comparison, South Korean GUOs, the second-largest contributor to mismatches, increased their foreign holdings by 53%.

Our analysis also demonstrates that foreign ownership is especially concentrated in popular 'flag of convenience' (FoC) jurisdictions such as Panama, Belize, Honduras, and Vanuatu. In each of these countries, more than 75% of flagged vessels are owned by foreign entities. Panama records the highest absolute number of mismatches (n=92), with its flag register used by GUO companies in 25 different countries. Considering only the top 10 FoC jurisdictions in the sample (i.e., Mozambique, Honduras, Belize, Panama, Vanuatu, Georgia, Morocco, Namibia, Senegal, and the Cook Islands), Spanish GUOs account for 27% of Flagto-GUO mismatches, followed by Taiwanese GUOs with 7%. Spanish GUOs dominate mismatches for vessels flagged to Argentina and several African nations (including Namibia, Mozambique, Mauritania, Senegal, and others), while Taiwanese GUOs capture the largest share of Honduran vessels.

A subset of 107 vessels (1.5% of the global sample) exhibited both a Flag-to-ISH mismatch and an ISH-to-GUO mismatch, meaning that the vessel was flagged to one country, directly owned by a company in a second country, and ultimately owned by a parent company in a third. These specific multi-jurisdictional ownership structures often involved tax havens and suggest deliberate corporate structuring aimed at securing business or fisheriesrelated advantages, minimizing financial and legal exposure, or reducing transparency in ownership and control.

Ownership concentration is another defining feature of the global LSF fleet. At the country level, the top 20% of GUO countries account for 78% of vessels. Inequality is slightly more pronounced at the GUO level than at the ISH level (Gini index: 0.748 and 0.731, respectively), reflecting a modest degree of consolidation at higher levels of control. This stems from multiple registered owners in different countries being ultimately owned by parent companies based in the same country. At the corporate level, the top 20% of firms own just over half of the global LSF fleet, indicating that ownership is highly concentrated geographically, but somewhat more dispersed across individual companies. The largest corporate owner is China's 'Pingtan Marine Enterprise, Ltd.' (77 vessels), followed by major Spanish firms such as 'Pescanova SA' and 'Abanca Corporación Bancaria SA', and 'Trident Seafoods Corporation' in the United States. Morocco's Omnium Nord Africain was the top African owner (34 vessels). Spanish firms often rely on international subsidiaries to manage foreign fleets, whereas companies in other countries are more likely to maintain nationally rooted ownership structures.

At the continental level, Europe, Asia, and the Americas show high rates of internal ownership – i.e., most vessels are owned within the same region they are flagged. In contrast, Africa and Oceania display much higher rates of control from outside the region. In Africa, nearly 29% of vessels are owned by companies from outside the continent, particularly in Spain. Oceania mirrors this pattern with 26% foreign ownership, primarily by Japanese and South Korean firms. Asia, meanwhile, exhibited the highest ownership

concentration: five countries (China, South Korea, Indonesia, Japan, Taiwan) account for 85% of sampled LSF vessels in the region.

#### Recommendations and next steps

The findings of this study underscore the need for an ownership-based analytical framework to support transparent and data-driven fisheries governance. Moving beyond the traditional focus on flag states as the primary unit of analysis, this approach offers a more accurate lens through which to examine the complex, transnational nature of corporate influence and control in industrial fisheries.

However, the study also highlights an urgent need for improved transparency regarding vessel ownership, and stronger international standards around vessel identification and corporate disclosure. Following the recommendations of Kinds et al. (2025), we urge fisheries managers and policymakers to systematically collect and publicly disclose ownership information, not only at the corporate level but also at the level of beneficial owners. More specifically, we make the following recommendations:

- Mandate disclosure of ownership information at vessel registration, sale, reflagging, and licensing.
- Expand and harmonize ownership data across global maritime databases.
- Develop an integrated system to track vessel flag and ownership histories for fisheries management, with the long-term goal of establishing a public global ownership registry of fishing vessels.
- Shift analytical focus from states to firms by investigating the strategies of specific corporate actors, while continuing to examine how regulatory and policy environments at the country level enable or constrain their operations.

# **1** Introduction

Sustainable fisheries are key to global food security and nutrition, economic development, and livelihoods. While fisheries management has traditionally focused on regulating effort, capacity, and flag state compliance, these measures have often proven insufficient to prevent overfishing and to ensure the long-term sustainability of fisheries (Cheung et al., 2024; Roberts et al., 2024). In recent years, fostering transparency has come to be widely recognized as a prerequisite for effective governance and the sustainable management of marine resources (Guggisberg et al., 2022). Central to this is the ability to monitor fishing activities and to enforce sanctions in the face of violations – notably Illegal, Unreported, and Unregulated (IUU) fishing, but also broader abuses such as labor violations (Selig et al., 2022). Yet a key obstacle lies in the identification of the true owners of fishing operations. Not only are ownership data often sparse, inconsistently reported, or deliberately withheld (Carmine et al., 2020; Kinds et al., 2025), but efforts to trace accountability are further complicated by the widespread use of opaque and fragmented corporate structures (Warmerdam et al., 2016, 2018; MRAG et al., 2019; Carmine et al., 2020; Kinds et al., 2025) and the strategic deployment of flags of convenience (FoCs) (Ford and Wilcox, 2019; Petrossian et al., 2020).

To date, fisheries governance has centered on flag states as the primary units of control – through mechanisms such as vessel monitoring systems, port state measures, and quota management. However, this flag-based paradigm has proven insufficient to ensure effective fisheries governance and sustainable fisheries (Roberts et al., 2024). In practice, flag states often exert limited oversight over the fishing operations in their sovereign waters, let alone over the companies and ownership structures behind them. Resource-rich countries in the Global South are particularly vulnerable to exploitation by transnational corporations (Standing, 2015), as they frequently lack the institutional capacity, political leverage, human and financial resources, or monitoring infrastructure to effectively regulate distant water fleets or scrutinize corporate arrangements behind foreign access (Stäbler et al., 2022; Campling et al., 2024). A second, more systemic issue undermining effective fisheries governance is the widespread absence of coherent regulations governing the collection, standardization, and public disclosure of ownership information both at the corporate level and, more critically, with respect to the beneficial owners ultimately profiting from fishing (Kinds, 2021; Kinds et al., 2025). This regulatory vacuum hinders transparency and accountability across jurisdictions, regardless of the enforcement capacity of the flag state. In this context, identifying the corporate entities behind fishing operations and their countries of registration is essential for understanding how control, influence, and accountability are structured in global fisheries. By tracing ownership hierarchies and mapping where corporate control is ultimately exercised, we can illuminate the distribution of power in the fisheries sector and reveal patterns that remain obscured by a narrow flag-based paradigm.

This report challenges the traditional flag-state paradigm by presenting the first comprehensive global analysis of vessel ownership in the large-scale fishing (LSF) fleet. Its objective is to demonstrate, for a sample of 6,962 LSF vessels, the extent to which the flag state of the vessels deviates from the country of their registered and ultimate owners. This analysis is based on the premise that any change in the country of registration across hierarchical levels (i.e., the vessel, its registered owner, and its ultimate owner) reflects a geographic shift in the center of decision-making, control and, potentially, the flow of benefits accrued from fishing. The study quantifies and describes these country shifts ('mismatches'), both globally and by continent. It also assesses levels of ownership concentration and identifies the countries and companies that dominate control over the global LSF fleet.

The report is structured as follows. Section 2 outlines the methods, including data sources, study scope, and the method used for ownership analysis. It also introduces the conceptual framework that underpins the analysis. Section 3 offers an overview of the sample, helping to contextualize the findings by further clarifying the scope of the study and highlighting key data gaps. Section 4 presents the core findings of the study, beginning with a global overview and then disaggregating patterns of vessel registration, ultimate ownership, and corporate concentration by continent. It concludes with a synthesis of global ownership patterns and dominant actors – both countries and transnational fishing corporations. Finally, section 5 provides conclusions and discusses the implications for governance and future research.

# 2 Methods

# 1.1 Data sources

The main source for ownership data was the Orbis database for company data, compiled and managed by Bureau van Dijk (Moody's Analytics) (BvD, 2022). Access to Orbis data is paid and membership based. Orbis is a widely used data source for ownership analysis (e.g., Nakamoto et al., 2019; Mizuno et al., 2020) including in the seafood industry (Warmerdam *et al.*, 2016, 2018; MRAG *et al.*, 2019; Virdin *et al.*, 2021). In Orbis, ownership relationships are collected through a country's Ministry of Commerce in jurisdictions where ownership disclosure is mandatory (this furthermore depends on company size, status (listed/unlisted), and ownership percentage), or otherwise from associated data providers, or directly from the companies themselves (source: Orbis Learning Zone<sup>1</sup>). Ownership information is updated weekly and regularly subjected to rigorous quality control. Marine vessel information is kept up to date based on information from IHS Markit (a subsidiary of S&P Global).

The Seasearcher database provided technical vessel data such as vessel length (LOA) and gross tonnage (GT). It also served as a reference for estimating the size of the global largescale fishing fleet (see 2.).2.2). Seasearcher is a comprehensive maritime intelligence Lloyd's platform managed by List Intelligence (LLI) (https://www.lloydslistintelligence.com/about-us/our-data). Access to Seasearcher data is subscription-based. Seasearcher offers real-time vessel tracking through the integration of data from AIS signals, terrestrial and shipborne receivers, and satellites. Other than that, it offers insights regarding vessel characteristics, ownership, sanctions, casualties, and port facilities. The data is collected from over 3,000 sources worldwide, and is validated by 500 agents across 170 countries, with the help of advanced algorithms and artificial intelligence (AI). The standardized data are presented to the user in the form of "actionable insights". Seasearcher is mainly focused on the maritime industry, but it has also been widely used in research, for example in using big data applied to shipping industry analysis (Kanamoto et al., 2021), studying maritime accidents resulting in pollution occurrence (Li et al., 2024), or for the construction of accident databases (Marino et al., 2023).

For information on gear type per vessel, we used Global Fishing Watch (GFW) data as it provides more detailed information than Seasearcher. The Global Fishing Watch database was developed through a collaboration between Oceana, SkyTruth, and Google. GFW compiles data from Automatic Identification System (AIS) signals, Vessel Monitoring System (VMS) data where available, and other sources to offer a detailed view of fishing activities across the globe (Kroodsma et al., 2018). More precisely, GFW integrates vessel

<sup>&</sup>lt;sup>1</sup>See <u>https://help.bvdinfo.com/LearningZone/Products/orbis/Content/Home.htm</u> for details (accessed 21 March 2025).

identity data sourced from over 40 public registries, including regional fisheries management organizations (RFMOs) and national registries, which provide information on vessel identity, vessel characteristics, ownership, and fishing authorizations (GFW, 2023). GFW data have been widely used in fisheries research, including recent studies demonstrating large-scale AIS disabling in commercial fisheries (Welch *et al.*, 2022), tracking elusive fishing activities (Park *et al.*, 2023), and mapping extensive industrial activity at sea (Paolo *et al.*, 2024), among others.

# 2.1 Scope

# IMO vessels as a proxy for estimating the world's LSF fleet

This study presents a global analysis of corporate ownership of 6,962 LSF vessels flagged to 146 flag states in 134 sovereign countries, constituting 37% of the world's registered LSF fleet. We aimed to include as many LSF vessels as possible, with the scope determined by two key factors: (1) our selection criteria, which included LSF vessels with an IMO number present in both the Orbis and Seasearcher databases, and (2) the availability of detailed ownership data in Orbis. Potential limitations related to data coverage and quality are detailed in Box 1 and in several supporting notes in Supplementary Materials (see, APPENDIX).

In the present study, LSF vessels are not identified using vessel size criteria (e.g., length or gross tonnage), but solely by the presence of an IMO number, which is used as a proxy for estimating the global LSF fleet. While IMO numbers are not globally mandatory, several RFMOs and jurisdictions require them for certain types of fishing vessels (Oceana, 2024a). Fishing vessels of 100 gross tonnage (GT) and above are eligible by the International Maritime Organization (IMO) to have an IMO number, as well as those over 12 meters in length *that are authorized to operate outside their national jurisdiction* (Pew, 2017). Vessels smaller than 100 GT other than those mentioned above, non-motorized vessels, and vessels <12 m do not qualify for an IMO number.

This implies two key assumptions. First, that the Seasearcher and Orbis databases provide a comprehensive overview of IMO registered fishing vessels at the time of extraction. Second, that fishing vessels eligible to have an IMO number indeed possess one. To account for the possibility that these assumptions are not fully met, the correct way to refer to the global population of LSF vessels is as a global *estimate* of *registered* LSF vessels. We reflect on these assumptions further in the Conclusions (section 5), and in the Supplementary Materials (See, APPENDIX).

# Ownership analysis: corporate owners at two key hierarchical levels defined by Orbis

The scope of the present analysis is limited to the *corporate* entities that directly and ultimately own LSF vessels around the world, with a particular focus on their countries of

registration. The ownership analysis is restricted to majority ownership relationships and considers two hierarchical levels: the vessel's 'registered owner', and its highest corporate shareholders – respectively referred to in Orbis as the 'Immediate Shareholder' (ISH) and the 'Global Ultimate Owner' (GUO). While a registered owner may have multiple shareholders with varying stakes, the GUO is defined as the corporate entity that holds at least 50.01% of the ISH, and thus, of the vessel itself (see section 2. for details).2.4 for details).

The 'status' variable in Orbis classifies entities (marine vessels and companies alike) as 'Active', 'Active (dormant)', 'Dissolved', 'In liquidation', or 'Status unknown'. Our analysis does not explicitly account for this variable. We present findings regarding companies' ownership structures with caution, given that many features of fishing vessels, including corporate ownership, are dynamic and can change from year to year (Carmine *et al.*, 2020).

The so-called 'beneficial owners' (BOs), defined as the natural persons acting *behind* the corporate entities and holding significant control or ownership stakes in a company (Tax Justice Network, 2023), are beyond the scope of this study. The disclosure of BO data is not mandatory in many jurisdictions, and in those where it is, only specific types of entities are required to disclose it (Oceana, 2024b). This results in a patchy distribution, hindering the use of ownership data in a systematic and global analysis like the one presented here.

#### Box 1. Understanding data coverage: key considerations

This report provides a comprehensive analysis of corporate ownership within a global sample of LSF vessels, leveraging the best available data. As with any data, it is not without limitations, and we deem it important to adequately address them here.

A first set of limitations pertains to data coverage. This includes the definition of the LSF vessel population as IMO-registered fishing vessels present in both the Orbis and the Seasearcher databases, and the restriction of the sample based on the availability of ownership data in Orbis (see section 4.1). Both carry significant implications for interpreting this study's results in the context of the global fishing industry – specifically, whether this global sample represents the global LSF fleet. To address this, it is essential to evaluate potential gaps in the data.

A second set of potential limitations pertains to data quality, notably concerning ownership data. In recent years, an increasing number of studies have examined ownership in the fisheries and maritime sectors (Sykes et al., 2014; Warmerdam et al., 2016, 2018; MRAG et al., 2019; Carmine et al., 2020; Kinds, 2021; Virdin et al., 2021; C4ADS, 2022; Oceana, 2022; Bengtsson et al., 2024; Kinds et al., 2025). All these studies have relied on either Orbis or Sesearcher data. However, aside from the fact sheets and user guides provided by the data providers themselves, independent assessments of data quality are currently lacking.

Several Annexes in the APPENDIX document, provide further context on these matters:

- Annex I explores the distribution of technical vessel data within the vessel population and the sample, highlighting how data gaps may impact interpretations of the sample and the broader LSF vessel population.
- Annex II presents an exploration of data quality through inconsistencies found between Seasearcher and Orbis.
- Annex III explores ownership data coverage in Orbis.

# 2.2 Constructing the ownership dataset

The ownership dataset was constructed using a stepwise protocol (Figure 1). In March 2024, we queried fishing vessels in Orbis using a Boolean search with the following criteria: Type: Marine vessels and NACE Rev. 2 (Primary codes only): 0311 - Marine fishing. The NACE code (Nomenclature statistique des Activités économiques dans la Communauté Européenne) is the European classification system for economic activities. It is integrated with other classification systems, such as the North American Industry Classification System (NAICS), to ensure international comparability (EC, 2008). This initially yielded a set of 24,223 IMO fishing vessels (Orbis only includes IMO vessels). In parallel, we extracted data from Seasearcher and filtered out non-IMO vessels, yielding a set of 20,000. We then cross-referenced the two datasets to identify vessels present in both sources. This step adds robustness to our estimate of the global LSF fleet, as it compares two of the leading global maritime data platforms. A match was found for 19,003 vessels, which we use as an estimate of the global LSF fleet in this study (hereafter referred to as 'the population').



Figure 1. Stepwise construction of the database for ownership analysis, drawing from three databases (Orbis, Sesearcher, GFW). In this study, the global population of registered LSF vessels was estimated at 19,003 vessels, 37% of which were included in the sample for ownership analysis (n=6,962).

Table S1 (See, APPENDIX) summarizes the information extracted in March 2024. Some minor data extrapolations were conducted on extracted Orbis data: for 19 vessels with unknown GUO country, the GUO country was inferred based on the ISH country, and for 12 vessels with unknown ISH country, the ISH country was inferred based on the flag country. This guarantees a cautious approach when evaluating nationality shifts across the three levels of interest – flag, registered owner (ISH), and ultimate owner (GUO). Using the 'countrycode' package in R, continent names were added, and country names were

standardized between the GFW and Orbis datasets. The package uses continent definitions from the World Development Indicators (World Bank)<sup>2</sup>.

The sample for which ownership could be analyzed was further limited by the availability of ownership data in Orbis. In total, ownership data were available for 6,962 fishing vessels, representing approximately 37% of the global LSF fleet as defined in this study<sup>3</sup>. Of the 167 flag states identified among global LSF vessels, our sample includes vessels from 146. The remaining 21 flag states (encompassing 20 sovereign countries) are not represented in our analysis because all vessels associated with these flags lacked ownership data in Orbis and were therefore excluded from the sample (Table 1). The impact of this is limited, however, given the relatively small number of vessels (n=49) these countries represent in Orbis.

Table 1. Flag states in the global population of LSF vessels not included in the sample due to missing ownership
data in Orbis. This affects a total of 49 vessels across 21 flag states (20 sovereign countries).

Flag country	No. vessels
Switzerland	9
Dominica	6
Costa Rica	5
Pakistan	4
Hong Kong SAR China	3
Syria	3
Bonaire, Sint Eustatius and Saba (Netherlands)	2
Bangladesh	2
Djibouti	2
Trinidad & Tobago	2
New Caledonia (France)	1
Samoa	1
British Virgin Islands	1
Austria	1
Malawi	1
Iraq	1
Montenegro	1
Bahrain	1
Gibraltar (United Kingdom)	1
American Samoa (United States of America)	1
Chad	1

Some minor extrapolations were applied to complete key fields in the dataset: for 19 vessels with missing GUO country information, the GUO country was inferred from the ISH country; for 12 vessels with missing ISH country, it was inferred from the flag country. This

<sup>&</sup>lt;sup>2</sup> In line with the default World Bank classification used in the countrycode package in R, we treated 'the Americas' as a single continental grouping. This encompasses countries in North, Central, and South America, as well as the Caribbean. Notably, this classification also considers Russia as part of Europe and Cyprus as part of Asia.

<sup>&</sup>lt;sup>3</sup> For the sake of completeness: for 9,280 of the 24,223 vessels identified in Orbis at least some shareholder information was available (38.3%). While 7,453 vessels had a match in Seasearcher, we retained 6,962 vessels in our final set due to gaps in the Orbis data. For instance, for some vessels a shareholder was identified (variable 'No. of shareholders' equal to 1), yet a record to that entity was lacking in Orbis, leading to empty fields for ISH and GUO related variables.

allowed for a more consistent and cautious evaluation of nationality shifts across the three levels of interest—flag, registered owner (ISH), and global ultimate owner (GUO). Using the 'countrycode' package in R, continent names were added, and country names were standardized across the Orbis, Seasearcher, and GFW datasets.

In a last step, technical vessel data from Seasearcher (LOA, GT) and GFW (gear type) were added to the dataset. While not directly related to the ownership analysis, they offer valuable context for understanding the sample in terms of vessel types, fisheries, and its representativeness compared to the estimated LSF population in any given country or continent (see <u>Annex I</u> and <u>Annex III</u> in APPENDIX).

Finally, note that the selection criteria used to query the Orbis database (e.g., '*Type: Marine vessels*' and '*NACE Rev. 2 (Primary codes only)*: 0311 - *Marine fishing*') appear to have included a small proportion of vessels (1.4%, n=94) which, according to GFW, are not strictly fishing vessels but support vessels, such as carriers and reefers. Also, some vessels in the dataset do not strictly qualify as 'large' (at least 82 vessels smaller than 20 m in our dataset) (Table S2, APPENDIX). See Box 1 for additional notes on data coverage.

# 2.3 Method for the analysis of vessel ownership

The method used for ownership analysis is the one developed by Kinds et al. (2025), which involves the bottom-up identification of shareholders and ultimate and beneficial owners along a hierarchical ownership path that starts with the fishing vessel (Figure 2). In Orbis, vessels are identified by their IMO number. This number serves as a permanent identifier throughout the vessel's operational life until it is scrapped (Pew, 2017). Provided that ownership records are kept up to date, it provides a robust link between the vessel as a physical means of production, and the corporate entities that operate and/or own it.



*Figure 2*. Schematic representation of the ownership structure of fishing vessels. Adapted from Kinds et al. (2025).

In this study, we focus on two default hierarchical levels provided by Orbis: the Immediate Shareholder (ISH) – which is the registered owner of the fishing vessel – and the Global Ultimate Owner (GUO). The GUO sits highest in the hierarchy, while the ISH sits lowest<sup>4</sup>. Consistent with the International Financial Reporting Standards (IFRS) definition of controlling shareholders, we define the GUO at the 50.01% threshold, whereby every hierarchical layer corresponds to minimum 50.01% ownership (see Figure 3 for parameterization). Additionally, we will use the derivative term 'ISH/GUO country' to refer to the country of registration of the corporate entity in question.

<sup>&</sup>lt;sup>4</sup> Note that the ISH and the GUO can be the same entity. This occurs when the registered owner of a fishing vessel has no controlling shareholders. In such cases, Orbis considers that the vessel's registered owner (i.e., its ISH) is also its global ultimate owner.

#### Corporate structure

Ultimate Owner		^					
The minimum percentage of control in the path from a subject company to its Ultimate Owner must be:							
○ 25.01%							
50.01%							
<ul> <li>I consider a company to be an Ultimate Owner if it has no identified shareholders or if its shareholder's percentages are not known.</li> <li>I want the highest quoted company to be considered the Ultimate Owner</li> <li>When displaying company structures I consider shareholder(s) to be ultimate owners if they are: (These options will change how you display the corporate structure in your reports and lists but will not affect your searches)</li> </ul>							
Individuals or families	Corporate companies	Private equity firms					
Public authorities, states, governments	Banks	Venture capital firms					
Managers/directors/employees	Financial institutions	Hedge funds					
Foundations/research institutes	Insurance companies	Funds/nominees/trusts/trustees					

Figure 3. Screenshot Orbis interface – parameter settings for defining the Ultimate Owner. The 'individuals or families' box was unchecked to avoid different levels of detail at the level of the GUO. Such differences may occur as a result of different levels of detail in the data provided to Bureau van Dijk. By unchecking the box, we consider only the highest company.

# 2.4 Conceptual framework: analysis of country shifts at three hierarchical levels

The analyses in this report are based on the premise that any change in the country of registration across hierarchical levels – the vessel, the ISH, and the GUO – can be interpreted as a geographic shift in the center of decision-making or control. However, an analysis of the specific nature of this power is beyond the scope of this study.

The analysis of discrepancies ('country shifts') is carried out at three levels (Figure 4). First, we analyze the proportion of vessels for which the country of registration of the Immediate Shareholder (ISH) (i.e., the registered owner) is different from the vessel's flag country. Second, we quantify the proportion of vessels for which the Global Ultimate Owner (GUO) is registered to a different country than the ISH. In this case, the ISH is a local subsidiary owned by a foreign or transnational corporation. In the report, we only highlight cases where the ISH and GUO countries both differ from the vessel's flag – i.e., instances of double mismatch, which occurred for at least 107 vessels in the global sample (see section

4.7.2). Third, we analyze the net country shifts<sup>5</sup> between the flag level and the GUO level, which is a measure of foreign influence over locally flagged vessels.



Figure 4. Conceptual model illustrating the three-step analysis of country shifts central to this report.

Country shifts are defined at the level of sovereign countries. This means that, for example, a vessel flagged to the Falkland Islands/Malvinas but owned by a company in the United Kingdom, does not constitute a shift. An overview of overseas territories and their corresponding sovereign states is provided in Table S3 (see, APPENDIX), while Table S4 (see, APPENDIX) details the 110 vessels excluded from our analysis for this reason.

It is important to note that the analysis of country shifts was limited to vessels with known flag registration. Of the 6,962 LSF vessels sampled for ownership analysis, 6,820 (98%) had complete flag information. For the remaining 142 vessels, owner identities and countries were known, but flag data was missing, making them ineligible for the shift analysis. Nonetheless, these vessels remained part of other components of the ownership analysis, such as assessments of corporate concentration, owner identity, and the characterization of corporate groups.

<sup>&</sup>lt;sup>5</sup> A 'net shift' because ownership at the ISH and the GUO level can cancel each other out. For example, some vessels flagged to Spain were directly owned by companies in African countries but ultimately controlled by Spanish GUOs. As a result, the net effect is that vessels flagged to Spain remain under Spanish ownership (i.e., no shift).

# **3** Overview of the sample

#### **Key findings**

- The sample for ownership analysis comprised 6,962 fishing vessels (36.6% of the global LSF fleet), flagged to 146 countries across five continents, with most vessels flagged to Europe (37%), followed by the Americas (25%), and Asia (20%). African and Oceanian vessels represented 13% and 3%, respectively.
- The top 10 flag states represented nearly half the sample, led by Russia (14.4%), the U.S. (7.9%), and China (4.9%).
- Sampling coverage varied by region: Africa had the highest, while the Americas had the lowest, with notable under sampling of Mexican (6.1%) and Colombian (3.7%) LSF vessels.
- Coverage was comparatively low for major fishing nations Spain (22.0% of the estimated Spanish LSF fleet), Japan (37.6%), Taiwan (36.4%), and China (29.4%). Coverage was high for Morocco (79.5%) and Namibia (81.6%).
- Despite representing 37% of the global LSF fleet, the sample closely mirrors the overall population's distribution, preserving proportional representation across continents.

The 6,962 fishing vessels which were sampled for ownership analysis (36.6% of globally identified LSF vessels) were flagged to 146 flag states in five continents: Africa (n=36 flag states), Americas (n=33), Asia (n=31), Europe (n=32), Oceania (n=14). Most vessels were flagged to countries in Europe<sup>6</sup> (n=2,571; 37%), followed by the Americas (n=1,726; 25%), and Asia (n=1,364; 20%). African (n=923) and Oceanian (n=236) vessels represented 13% and 3%, respectively. Due to missing flag state information for 142 vessels (2% of the sample), the effective sample size for analyzing country shifts was 6,820 vessels (see section 3). Finally, while the sample includes just 37% of the global LSF fleet, the distribution of countries and continents within it broadly reflects that of the total population, thereby preserving a high degree of geographical representativeness (Figure S1, APPENDIX).

The 10 most common flag states in our sample accounted for nearly half of the vessels (48.7%). Russia was the most prominent flag state (n=1,002; 14.4% of sampled vessels), followed by the United States (n=550; 7.9%), and China (n=341; 4.9%) (Table 2). Similarly, the top 10 flag states by gross tonnage (GT) represented 56.3% of identifiable GT in the

<sup>&</sup>lt;sup>6</sup> We used continent definitions from the World Development Indicators (World Bank), which classifies Russia as part of Europe.

# sample<sup>7</sup>, further highlighting Namibia and Chile as significant fishing nations within the dataset.

Table 2. Top 10 flag countries in the sample for ownership analysis, categorized by the number of vessels and identifiable GT. The column 'No. vessels' includes the LSF vessels sampled, with the estimated national LSF fleet size provided in parentheses. The position in the top 10 reflects the rank of each country based on the number of vessels (GT) sampled, while the percentage of sample represents the proportion of the total sample accounted for by vessels (GT) from each country.

Flag country	No. vessels	Position in top 10	% of sample	GT	Position in top 10	% of sample
Russia	1,002 (2,341)	1	14.4	1,257,995	1	24.9
United States	550 (1,381)	2	7.9	272,230	3	5.4
China	341 (1,159)	3	4.9	342,014	2	6.8
Morocco	268 (336)	4	3.8	106,394	9	2.1
South Korea	256 (439)	5	3.7	184,211	5	3.6
Norway	224 (663)	6	3.2	229,849	4	4.6
Spain	203 (921)	7	2.9	123,890	6	2.5
Argentina	188 (400)	8	2.7	116,420	7	2.3
Canada	188 (414)	9	2.7	76,665	-	1.5
Indonesia	173 (300)	10	2.5	49,545	-	1.0
Namibia	104 (153)	-	1.5	111,749	8	2.2
Chile	152 (219)	-	2.2	100,656	10	2.0

We now turn to a more detailed analysis of the sample's geographical coverage. For clarity, 'coverage' refers to the proportion of vessels within the global LSF population (n=19,003) for which ownership information could be analyzed (37%). As outlined in section 2.,2.2, our estimate of the global LSF population is limited to IMO-registered vessels present in both the Orbis and Seasearcher databases as of March 2024. The sample is further constrained by the availability of ownership data in Orbis. Accordingly, the analysis of coverage presented here specifically reflects gaps in ownership data coverage within Orbis.

Figure 5 visually represents differences in LSF fleet coverage across continents. We refer to Table S5 (see, APPENDIX) for an overview of sample coverage by flag country in terms of vessel numbers and GT.

• For Africa, overall LSF vessel coverage was high compared to other continents (58.5%). Coverage was slightly higher (61.4%) when only the top 10 flag states in terms of vessel numbers were considered. Coverage was the lowest for South Africa and Ghana (43.4% and 31.6% of the estimated LSF population, respectively).

<sup>&</sup>lt;sup>7</sup> 'Identifiable' because GT information was not available in Seasearcher for all vessels in the sample and the population (see further).

- For Oceania, vessel coverage was slightly lower for the top 10 flag countries compared to the sample as a whole, due to high sampling rates for several countries with rather insignificant industrial fishing fleets<sup>8</sup> (see <u>Annex III</u> for additional context, APPENDIX). Coverage is comparatively high for Vanuatu (66.7%), the second largest flag country in Oceania (population).
- For Asia, coverage was comparatively low for Japan (37.6%), Taiwan (36.4%), and China (29.4%), despite these countries making up an estimated 62% of all Asian LSF vessels (population). It should be noted, however, that our approach likely underestimates the true size of China's LSF fleet (estimated at 1,159 vessels) (see Box 2).
- For Europe, despite the high absolute number of vessels sampled, coverage remains comparatively low. Coverage was especially low for Spain, despite being the second most important flag country in the European continent (population) only 22.0% of LSF vessels were sampled.
- Overall coverage was the lowest for the Americas, largely due to the dramatic undersampling of the LSF fleets of Mexico and Colombia: only 6.1% and 3.7% of LSF vessels, respectively. This is significant, because Mexico and Colombia are the second and third largest flag countries in the Americas (population). Comparatively high coverage was obtained for Chile (69.4%) and Ecuador (66.7%) (Table S5, APPENDIX).



Figure 5. Sample coverage of the estimated LSF fleets by continent. Blue: all flag states; Red: only top 10 flag states. Triangles indicate the absolute sample size.

 $<sup>^8</sup>$  Most notably a 100% sampling rate for the Marshall Islands (4 out of 4 LSF vessels sampled).

#### Box 2. Uncertainties in national LSF Fleet estimates: the case of Spain and China.

As outlined in sections 2.2.2 and 2.,2.3, our method for estimating national LSF fleets is likely conservative (i.e., only IMO vessels present in both Orbis and Seasearcher) and may therefore underestimate their actual size. In the absence of a comprehensive analysis of relevant literature and public databases – such as national fleet registers and RFMO records – accurately pinpointing gaps in our estimates of countries' national LSF fleets remains difficult.

In particular, our approach may have underestimated the size of the LSF fleets of Spain (n=921) and China (n=1,159). The 2024 Annual Economic Report on the EU Fishing Fleet (STECF, 2024) reports that Spain's large-scale fleet includes 3,337 vessels, of which 199 are classified as distant water fishing (DWF) vessels. Estimates of China's DWF fleet vary widely, ranging from 1,989 vessels (Mallory, 2013), to 3,432 vessels (Pauly *et al.*, 2014), with Gutiérrez *et al.* (2020) identifying as many as 16,966 vessels<sup>9</sup>. However, according to Pauly *et al.* (2022) the latter number is likely an overestimation. They estimated the Chinese DWF fleet at a minimum of ca. 900 vessels, with upper estimates including an additional ~ 2,000 'invisible' vessels. It is difficult to determine precisely how our estimate of 1,159 vessels aligns with these figures, especially as our analysis was not limited to DWF fleets.

Given these examples, it is likely that similar underestimations exist for other countries as well, particularly those with large, heterogeneous fleets. Addressing these gaps will require more systematic cross-validation against national registers, RFMO records, and other sources in future research.

 $<sup>^{\</sup>rm 9}$  Of these, 2,076 were IMO-registered vessels flying the Chinese flag.

# 4 Findings

# 4.1 World

#### **Key findings**

- The 6,962 sampled global fishing vessels were directly owned by 4,468 companies (ISH) and ultimately by 4,120 companies (GUO).
- At the ISH level, a Flag-to-ISH mismatch was observed for 11.8% of vessels (n=823). At the GUO level, Flag-to-GUO country mismatches increased to 15.8% (n=1,098). Country shifts most frequently involved ownership by companies in Spain (23% of vessels), South Korea (7%), and the U.S. (4%).
- Analysis at the GUO level showed significant increases in vessel ownership compared to the ISH level for Spain (+178 vessels; a relative increase of 63%), South Korea (+36 vessels; +12%), and the United States (+26 vessels; +5%). Significant decreases were noted for GUOs in Argentina (-50 vessels; -28%), Panama (-40 vessels; -37%), and Mozambique (-22 vessels; -71%).
- The flags most associated with foreign ownership at the GUO level were Panama (n=92), Belize (n=41), and Honduras (n=39), with over 75% of their respective fleets owned by companies based in foreign countries.
- Vessels were unevenly distributed across GUO countries (Gini=0.748), with companies in the top 5 countries (Russia, Spain, the United States, China, and South Korea) owning about 40% of vessels.

# 4.1.1 Registered ownership of fishing vessels

The 6,962 fishing vessels in the global sample were directly owned by 4,468 companies (ISHs). European companies owned the largest share of vessels (39.5%), followed by companies in the Americas (23.5%), and Asia (21.8%). African companies directly owned 12.0% of LSF vessels, whereas Oceanian companies owned 3.2%. The 10 largest ISH countries in terms of vessel numbers jointly accounted for 51.0% of sampled LSF vessels globally (Table 3). Spanish ISH companies owned vessels registered under 31 different flag states. South Korea, Norway, and the United Kingdom occupied second place with each 17 flags.

ISH country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)
Russia	970	17	595	1.7 ± 1.6
United States	565	17	485	1.2 ± 1.5
China	357	11	92	4.2 ± 10.0
South Korea	300	19	151	2.3 ± 3.6
Spain	282	31	233	$1.3 \pm 1.0$
Norway	254	19	232	$1.1 \pm 0.5$
Morocco	253	6	96	2.7 ± 4.4
United Kingdom	196	19	173	$1.2 \pm 0.6$
Canada	192	8	137	1.4 ± 1.3
Japan	180	10	132	1.5 ± 1.1

Table 3. Top 10 countries of ISHs owning LSF vessels in the global sample, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the ISH level, the number of different flag states utilized, and the average number of vessels per company.

For our analysis of country discrepancies, we focus on a subsample of 6,820 vessels, excluding 142 vessels with unknown flag states (see section 2.).2.5). The alluvial plot in Figure 6 shows the country shifts (Flag-to-ISH country mismatches) for the top 10 ISH countries in the global sample (right side of the plot)<sup>10</sup>. Note that only vessels are displayed for which a country shift is present. For each flag state (left side), the percentage of mismatched vessels is displayed between brackets. At the ISH level, a country shift was recorded for 11.8% of LSF vessels globally (n=823).

Of these mismatching vessels, the largest share (36.8%) was owned by European ISH companies (mainly in Spain, Norway, and the Netherlands), followed by Asian companies (27.0%, mainly in South Korea, Taiwan, and China), and companies registered in the Americas (20.8%; mainly in Panama, Belize, and the U.S.). The top 10 ISH countries captured 46.7% of country shifts at the ISH level (Table S6, APPENDIX), with Spanish ISH companies alone accounting for 9.7%. The positioning of Panama at both ends of the plot is noteworthy and reflects its dual role as a flag of convenience and a popular jurisdiction for company registration (Galaz *et al.*, 2018; Petrossian *et al.*, 2020).

<sup>&</sup>lt;sup>10</sup> Note that the design of this plot is slightly different from the alluvial plots in sections 4.2 through 4.6, where the plots display mismatches for the top 10 flag states (not owner countries).



Flag country

Top 10 ISH countries

Figure 6. World – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the second analytical level (ISH). Only deviations for the top 10 ISH countries utilizing foreign flags are included in the figure. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which ISH country  $\neq$  flag country. Only flag countries for which the total number of vessels is greater than 3, are labeled.

The four flags most associated with foreign ownership at the ISH level were Russia (n=64; 6% of Russian vessels), Panama (n=63; 52%), Belize (n=62; 74%), and Honduras (n=50; 78%)<sup>11</sup>. The Russian vessels were owned by foreign ISH companies in 26 countries, but

mainly in Ukraine, Japan, Norway, and South Korea. The Panamanian vessels were owned by ISHs in 24 countries, but mainly in Spain, South Korea and Ecuador, while the Belizean vessels were owned by ISHs in 45 countries, but mainly by companies registered in Panama, Colombia, and the U.S. (Table S7, APPENDIX). Panama and Belize are known FoCs (Ford and Wilcox, 2019; Petrossian *et al.*, 2020). Our results further indicate that Honduras serves as a key flag of convenience for Taiwanese fishing companies at the ISH level: 19 Honduran vessels were owned by Taiwanese ISHs, accounting for 38% of Flag-to-ISH country shifts for Honduras, and 30% of all Honduran LSF vessels sampled.

# 4.1.2 Ultimate ownership of fishing vessels

The 6,962 fishing vessels in the global sample were ultimately owned by 4,120 companies (GUOs). European companies owned the largest share of vessels (42.0%) (+2.5 percentage points compared to the ISH level), followed by Asian companies (22.7%) (+0.9 percentage points), and companies in the Americas (22.0%) (-1.5 percentage points). African companies ultimately owned 10.4% of LSF vessels (-1.6 percentage points), whereas Oceanian companies owned 2.9% (-0.3 percentage points). The top 10 GUO countries jointly accounted for 54.2% of sampled LSF vessels globally (Table 4).

Table 4. Top 10 countries of GUOs ultimately owning LSF vessels in the global sample, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the GUO level, the number of different flag states utilized, and the average number of vessels per company.  $\Delta$ ISH denotes the difference in the number of vessels per company compared to analysis at the ISH level.

GUO country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)	Δısh
Russia	959	17	549	1.7 ± 1.8	No change
United States	591	23	465	1.3 ± 1.9	+0.1
Spain	460	41	244	1.9 ± 3.3	+0.6
China	363	11	64	5.7 ± 14.0	+1.5
South Korea	336	25	127	2.6 ± 4.5	+0.3
Norway	249	17	214	$1.2 \pm 0.5$	+0.1
Morocco	239	5	82	2.9 ± 4.7	+0.2
Canada	194	10	128	1.5 ±1.7	+0.1
Japan	193	17	126	1.5 ± 1.2	No change
United Kingdom	190	24	132	$1.4 \pm 1.1$	+0.2

Table 5 shows the increases (+) and decreases (-) in vessel numbers between the ISH and GUO level for the top owner countries in the global sample. The most significant increase

<sup>&</sup>lt;sup>11</sup> In the alluvial plot, the sizes of the country rectangles on the left do not accurately reflect the flag countries' ranking or importance. For example, although Russian vessels rank second in terms of Flag-to-ISH mismatches, their rectangle appears small. This is because only the top 10 ISH countries are represented on the right, and ownership is distributed across many ISH countries (n=26).

was found for Spain (+178 vessels, corresponding to a relative increase of 63%). The second largest increase was found for South Korean companies (+36 vessels; +12%). The United States occupied third place with an increase of 26 vessels (+5%). According to Orbis data, 11 LSF vessels<sup>12</sup> directly owned by South Korean fishing companies were ultimately owned by GUOs in North Korea, representing a large shift compared to the ISH level (+183%). This result must be interpreted with caution, as it had not been confirmed using other sources at the time of writing this report. The most significant decreases were found for Argentina (-50 vessels; -28% compared to the number of vessels owned by Argentinian ISHs), Panama (-40 vessels; -37%), and Mozambique (-22 vessels; -71%). See Table S8 (see, APPENDIX) for an overview of delta values for all owner countries.

Table 5. Increase (+) and decrease (-) in the number of vessels between analysis at the ISH vs. the GUO level for the top owner countries in the global sample. Only the top 10 increasing and decreasing countries are included. The delta ( $\Delta$ ) indicates the absolute difference in vessel counts (+ or -) between the two levels, along with the corresponding percentage change. Shaded in grey: countries that are among the top 10 GUO countries.

+/-	Country	Vessels owned by ISHs	Vessels owned by GUOs	Δ (no. vessels)	Δ(%)
	Spain	282	460	+178	+63
	South Korea	300	336	+36	+12
	United States	565	591	+26	+5
	Netherlands	102	121	+19	+19
	Italy	72	87	+15	+21
Ŧ	Japan	180	193	+13	+7
	North Korea	6	17	+11	+183
	China	357	363	+6	+2
	Colombia	23	28	+5	+22
	Taiwan	120	125	+5	+4
	Argentina	176	126	-50	-28
	Panama	108	68	-40	-37
	Mozambique	31	9	-22	-71
	France	107	90	-17	-16
	Angola	25	9	-16	-64
-	Senegal	54	39	-15	-28
	Morocco	253	239	-14	-6
	Belize	62	50	-12	-19
	Russia	970	959	-11	-1
	Namibia	103	93	-10	-10

For our analysis of country discrepancies, we focus on a subsample of 6,820 vessels, excluding 142 vessels with unknown flag states (see section 2.). Figure 72.5). Figure 7 shows an alluvial plot highlighting Flag-to-GUO country mismatches in the global sample, for the top 10 GUO countries<sup>13</sup>. A country shift was recorded for 15.8% of LSF vessels

<sup>&</sup>lt;sup>12</sup> Of these, 9 vessels are flagged to North Korea, while for 2 vessels the flag is unknown.

<sup>&</sup>lt;sup>13</sup> Note that the design of this plot is slightly different from the alluvial plots in sections 4.2 through 4.6, where the plots display mismatches for the top 10 flag states (not owner countries).

globally (n=1,098) – an increase of 4.0 percentage points compared to analysis at the ISH level. Almost half of mismatching vessels were owned by GUOs in Europe (n=530; 48%) (+18 percentage points), while a quarter was owned by Asian GUOs (n=276) (+4 percentage points).

The dominant GUO countries correspond to those identified at the ISH level (Table S9, APPENDIX). Spanish GUOs alone accounted for almost a quarter (n=250; 23%) of Flag-to-GUO mismatches globally. This furthermore represents a significant increase compared to analysis at the ISH level: from 80 foreign flagged LSF vessels owned by Spanish ISHs to 250 vessels owned by GUOs, corresponding to a relative increase of 213%<sup>14</sup>. For comparison, the second largest GUO country responsible for Flag-to-GUO mismatches, South Korea (n=72), only marks a 53% increase. In line with findings by Kinds et al. (2025), this suggests a pronounced strategy by Spanish companies to exert control through corporate ownership of local subsidiaries.

Similar to analysis at the ISH level, Panama remains represented on both sides of the plot. However, the number of vessels linked to Panamanian GUOs is notably lower – 29 compared to 39; a decrease of 26%. This further supports the hypothesis that Panama serves primarily as a flag of convenience and a jurisdiction for subsidiary registration, while the ultimate owners are foreign entities. Due to its secrecy laws and the non-public nature of its beneficial ownership register (Transparency International, 2021), it cannot be ruled out that many Panamanian GUOs are in fact owned by foreign investors. This situation raises concerns about the true ownership and control of these entities and the vessels they operate (Campling, 2012; Sykes et al., 2014; Kinds et al., 2025).

<sup>&</sup>lt;sup>14</sup> Note that this only reflects the shifts – the +63% increase reported earlier encompassed all vessels owned by Spanish GUOs (including those flagged to Spain).



Flag country

Top 10 GUO countries

Figure 7. World – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the third analytical level (GUO). Only deviations for the top 10 GUO countries utilizing foreign flags are included in the figure. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for whichGUO country  $\neq$  flag country. Only flag countries for which the total number of vessels is greater than 3, are labeled.

The five flags most associated with foreign ownership at the GUO level were Panama (77% of Panamanian vessels) (+25 percentage points compared to analysis at the ISH level), Russia (8%) (+2 percentage points), Argentina (36%) (+26 percentage points), Belize (77%)

(+3 percentage points), and Honduras (80%) (-2 percentage points)<sup>15</sup> (Table S10, APPENDIX). The Panamanian vessels (n=92) were owned by companies in 25 countries, but mostly in South Korea, Spain, Taiwan and Ecuador (jointly encompassing 52% of Panamanian vessels). The Russian vessels (n=77) were owned by companies in 25 countries, but mostly in the United States, Ukraine, and Norway. The Argentinian vessels (n=67) were owned by GUOs in10 countries, with Spain and China jointly accounting for almost 75% of shifts (Spanish GUOs alone accounted for 64% of shifts). Finally, the vessels flagged to Belize (n=65), and Honduras (n=51) were owned by GUOs in, respectively, 34 and 21 countries. Analysis at the GUO level confirms our earlier finding at the ISH level that Honduras serves as a key flag of convenience for Taiwanese fishing companies.

# 4.1.3 Ownership concentration

In the previous sections, we detailed how sampled vessels (n=6,962) were flagged to at least 146 flag states<sup>16</sup>, directly owned by 4,468 ISHs in 134 countries, and ultimately owned by 4,120 GUOs in 133 countries.

The left plot in Figure 8 shows the Lorenz curves for each of these levels, indicating the inequality in LSF vessel distribution between countries. Inequality is high at all levels. The Gini coefficient is the same for the flag and ISH levels (0.731). This may be explained by the relatively close alignment between flag and ISH country (a Flag-to-ISH mismatch was recorded for approximately 12.0% of vessels) and the fact that ownership at the ISH level is not disproportionally concentrated in a few countries. At the level of the GUO, inequality increases marginally (Gini=0.748). Such an increase is expected, since registered owners may be distributed across more countries than the corporations that ultimately own them. In other words, when several ISHs are traced back to their GUOs, ownership consolidates in fewer locations, increasing inequality. However, despite the significant increase in the proportion of country mismatches between the ISH and the GUO level, this did not result in a large effect on inequality. This is mainly because roughly the same countries are concentrate a substantial number of vessels, or that the registered owner and the ultimate are the same entity (see additional reflections on ownership structure in section 4.7.1).

At the flag level, the top 20% of countries account for approximately 75% of the sampled vessels, while at the GUO level, this figure rises to 78%. As will become clear in sections 4.2 through 4.6, ownership of vessels in Asia and the Americas contribute most to this inequality. However, it is important to note that the global analysis presented here is not

<sup>&</sup>lt;sup>15</sup> In the alluvial plot, the sizes of the country rectangles on the left do not accurately reflect the flag countries' ranking or importance. For example, although Russian vessels rank second in terms of Flag-to-GUO mismatches, their rectangle appears small. This is because only the top 10 GUO countries are represented on the right, and ownership is distributed across many GUO countries (n=25).

 $<sup>^{\</sup>rm 16}$  'At least' because the flag was not known for 142 sampled LSF vessels.

merely the sum of the individual continental analyses, due to cross-continent ownership of fishing vessels by certain companies (see section 4.7.3).

Analysis above has shown that companies in the top 10 GUO countries collectively own over half of the sampled vessels worldwide (see Table 4). Inequality is considerably lower when corporate entities are considered (Figure 8, right plot). At the GUO level, the top 20% corporations owned slightly more than half of the sampled vessels (51%).



Figure 8. World – Gini coefficients and Lorenz curves indicating inequality in the distribution of fishing vessels between countries (left) / corporate entities (right) at three (two) analytical levels (Flag country), ISH country, GUO country).

The largest GUO companies owning LSF vessels in the global sample will be discussed in section 4.7.3. Here, we zoom in on large fishing companies with high degrees of transnational ownership, calculated as the diversity of countries in their ownership structure (the sum of the number of unique flag and ISH countries). Table 6 shows the 10 GUO companies in the global sample with the highest country diversity in their ownership structures. Seven companies were registered in Spain<sup>17</sup>. Their rankings suggest that a highly international ownership structure is not solely a characteristic of the largest fishing corporations. However, a deeper examination of ownership structures is necessary for definitive conclusions.

<sup>&</sup>lt;sup>17</sup> According to third sources, 'Jose Marti Peix S.A.' and 'Astipesca S.L.' have been dissolved. The former entered bankruptcy proceedings in 2014 (<u>https://imcsnet.org/resource/beneficial-ownership-case-study-jose-marti-peix</u>), while 'Astipesca S.L.' filed for voluntary bankruptcy in 2008 (<u>https://boe.es/boe/dias/2008/05/19/pdfs/B06570-06570.pdf</u>).

Table 6. The 10 GUO companies in the global sample with the highest country diversity in their ownership structure, calculated as the sum of the number of ISH countries and the number of flag countries. The 'Rank' column indicates the position of each GUO based on the total number of vessels they own across the entire sample. The numbers between brackets in the ISH and Flag countries columns indicate the number of unique countries involved. (\*) Company in liquidation according to third sources.

GUO name	GUO country	No. vessels	Rank	ISH countries	Flag countries
Pescanova SA	Spain	30	8	Argentina, Spain, Chile, United Kingdom, Namibia (5)	Argentina, Chile, Falkland Islands/Malvinas (UK), Mozambique, Namibia, Spain (6)
Freiremar S.A.	Spain	14	23	Spain, United Kingdom, Argentina (3)	Angola, Argentina, Belize, Falkland Islands/Malvinas (UK), Senegal, Spain, Uruguay (7)
Albacora, Sociedad Anonima	Spain	13	28	Spain, Curaçao, Ecuador, Panama (4)	Curaçao, Ecuador, Mauritius, Panama, Seychelles, Spain (6)
Jose Marti Peix S.A. <sup>(*)</sup>	Spain	14	24	Cameroon, Spain, Morocco, Senegal (4)	Cameroon, Mauritania, Morocco, Senegal, Spain (5)
Abanca Corporacion Bancaria SA	Spain	28	11	Mozambique, Uruguay, Spain (3)	Angola, Argentina, Mozambique, Namibia, Spain, Uruguay (6)
Cornelis Vrolijk Holding B.V.	Netherlands	10	50	Netherlands, France, United States, United Kingdom (4)	France, Germany, Netherlands, United Kingdom, United States (5)
Astipesca S.L. <sup>(*)</sup>	Spain	12	33	Morocco, Gabon, Mauritania, Spain (4)	Gabon, Guinea-Bissau, Mauritania, Morocco, Spain (5)
Factor Holding S.R.L.	Italy	9	65	France, Solomon Islands, Spain, Ecuador (4)	Ecuador, France, Solomon Islands, Spain, Venezuela (5)
Sociedad Anonima Eduardo Vieira	Spain	14	25	Senegal, Argentina, Namibia, Peru (4)	Argentina, Namibia, Peru, Senegal, Spain (5)
UK Fisheries Limited	United Kingdom	7	97	France, Spain, United Kingdom, Portugal (4)	Angola, France, Mauritius, Portugal, United Kingdom (5)

# 4.2 Europe

#### **Key findings**

- The 2,571 sampled European-flagged fishing vessels were directly owned by 1,876 companies (ISH) and ultimately by 1,775 companies (GUO); the majority of vessels were directly (97.5%) and ultimately (97.2%) owned by European companies.
- Vessel flag and ISH country aligned closely, with a Flag-to-ISH mismatch observed in just 7.1% of vessels (n=182). At the GUO level, Flag-to-GUO country mismatches are slightly higher, at 9.0% (n=231). Most shifts involved ownership by companies in other European countries.
- Analysis at the GUO level showed significant increases in European LSF vessel ownership compared to the ISH level for Spain (+20 vessels; a relative increase of 10%), the Netherlands (+14 vessels; +15%), and the U.S (+14 vessels; +1400%).
- The flags most associated with foreign ownership at the GUO level were Russia (n=77) (8% of Russian flagged vessels), the United Kingdom (n=21) (12%) and France (n=19) (19%).
- Vessels were unequally distributed across GUO countries (Gini=0.793), with companies in the top 5 countries (Russia, Norway, Spain, the United Kingdom, and Denmark) owning about 65% of vessels.

In Europe, the 2,571 sampled European-flagged vessels were flagged to 32 states in 30 sovereign countries. The top 10 flag countries in the sub-sample accounted for 80.2% of fishing vessels and 84.2% of identifiable gross tonnage (Table S11, APPENDIX). This corresponds rather well to the top 10 countries in the population, and their relative proportions (79.0% and 79.2%) (Table S12, APPENDIX).

# 4.2.1 Registered ownership of fishing vessels

The 2,571 sampled European fishing vessels were directly owned by 1,876 companies (ISHs). The vast majority of vessels were owned by European companies (97.5%), and the 10 largest registered owner (ISH) countries jointly accounted for 80.7% of European fishing vessels (Table 7).

ISH country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)
Russia	947	5	569	1.7 ± 1.5
Norway	229	8	207	$1.1 \pm 0.4$
Spain	200	6	160	$1.3 \pm 0.9$
United Kingdom	164	9	144	$1.1 \pm 0.6$
Denmark	123	8	98	$1.3 \pm 0.7$
France	99	3	71	$1.4 \pm 1.1$
Netherlands	95	6	84	$1.1 \pm 0.4$
Iceland	85	6	51	1.7 ± 1.0
Greece	69	1	67	$1.0 \pm 0.2$
Italy	64	2	51	$1.3 \pm 0.7$

Table 7. Top 10 countries of ISHs owning LSF vessels flagged to European countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the ISH level, the number of different European flag states utilized, and the average number of vessels per company.

The alluvial plot in Figure 9 shows the country shifts for the top 10 European flag states in the sample (Flag-to-ISH mismatches). In Europe there is a strong consistency between flag and ISH country: a country shift was recorded for 7.1% of European vessels (n=182). Of these, the majority (64.3%) were owned by companies in other European countries, and the top 10 ISH countries captured 55.6% of country shifts at the ISH level (Table S13, APPENDIX).


ISH country

Figure 9. Europe – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the second analytical level (ISH). Only deviations for the top 10 European flag states in terms of vessel numbers are included in the figure. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which ISH country  $\neq$  flag country. Only ISH countries for which the total number of vessels is greater than 1, are labeled.

The three flags most associated with foreign ownership at the ISH level were Russia (6% of Russian vessels), the UK (10%), and Spain (6%). The Russian vessels (n=64) were owned by foreign ISH companies in 26 countries, but mainly in Ukraine, Japan, Norway, and South Korea, while the UK vessels (n=16) were owned mostly by companies in the Netherlands, France and Spain. Finally, the Spanish vessels (n=12) were mostly owned by companies

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registered in Africa (Angola, Senegal, Cameroon, Mozambique, and Morocco) (Table S14, APPENDIX).

# 4.2.2 Ultimate ownership of fishing vessels

The 2,571 sampled European fishing vessels were ultimately owned by 1,775 companies (GUOs). The top 10 GUO countries, all in Europe, jointly accounted for 81.1% of sampled European-flagged fishing vessels (Table 8).

Table 8. Top 10 countries of GUOs ultimately owning LSF vessels flagged to European countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the GUO level, the number of different European flag states utilized, and the average number of vessels per company.  $\Delta$ ISH denotes the difference in the number of vessels per company compared to analysis at the ISH level.

CUO country	No. vessels	No flags	No. of companies	Voscols/company (avg.)	Δ <sub>ISH</sub>
GOO country	owned	NO. Hags	No. of companies	vessels/company (avg.)	
Russia	933	4	536	1.7 ± 1.8	No change
Norway	229	8	197	$1.2 \pm 0.5$	+0.1
Spain	220	8	168	$1.3 \pm 1.0$	No change
United Kingdom	165	11	119	$1.4 \pm 1.0$	+0.2
Denmark	121	7	88	$1.4 \pm 1.3$	+0.1
Netherlands	109	8	85	$1.3 \pm 0.9$	+0.2
Iceland	87	7	51	1.7 ± 1.1	No change
France	84	3	60	1.4 ± 1.2	No change
Greece	70	1	68	$1.0 \pm 0.2$	No change
Italy	68	4	52	$1.3 \pm 0.8$	No change

Table 9 shows the increases (+) and decreases (-) in vessel numbers between the ISH and GUO level for the top owner countries for European flagged vessels. The vast majority were ultimately owned by European companies (97.2%) (Table S15, APPENDIX). Major shifts within Europe include an increase in the number of vessels owned by Spanish and Dutch companies compared to analysis at the ISH level – relative increases of 10% and 15% (+20 and +14 vessels), respectively. Analysis at the GUO level showed a strong relative increase in vessels owned by companies in the United States (+1,400%; +14 vessels). Significant decreases were observed for African countries, primarily due to eight Spanish-flagged vessels registered to ISHs in Angola, Senegal, Cameroon, and Mozambique but ultimately owned by Spanish companies. See Table S15 (APPENDIX) for an overview of delta values for all owner countries.

Table 9. Increase (+) and decrease (-) in the number of vessels between analysis at the ISH vs. the GUO level for the top owner countries of European LSF vessels. Only the top 5 increasing and decreasing countries are included. The delta ( $\Delta$ ) indicates the absolute difference in vessel counts (+ or -) between the two levels, along with the corresponding percentage change. Shaded in grey: countries that are among the top 10 GUO countries of European LSF vessels.

+/- Owner		Vossals owned by ISUs	Vessels owned by CLIOs	Δ (no.	A (%)
+/-	country	vessels owned by ISHS	vessels owned by GOOS	vessels)	Δ (70)
	Spain	200	220	+20	+10
	Netherlands	95	109	+14	+15
+	United States	1	15	+14	+1400
	Italy	64	68	+4	+6
	Iceland	85	87	+2	+2
	France	99	84	-15	-15
	Russia	947	933	-14	-1
-	Germany	42	36	-6	-14
	Lithuania	30	24	-6	-20
	Portugal	52	47	-5	-10

Figure 10 shows the country shifts between the flag and the GUO level for the top 10 European flag states in the sample. A country shift was recorded for 9.0% of European vessels (n=231) – an increase of 1.9 percentage points compared to analysis at the ISH level. The majority of vessels for which a shift was recorded were owned by companies in other European countries (69.3%) (Table S16, APPENDIX). Dominant countries include those found at the ISH level, as well as the U.S.



GUO country

Figure 10. Europe – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the third analytical level (GUO). Only deviations for the top 10 European flag states are included in the figure. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which GUO country  $\neq$  flag country. Only GUO countries for which the total number of vessels is greater than 1, are labeled.

The three flags most associated with foreign ownership at the GUO level were Russia (8% of Russian vessels) (+2 percentage points compared to the ISH level), the UK (12%) (+2 percentage points), and France (19%) (+13 percentage points). The Russian vessels (n=77) were owned by foreign companies in 25 countries, but mostly in the United States, Ukraine, and Norway (Table S17, APPENDIX), while the UK vessels (n=21) were owned mostly by

companies in the Netherlands and Spain. Finally, the French vessels (n=19) were owned mostly by companies in Spain, the UK, Italy, and the Netherlands. Interestingly, only two percent (-4 percentage points) of Spanish vessels were owned by foreign companies at the GUO level. This decrease reflects the ownership, by Spanish GUOs, of several African subsidiaries (ISHs) owning Spanish flagged fishing vessels (see Table S14, APPENDIX).

#### 4.2.3 Ownership concentration

In the previous sections, we detailed how sampled European vessels (n=2,571) were flagged to 32 flag states, directly owned by 1,876 ISHs in 56 countries, and ultimately owned by 1,775 GUOs in 53 countries.

The left plot in Figure 11 shows the Lorenz curves for each of these levels, indicating the inequality in fishing vessel distribution between countries. Inequality increases from the flag (Gini=0.677) to the ISH level (Gini=0.802), and then slightly goes down at the GUO level (Gini=0.793). At the flag level, the top 20% of countries capture ca. 70% of sampled vessels, while at the GUO level, this is over 80%. Analysis shows that GUO companies in Russia, Norway, Spain, the UK, and Denmark collectively own the most vessels (64.7% of sampled European vessels). Inequality is considerably lower when corporate entities are considered (Figure 11, right plot). At the GUO level, the top 20% corporations owned ca. 44% of vessels.

The largest GUO companies (≥ 10 vessels) (n=11) owning European-flagged LSF vessels are summarized in Table S18 (See, APPENDIX). Eight are Russian (73%), while the remaining three companies are registered in Romania, Denmark, and the United States. The largest GUO company was 'Murmanrybprom Joint Stock Company' (Russia), ultimately owning 16 Russian flagged fishing vessels through 7 Russian subsidiaries.



Europe - Inequality based on corporate identities (ISH, GUO)



Figure 11. Europe – Gini coefficients and Lorenz curves indicating inequality in the distribution of fishing vessels between countries (left) / corporate entities (right) at three (two) analytical levels (Flag country), ISH country, GUO country).

# 4.3 Americas

#### Key findings

- The 1,726 sampled fishing vessels in the Americas were directly owned by 1,248 companies (ISH) and ultimately by 1,155 companies (GUO), with most vessels directly (88.0%) and ultimately (82.3%) owned by companies in the region.
- Vessel flag and ISH country mismatched for 16.5% of vessels (n=285). At the GUO level, Flag-to-GUO country mismatches increased to 23.4% (n=404). Most shifts involved ownership by companies in Spain, Taiwan, South Korea, and the United States. European GUOs accounted for 40% of total shifts.
- Analysis at the GUO level showed significant relative increases in the ownership of American-flagged LSF vessels compared to the ISH level for Spain (+73 vessels; +292%) and notable decreases for Argentina (-48 vessels; -28%) and Panama (-34 vessels; -43%).
- The flags most associated with foreign ownership at the GUO level were Panama (n=92) (77% of Panamanian flagged vessels), Argentina (n=67) (36%), and Belize (n=65) (77%).
- Panama's position reaffirms its status as a key flag of convenience (77% of Panamanian vessels are foreign owned at the GUO level), but it also highlights Panama's role as a hub for subsidiary registration, facilitating transnational corporations operating vessels in the region (mostly flagged to Belize and Honduras).
- Vessels were unequally distributed across GUO countries (Gini=0.815), with companies in the top 5 countries (United States, Canada, Chile, Argentina, and Spain) owning about 65% of vessels.

In the Americas, the 1,726 sampled vessels were flagged to 33 states in 31 sovereign countries. The top 10 flag countries in the sub-sample accounted for 89.6% of fishing vessels, and 84.0% of identifiable GT (Table S11, APPENDIX). Most of these flag countries also appear in the population top 10 in similar proportions (90.5% and 76.4%), albeit in a slightly different order (Table S12, APPENDIX).

## 4.3.1 Registered ownership of fishing vessels

The 1,726 sampled vessels in the Americas were directly owned by 1,248 companies (ISHs). The vast majority of vessels were owned by regional companies (88.0%). The 10 largest ISH countries jointly accounted for 81.6% of fishing vessels (Table 10).

Table 10. Top 10 countries of ISHs owning LSF vessels flagged to countries in the Americas, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the ISH level, the number of different flag states utilized (Americas), and the average number of vessels per company.

ISH country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)
United States	554	10	473	1.2 ± 1.5
Canada	185	2	130	$1.4 \pm 1.2$
Argentina	173	4	108	1.6 ± 1.9
Chile	148	3	61	2.4 ± 2.8
Ecuador	88	4	55	$1.6 \pm 1.8$
Panama	79	9	70	$1.1 \pm 0.4$
Mexico	73	3	31	2.4 ± 2.3
Peru	49	2	29	1.7 ± 1.5
Belize	30	6	27	$1.1 \pm 0.3$
Venezuela	29	3	20	1.5 ± 1.6

Figure 12 shows the country shifts between the flag and the ISH level for the top 10 sampled flag states in the Americas (Flag-to-ISH mismatches). A country shift was recorded for 16.5% of vessels (n=285). Only 34.4% of these vessels were owned by ISH companies in the Americas. European companies accounted for 26.7%, and Asian countries for 26.0%. The top 10 ISH countries captured 54.4% of country shifts at the ISH level (Table S19, APPENDIX).



Figure 12. Americas – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the second analytical level (ISH). Only deviations for the top 10 flag states in the Americas in terms of vessel numbers are included in the figure. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which ISH country  $\neq$  flag country. Only ISH countries for which the total number of vessels is greater than 1, are labeled.

The three flags most associated with foreign ownership at the ISH level were Panama (52% of Panamanian vessels), Belize (74%), and Honduras (78%). Vessels flagged to these three countries were owned by firms in a range of ISH countries across all continents (Table S20, APPENDIX), suggesting their importance in the governance of large fishing corporations. The Panamanian vessels (n=63) were owned by ISH companies in 24 countries, with strongest links existing between Panama and Spain, South Korea, and Ecuador. The

Belizean vessels (n=62) were owned by companies in 35 countries, and the Honduran vessels (n=50) were owned by companies in 20 countries (but mainly by Taiwanese companies).

## 4.3.2 Ultimate ownership of fishing vessels

The 1,726 sampled vessels in the Americas were ultimately owned by 1,155 companies (GUOs). The 10 largest GUO countries jointly accounted for 80.6% of fishing vessels (Table 11).

Table 11. Top 10 countries of GUOs ultimately owning LSF vessels flagged to countries in the Americas, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the GUO level, the number of different flag states (Americas) utilized, and the average number of vessels per company.  $\Delta$ ISH denotes the difference in the number of vessels per company compared to analysis at the ISH level.

GUO country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)	Δ <sub>ISH</sub>
United States	565	12	449	1.3 ± 1.8	+0.1
Canada	187	4	125	1.5 ± 1.6	+0.1
Chile	142	3	52	2.7 ± 3.3	+0.3
Argentina	125	4	83	1.5 ± 1.1	+0.1
Spain	98	13	36	2.7 ± 4.0	+1.5
Ecuador	83	3	51	$1.6 \pm 2.0$	No change
Mexico	73	3	31	2.4 ± 2.3	No change
Panama	45	7	41	$1.1 \pm 0.4$	No change
Peru	42	2	25	1.7 ± 1.3	No change
Venezuela	31	4	19	$1.6 \pm 1.8$	+0.1

Table 12 shows the increases (+) and decreases (-) in vessel numbers between the ISH and GUO level for the top owner countries for vessels in the Americas. The majority of vessels were ultimately owned by companies in the Americas (82.3%) – a decrease of 5.7 percentage points compared to analysis at the ISH level (Table S21, APPENDIX). Notable relative decreases were recorded for Argentina (-48 vessels; -28%) and Panama (-34 vessels; -43%). European companies' ownership of fishing vessels in the Americas increased from 5.6% to 10.0%. For Asian companies the share increased from 4.3% to 5.9%. A significant increase was recorded for Spain (+73 vessels; +292%). See Table S21 (APPENDIX) for an overview of delta values for all owner countries.

Table 12. Increase (+) and decrease (-) in the number of vessels between analysis at the ISH vs. the GUO level for the top owner countries of American LSF vessels. Only the top 5 increasing and decreasing countries are included. The delta ( $\Delta$ ) indicates the absolute difference in vessel counts (+ or -) between the two levels, along with the corresponding percentage change. Shaded in grey: countries that are among the top 10 GUO countries of American LSF vessels.

+/-	Owner country	Vessels owned by ISHs	Vessels owned by GUOs	$\Delta$ (no. vessels)	Δ(%)
	Spain	25	98	+73	+292
	South Korea	15	28	+13	+87
+	United States	554	565	+11	+2
	Japan	3	10	+7	+233
	Italy	0	6	+6	NA
	Argentina	173	125	-48	-28
	Panama	79	45	-34	-43
-	United Kingdom	27	16	-11	-41
	Peru	49	42	-7	-14
	Uruguay	25	18	-7	-28

Figure 13 shows the country shifts between the flag and the GUO level for the top 10 flag states in the Americas. A country shift was recorded for 23.4% of vessels (n=404) – an increase of 6.9 percentage points compared to analysis at the ISH level. The largest share of these vessels was ultimately owned by companies in Spain (24.3%), followed by Taiwan (7.2%), South Korea and the United States (both accounting for 6.9%) (Table S22, APPENDIX). European GUOs accounted for 40.1% of country shifts, Asian companies for 25.2%, and 26.7% of shifting vessels were owned by other countries in the region.



GUO country

Figure 13. Americas – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the third analytical level (GUO). Only deviations for the top 10 flag states in the Americas are included in the figure. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which GUO country  $\neq$  flag country. Only GUO countries for which the total number of vessels is greater than 1, are labeled.

The three flags most associated with foreign ownership at the GUO level were Panama (77% of Panamanian vessels) (an increase of 25 percentage points compared to the ISH level), Argentina (36%) (+26 percentage points), and Belize (77%) (+3 percentage points) (Table S23, APPENDIX). The Panamanian vessels (n=92) were owned by foreign companies in 25 countries, but mostly in South Korea, Spain, Taiwan, and Ecuador. The Argentinian

vessels (n=67) were owned by companies in 10 countries, with Spanish and Chinese companies together representing about three quarters of total shifts  $(74.7\%)^{18}$ . The Belizean vessels (n=65) were ultimately owned by companies in 34 countries.

# 4.3.3 Ownership concentration

In the previous sections, we detailed how American vessels (n=1,726) were flagged to 33 flag states, directly owned by 1,248 ISHs in 73 countries, and ultimately owned by 1,155 GUOs in 72 countries.

The left plot in Figure 14 shows the Lorenz curves for each of these levels, indicating the inequality in fishing vessel distribution between countries. Inequality increases from the flag (Gini = 0.746) to the ISH level (Gini = 0.825), and then slightly goes down at the GUO level (Gini = 0.815). At the flag level, the top 20% of flag countries capture ca. 75% of sampled vessels. At the GUO level, this is 87%. Analysis shows that GUO companies in the United States, Canada, Chile, Argentina, and Spain collectively own the most vessels (64.7% of sampled vessels flagged to the Americas). Inequality is considerably lower when corporate entities are considered (Figure 14, right plot). At the GUO level, the top 20% of corporations owned ca. 46% of vessels.

The largest GUO companies ( $\geq$  10 vessels) (n=10) owning LSF vessels flagged in the Americas are summarized in Table S24 (APPENDIX). Most of them were located in the Americas: United States (1 company), Chile (2 companies), Canada (2 companies), Ecuador (1 company), and Cuba (1 company). There are furthermore two companies from Spain, and one from Taiwan. The largest company, the U.S. based 'Trident Seafoods Corporation', owned 37 fishing vessels flagged to countries in the Americas, through two subsidiaries.

<sup>&</sup>lt;sup>18</sup> Spanish GUOs alone accounted for 64.2%.

Americas - Inequality based on country (Flag, ISH, GUO)

Americas - Inequality based on corporate identities (ISH, GUO)



Figure 14. Americas – Gini coefficients and Lorenz curves indicating inequality in the distribution of fishing vessels between countries (left) / corporate entities (right) at three (two) analytical levels (Flag country), ISH country, GUO country).

## 4.4 Asia

#### Key findings

- The 1,364 sampled Asian fishing vessels were directly owned by 650 companies (ISH) and ultimately by 589 companies (GUO); the vast majority of vessels were directly (97.4%) and ultimately (97.4%) owned by Asian companies.
- Vessel flag and ISH country aligned closely, with a Flag-to-ISH mismatch observed in 7.5% of vessels (n=102). At the GUO level, Flag-to-GUO country mismatches were slightly lower, at 7.0% (n=96). Most shifts involved ownership by companies in other Asian countries.
- Analysis at the GUO level showed small increases in vessel ownership for China (+5 vessels; +2%), South Korea (+2 vessels; +1%), and North Korea (+9 vessels; +180%) compared to the ISH level.
- The flags most associated with foreign ownership at the GUO level were Georgia (n=25) (52% of Georgian flagged vessels), Indonesia (n=6) (3%), and China (n=8) (2%).
- Vessels were unequally distributed across GUO countries (Gini=0.815), with companies in the top 5 countries (China, South Korea, Indonesia, Japan, and Taiwan) owning about 85% of vessels. Corporate concentration was furthermore high compared to other continents, with the top 20% corporations owning > 60% of vessels.

In Asia, the 1,364 sampled vessels are flagged to 31 states. The top 10 flag countries in the sub-sample account for 91.4% of fishing vessels and 89.6% of gross tonnage (Table S11, APPENDIX). This corresponds well with the countries and their relative proportions found in the population (91.0% and 85.0%), albeit in a slightly different order (Table S12, APPENDIX).

## 4.4.1 Registered ownership of fishing vessels

The 1,364 sampled Asian fishing vessels were directly owned by 650 companies (ISHs). The vast majority of vessels were owned by Asian companies (97.4%). The 10 largest ISH countries jointly accounted for 90.2% of Asian fishing vessels (Table 13).

ISH country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)
China	329	2	78	$4.2 \pm 10.2$
South Korea	266	5	115	$2.3 \pm 3.5$
Indonesia	169	1	54	$3.1 \pm 3.4$
Japan	165	5	114	$1.4 \pm 1.0$
Taiwan	86	3	78	$1.1 \pm 0.3$
Philippines	73	3	18	4.1 ± 7.2
Turkey	55	2	45	$1.2 \pm 0.5$
India	42	1	20	$2.1 \pm 2.2$
Georgia	24	1	22	$1.1 \pm 0.3$
Iran	21	2	12	$1.8 \pm 1.8$

Table 13. Top 10 countries of ISHs owning LSF vessels flagged to Asian countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the ISH level, the number of different Asian flag states utilized, and the average number of vessels per company.

Figure 15 shows the country shifts between the flag and the ISH level for the top 10 Asian flag states in the sample (Flag-to-ISH mismatches). A country shift was recorded for 7.5% of Asian vessels (n=102). Of these, the majority were owned by companies in other Asian countries (64.7% of vessels for which a country shift is present). South Korean companies accounted for 18.6% of shifts, Turkish companies for 12.7%, and Japanese companies for 7.8%<sup>19</sup>. The top 10 ISH countries capture 74.5% of country shifts at the ISH level (Table S25, APPENDIX).

<sup>&</sup>lt;sup>19</sup> Note: for Asia and Oceania, these percentages do not directly correspond to the sizes of the ISH country rectangles on the right side of the alluvial plots. This discrepancy arises because the plot includes only the top 10 flag states where the vessel's flag differs from the ISH's country of registration. In these regions, numerous smaller flag states collectively contribute to shifts, which are not fully captured in the visualization.



ISH country

Figure 15. Asia – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the second analytical level (ISH). Only deviations for the top 10 Asian flag states in terms of vessel numbers are included in the figure (note that there were no country shifts for vessels flagged to Turkey). The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which ISH country  $\neq$  flag country. Only ISH countries for which the total number of vessels is greater than 1, are labeled.

Among the top 10 flag states in the sample<sup>20</sup>, the three flags most associated with foreign ownership at the ISH level were Georgia (n=24; 50% of Georgian vessels), China (n=13; 4%), and South Korea (n=9; 4%). The Georgian vessels were mainly owned by ISHs in Turkey,

<sup>&</sup>lt;sup>20</sup> Taking all flag states into account, the picture changes slightly: Georgia (n=24), North Korea (n=15), China (n=13), Mongolia (n=12), and South Korea (n=9).

Cambodia, and Taiwan, while most Chinese vessels were owned by ISHs in Hong Kong and Japan. Finally, for South Korean vessels, shifts were mainly attributed to companies outside Asia (Angola, Argentina, Honduras, Panama, Saudi Arabia, Russia, and Spain) (Table S26, APPENDIX).

## 4.4.2 Ultimate ownership of fishing vessels

The 1,364 sampled Asian fishing vessels were ultimately owned by 589 companies (GUOs). The 10 largest GUO countries (all in Asia) jointly accounted for 90.6% of Asian fishing vessels (Table 14).

Table 14. Top 10 countries of GUOs ultimately owning LSF vessels flagged to Asian countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the GUO level, the number of different Asian flag states utilized, and the average number of vessels per company. \Disk ISH denotes the difference in the number of vessels per company compared to analysis at the ISH level.

GUO country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)	Δısh
China	334	2	56	6.0 ± 14.1	+1.8
South Korea	268	6	102	2.6 ± 4.3	+0.3
Indonesia	167	1	52	3.2 ± 3.5	+0.1
Japan	166	5	113	1.5 ± 1.0	+0.1
Taiwan	87	3	77	$1.1 \pm 0.4$	No change
Philippines	73	3	18	4.1 ± 7.2	No change
Turkey	55	2	44	$1.3 \pm 0.6$	+0.1
India	42	1	18	2.3 ± 2.6	+0.2
Georgia	23	1	21	$1.1 \pm 0.3$	No change
Iran	21	2	11	1.9 ± 1.9	+0.1

Table 15 shows the increases (+) and decreases (-) in vessel numbers between the ISH and GUO level for the top owner countries for Asian vessels. The majority of vessels are ultimately owned by Asian companies (97.4%) – no change compared to analysis at the ISH level (Table S27, APPENDIX). Notable relative decreases are recorded for Saudi Arabia (-89%) (-8 vessels ultimately owned by the same company in South Korea, 'Hwa Jin Enterprises Company'), and Hong Kong (-80%) (-4 vessels ultimately owned by three Chinese companies). A notable relative increase is recorded for North Korea (+180%) (+9 vessels), where seven South Korean subsidiaries appear to be ultimately owned by a state-owned North Korean company. See Table S27 (APPENDIX) for an overview of delta values for all owner countries.

Table 15. Increase (+) and decrease (-) in the number of vessels between analysis at the ISH vs. the GUO level for the top owner countries of Asian LSF vessels. Only the top 5 increasing and decreasing countries are included. The delta ( $\Delta$ ) indicates the absolute difference in vessel counts (+ or -) between the two levels, along with the corresponding percentage change. Shaded in grey: countries that are among the top 10 GUO countries of Asian LSF vessels.

+/-	Owner country	Vessels owned by ISHs	Vessels owned by GUOs	∆ (no. vessels)	Δ(%)
	North Korea	5	14	+9	+180
	China	329	334	+5	+2
+	South Korea	266	268	+2	+1
	Russia	6	8	+2	+33
	Australia	1	3	+2	+200
	Saudi Arabia	9	1	-8	-89
-	Hong Kong SAR China	5	1	-4	-80
	Belize	7	4	-3	-43
	Indonesia	169	167	-2	-1
	Turkmenistan	3	1	-2	-67

Figure 16 shows the country shifts between the flag and the GUO level for the top 10 Asian flag states in the sample. A country shift was recorded for 7.0% of Asian vessels (n=96) – a decrease of 0.5 percent points compared to analysis at the ISH level. This decrease is driven by vessels flagged to and ultimately owned by a company in the same country, while directly owned by a company in another country. The largest share of shifting Asian vessels were ultimately owned by companies in South Korea (13.7%), followed by Turkey (12.8%) and North Korea (8.8%)<sup>21</sup> (Table S28, APPENDIX). Asian GUOs accounted for 63.5% of shifts.

<sup>&</sup>lt;sup>21</sup> Note: for Asia and Oceania, these percentages do not directly correspond to the sizes of the GUO country rectangles on the right side of the alluvial plots. This discrepancy arises because the plot includes only the top 10 flag states where the vessel's flag differs from the GUO's country of registration. In these regions, numerous smaller flag states collectively contribute to shifts, which are not fully captured in the visualization.



Vessel country

GUO country

Figure 16. Asia – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the third analytical level (GUO). Only deviations for the top 10 Asian flag states are included in the figure (note that there were no country shifts for vessels flagged to Turkey). Numbers on the left indicate, for each flag country, the percentage of vessels for which GUO country  $\neq$  flag country. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which GUO country  $\neq$  flag country. Only GUO countries for which the total number of vessels is greater than 1, are labeled.

Among the top 10 flag states in the sample, the three flags most associated with foreign ownership at the GUO level were Georgia (52% of Georgian vessels) (+2 percentage points compared to the ISH level), China (2%) (-2 percentage points), and Indonesia (3%) (+1 percentage point). The Georgian vessels (n=25) were owned by companies in seven

countries, but predominantly in Turkey, while the Chinese vessels (n=8) were owned by companies in seven countries. Finally, the Indonesian vessels (n=6) were ultimately owned by companies in South Korea and Australia (Table S29, APPENDIX).

# 4.4.3 Ownership concentration

In the previous sections, we detailed how Asian vessels (n=1,364) were flagged to 31 flag states, directly owned by 650 ISHs in 50 countries, and ultimately owned by 589 GUOs in 47 countries.

The left plot in Figure 17 shows the Lorenz curves for each of these levels, indicating the inequality in fishing vessel distribution between countries. Inequality increases from the flag (Gini = 0.746) to the ISH level (Gini = 0.817), and then slightly goes down at the GUO level (Gini = 0.815). At the flag level, the top 20% of flag countries capture ca. 80% of sampled vessels. At the GUO level, this is 89%. Analysis shows that GUO companies in China, South Korea, Indonesia, Japan, and Taiwan collectively own the most vessels (74.9% of Asian vessels sampled). Inequality is considerably lower when corporate entities are considered (Figure 17, right plot). At the GUO level, the top 20% of corporations owned ca. 61% of vessels.

The largest GUO companies (≥ 10 vessels) (n=18) owning Asian-flagged LSF vessels are summarized in Table S30 (See, APPENDIX). All of them were located in Asia. The largest company was the Chinese 'Pingtan Marine Enterprise, Ltd.': 77 vessels through a single subsidiary 'Fujian Pingtan County Ocean Fishery Group Company Limited'.



Asia - Inequality based on corporate identities (ISH, GUO)



Figure 17. Asia – Gini coefficients and Lorenz curves indicating inequality in the distribution of fishing vessels between countries (left) / corporate entities (right) at three (two) analytical levels (Flag country), ISH country, GUO country).

# 4.5 Africa

#### Key findings

- The 923 sampled African fishing vessels were directly owned by 521 companies (ISH) and ultimately by 474 companies (GUO); the majority of vessels were directly (81.9%) and ultimately (71.1%) owned by African companies. European companies directly owned 10.2% of vessels, increasing to 19.7% at the GUO level.
- There were significant deviations between flag and ISH country, with a Flagto-ISH mismatch observed in 21.3% of vessels (n=197). At the GUO level, Flag-to-GUO country mismatches increased to 31.9% (n=294). Most shifts involved ownership by companies in Europe, especially Spain.
- Analysis at the GUO level showed significant increases in African LSF vessel ownership compared to the ISH level for Spain (+83 vessels; +193%), the UK (+4 vessels; +133%), and South Korea (+5 vessels; +250%).
- The flags most associated with foreign ownership at the GUO level were Morocco (n=34) (13% of Moroccan flagged vessels), Mozambique (n=38) (86%), and Namibia (n=28) (27%).
- Vessels were unequally distributed across GUO countries (Gini=0.738), with companies in the top five countries (Morocco, Spain, Namibia, South Africa, Ghana) owning about 62% of vessels. Corporate concentration was comparatively high, with the top 20% corporations owning ca. 54% of vessels.

In Africa, the 923 sampled vessels are flagged to 36 states in 34 sovereign countries. The top 10 flag countries in the sub-sample account for 79.5% of fishing vessels and 83.5% of gross tonnage (Table S11, APPENDIX). This corresponds rather well to the countries and their relative proportions found in the population (76.3% and 74.2%) (Table S12, APPENDIX).

#### 4.5.1 Registered ownership of fishing vessels

The 923 sampled African fishing vessels were directly owned by 521 companies (ISHs). The vast majority of vessels were owned by African companies (81.9%), and European companies directly owned 10.2% of the sampled vessels. The 10 largest ISH countries jointly accounted for 72.7% of African fishing vessels (Table 16).

ISH country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)
Morocco	249	3	91	$2.7 \pm 4.4$
Namibia	95	6	61	$1.6 \pm 1.3$
South Africa	77	3	45	$1.7 \pm 3.3$
Senegal	52	2	25	$2.1 \pm 2.0$
Ghana	51	3	38	$1.3 \pm 0.6$
Spain	43	13	37	$1.2 \pm 0.7$
Mauritania	39	2	23	$1.7 \pm 1.1$
Mozambique	28	3	6	4.7 ± 8.0
Angola	21	1	8	$2.6 \pm 1.6$
Côte d'Ivoire	16	3	4	$4.0 \pm 6.0$

Table 16. Top 10 countries of ISHs owning LSF vessels flagged to African countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the ISH level, the number of different African flag states utilized, and the average number of vessels per company.

Figure 18 shows the country shifts between the flag and the ISH level for the top 10 African flag states in the sample (Flag-to-ISH mismatches). A country shift was recorded for 21.3% of African vessels (n=197). Of these, the overwhelming majority (84.3% of vessels for which a country shift is present) were owned by companies outside Africa. European companies accounted for almost half of these shifting vessels (47.2%), and Spanish companies alone accounted for 21.8%. The top 10 ISH countries capture 60.9% of country shifts at the ISH level (Table S31, APPENDIX).



ISH country

Figure 18. Africa – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the second analytical level (ISH). Only deviations for the top 10 African flag states in terms of vessel numbers are included in the figure. Numbers between brackets on the left indicate, for each flag country, the percentage of vessels for which ISH country  $\neq$  flag country. The statistics between brackets on the left indicate, for each flag country  $\neq$  flag country. The statistics between brackets on the left indicate, for each flag country  $\neq$  flag country. Only ISH countries for which the total number of vessels is greater than 1, are labeled.

Owing to their dominance in the sample, Moroccan vessels represent the highest absolute number of shifting vessels (n=21), despite making up only 8% of flagged vessels. Bahraini and Spanish companies own most vessels. As much as 79% of vessels flagged to Guinea-Bissau (n=19) are owned by ISHs in other countries (13 countries in total). Forty-three percent (43%) of Mozambican vessels (n=19) are directly owned by foreign companies,

mainly in China and Spain (Table S32, APPENDIX). Eighteen percent (18%) of Namibian vessels (n=19) are foreign owned, most of which by Spanish companies.

# 4.5.2 Ultimate ownership of fishing vessels

The 923 sampled African fishing vessels were ultimately owned by 474 companies (GUOs). The 10 largest GUO countries jointly accounted for 74.8% of African fishing vessels (Table 17).

Table 17. Top 10 countries of GUOs ultimately owning LSF vessels flagged to African countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the GUO level, the number of different African flag states utilized, and the average number of vessels per company.  $\Delta$ ISH denotes the difference in the number of vessels per company compared to analysis at the ISH level.

GUO country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)	Δ <sub>ISH</sub>
Morocco	235	2	80	2.9 ± 4.7	+0.2
Spain	126	16	48	2.6 ± 3.7	+1.4
Namibia	85	5	47	1.8 ± 2.1	+0.2
South Africa	78	4	42	$1.9 \pm 3.4$	+0.2
Ghana	47	3	36	$1.3 \pm 0.6$	No change
Senegal	39	2	20	$2.0 \pm 2.1$	-0.1
Mauritania	30	1	18	1.7 ± 1.5	No change
Côte d'Ivoire	16	3	4	4.0 ± 6.0	No change
China	12	2	1	12.0 ± NA	+6.0
Guinea	11	1	7	$1.6 \pm 0.8$	+0.2
Tunisia	11	1	6	1.8 ± 1.2	+0.2

Table 18 shows the increases (+) and decreases (-) in vessel numbers between the ISH and GUO level for the top owner countries for African vessels. The majority of vessels are ultimately owned by African companies (71.1%) – a decrease of 10.8 percentage points compared to analysis at the ISH level (Table S33, APPENDIX). European companies' ownership of African fishing vessels increases from 10.2% to 19.7%. Notable relative decreases are recorded for Mozambique (-75%) (-21 vessels), Angola (-57%) (-12 vessels), Senegal (-25%) (-13 vessels), Mauritania (-23%) (-9 vessels). The strongest relative increase is recorded for Spain (+193%) (+83 vessels). See Table S33 (APPENDIX) for an overview of delta values for all owner countries.

Table 18. Increase (+) and decrease (-) in the number of vessels between analysis at the ISH vs. the GUO level for the top owner countries of African LSF vessels. Only the top 5 increasing and decreasing countries are included. The delta ( $\Delta$ ) indicates the absolute difference in vessel counts (+ or -) between the two levels, along with the corresponding percentage change. Shaded in grey: countries that are among the top 10 GUO countries of African LSF vessels.

+/-	Owner country	Vessels owned by ISHs	Vessels owned by GUOs	$\Delta$ (no. vessels)	Δ(%)
	Spain	43	126	83	193
	South Korea	2	7	5	250
+	United Kingdom	3	7	4	133
	United Arab Emirates	0	4	4	NA
	Oman	0	4	4	NA
	Mozambique	28	7	-21	-75
	Morocco	249	235	-14	-6
-	Senegal	52	39	-13	-25
	Angola	21	9	-12	-57
	Namibia	95	85	-10	-11

Figure 19 shows the country shifts between the flag and the GUO level for the top 10 African flag states in the sample. A country shift was recorded for 31.9% of African vessels (n=294) – an increase of 10.6 percentage points compared to analysis at the ISH level. Most of these vessels were ultimately owned by companies in Spain (42.9%), followed by China (4.1%) and Bahrain (3.4%) (Table S34, APPENDIX). European GUOs accounted for 61.6% of country shifts. In Africa, dominant countries included Namibia and South Africa, although with numbers far below those seen for European companies (together 17 vessels, 5.8% of the total).



GUO country

Figure 19. Africa – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the third analytical level (GUO). Only deviations for the top 10 African flag states are included in the figure. Numbers on the left indicate, for each flag country, the percentage of vessels for which GUO country  $\neq$  flag country. The statistics between brackets on the left indicate, for each flag country, the absolute number and percentage of vessels for which GUO country  $\neq$  flag country. Only GUO countries for which the total number of vessels is greater than 1, are labeled.

Eighty-six percent (86%; n=38) of Mozambican vessels are ultimately owned by foreign companies at the GUO level, mainly in Spain and China – double of what we found at the ISH level. Compared to the ISH level, a larger share of Moroccan vessels (13%; n=34) shift nationalities (+5 percentage points), mostly due to corporate ownership by Spanish and Bahraini GUOs. Twenty-seven percent (27%; n=28) of Namibian vessels (+9 percentage

points) are ultimately owned by foreign companies (mainly in Spain and South Africa) (Table S35, APPENDIX).

# 4.5.3 Ownership concentration

In the previous sections, we detailed how African vessels (n=923) were flagged to 36 flag states, directly owned by 521 ISHs in 72 countries, and ultimately owned by 474 GUOs in 74 countries.

The left plot in Figure 20 shows the Lorenz curves for each of these levels, indicating the inequality in fishing vessel distribution between countries. Inequality increases from the flag (Gini = 0.667) to the ISH level (Gini = 0.735) and is highest at the GUO level (Gini = 0.738). The slightly steeper curve at the GUO level is mainly due to the consolidation of the position of Spain at this level (43 vessels attributed to Spain at the ISH level, while 126 at the GUO level). At the flag level, the top 20% of flag countries capture ca. 72% of sampled vessels. At the GUO level, this is 78%. Analysis shows that GUO companies in Morocco, Spain, Namibia, South Africa, and Ghana collectively own the most vessels (61.9% of sampled African vessels). Inequality is considerably lower when corporate entities are considered (Figure 20, right plot). At the GUO level, the top 20% of corporations owned ca. 54% of vessels.

The largest GUO companies (≥ 10 vessels) (n=14) owning African-flagged LSF vessels are summarized in Table S36 (APPENDIX). Ten of them were located in Africa: Morocco (5 companies), Namibia (2 companies), South Africa (1 company), Ivory Coast (1 company), and Senegal (1 company). There were furthermore two companies from Spain, one from China, and one from Bahrain. The largest GUO company was the Moroccan company 'Omnium Nord Africain Group of Companies', owning 34 fishing vessels through its subsidiary 'Omnium Marocaine de Pêche'.

Africa - Inequality based on country (Flag, ISH, GUO)

Africa - Inequality based on corporate identities (ISH, GUO)



Figure 20. Africa – Gini coefficients and Lorenz curves indicating inequality in the distribution of fishing vessels between countries (left) / corporate entities (right) at three (two) analytical levels (Flag country), ISH country, GUO country).

# 4.6 Oceania

#### Key findings

- The 236 sampled Oceanian fishing vessels were directly owned by 167 companies (ISH) and ultimately by 156 companies (GUO). The majority of vessels were directly (80.9%) and ultimately (73.7%) owned by Oceanian companies.
- There were significant deviations between flag and ISH country, with a Flagto-ISH mismatch was observed in 24.2% of vessels (n=57). At the GUO level, Flag-to-GUO mismatches increased to 30.9% (n=73). Most shifts involved ownership by companies outside Oceania, particularly from South Korea and Japan.
- Analysis at the GUO level showed significant increases in Oceanian LSF vessel ownership compared to the ISH level for South Korea (+9 vessels; +150%), Japan (+3 vessels; +150%), and the Netherlands (+3 vessels; +300%).
- The flags most associated with foreign ownership at the GUO level were Vanuatu (n=16) (32% of Vanuatu flagged vessels), the Cook Islands (n=13) (57%), and Kiribati (n=7) (64%).
- Vessel ownership was moderately concentrated at the GUO country level (Gini=0.675), with companies in Australia, New Zealand, Vanuatu, and South Korea jointly owning about 62% of vessels.

In Oceania, the 236 sampled vessels are flagged to 14 states in 13 sovereign countries. The top 10 flag countries in the sub-sample account for 95.3% of fishing vessels and 94.9% of gross tonnage (Table S11, APPENDIX). This corresponds well to the countries and their relative proportions found in the population (95.9% and 92.2%) (Table S12, APPENDIX).

## 4.6.1 Registered ownership of fishing vessels

The 236 sampled Oceanian fishing vessels were directly owned by 167 companies (ISHs). The vast majority of vessels were owned by Oceanian companies (80.9%). The 10 largest ISH countries jointly accounted for 83.9 % of Oceanian fishing vessels (Table 19).

ISH country	No. vessels owned	No. flags	No. of companies	Vessels/company (avg.)
Australia	63	2	44	1.4 ± 1.1
New Zealand	45	4	28	1.6 ± 1.5
Vanuatu	40	4	30	$1.3 \pm 0.7$
Kiribati	12	3	7	1.7 ± 1.1
Micronesia (Fed. States of)	8	1	4	2.0 ± 1.4
Nauru	7	1	6	$1.2 \pm 0.4$
South Korea	6	4	3	2.0 ± 1.7
Marshall Islands	5	2	3	1.7 ± 1.2
Hong Kong SAR China	4	2	2	2.0 ± 1.4
Taiwan	4	2	4	$1.0 \pm 0.0$
United States	4	4	4	$1.0 \pm 0.0$

Table 19. Top 10 countries of ISHs owning LSF vessels flagged to Oceanian countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the ISH level, the number of different Oceanian flag states utilized, and the average number of vessels per company.

Figure 21 shows the country shifts between the flag and the ISH level for the top 10 Oceanian flag states in the sample (Flag-to-ISH mismatches). A country shift was recorded for 24.2% of Oceanian vessels (n=57). Of these, the overwhelming majority (78.9% of vessels for which a country shift is present) were owned by ISH companies outside Oceania. Asian companies accounted for the largest share of these shifting vessels (38.6%), with South Korean companies alone representing 10.5%<sup>22</sup>. The top 10 ISH countries capture 59.7% of country shifts at the ISH level (Table S37, APPENDIX).

<sup>&</sup>lt;sup>22</sup> Note: for Asia and Oceania, these percentages do not directly correspond to the sizes of the ISH country rectangles on the right side of the alluvial plots. This discrepancy arises because the plot includes only the top 10 flag states where the vessel's flag differs from the ISH's country of registration. In these regions, numerous smaller flag states collectively contribute to shifts, which are not fully captured in the visualization.



ISH country

Figure 21. Oceania – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the second analytical level (ISH). Only deviations for the top 10 Oceanian flag states in terms of vessel numbers are included in the figure (note that there were no country shifts for vessels flagged to Micronesia). Numbers between brackets on the left indicate, for each flag country, the percentage of vessels for which ISH country  $\neq$  flag country. The statistics between brackets on the left indicate, for each flag country. Only ISH countries for which the total number of vessels is greater than 1, are labeled.

The three flags most associated with foreign ownership at the ISH level were the Cook Islands (61% of Cook Islands-flagged vessels), Vanuatu (26%), and Tuvalu (75%). The Cook Islands-flagged vessels (n=14) were primarily owned by foreign companies in Ecuador, South Africa, and Kiribati. The Vanuatu-flagged vessels (n=13) were primarily owned by

foreign companies in Taiwan and Japan. Finally, the Tuvalu-flagged vessels (n=6) were mainly owned by companies in South Korea (Table S38, APPENDIX).

# 4.6.2 Ultimate ownership of fishing vessels

The 236 sampled Oceanian fishing vessels were owned by 156 companies (GUOs). The 10 largest GUO countries jointly accounted for 86.0% of Oceanian fishing vessels, a decrease of 2.1 percent points compared to analysis at the ISH level (Table 16).

Table 20. Top 10 countries of GUOs ultimately owning LSF vessels flagged to Oceanian countries, ranked by total vessels owned. The table furthermore includes additional details on the number of owning companies at the GUO level, the number of different Oceanian flag states utilized, and the average number of vessels per company.  $\Delta$ ISH denotes the difference in the number of vessels per company compared to analysis at the ISH level.

CLIO country	No. vessels	No flags	No of companies	Vessels/company	Δısh	
GOO country	owned	NO. Hags	No. of companies	(avg.)		
Australia	63	2	39	1.6 ± 1.5	+0.2	
New Zealand	43	4	25	1.7 ± 1.8	+0.1	
Vanuatu	36	3	26	$1.4 \pm 0.8$	+0.1	
South Korea	15	6	7	2.1 ± 1.3	+0.1	
Kiribati	7	3	5	$1.4 \pm 0.5$	-0.4	
Nauru	7	1	6	$1.2 \pm 0.4$	No change	
Micronesia (Fed. States of)	6	1	3	$2.0 \pm 1.7$	No change	
Japan	5	3	4	$1.3 \pm 0.5$	+0.3	
Marshall Islands	5	2	3	1.7 ± 1.2	No change	
Hong Kong SAR China	4	2	2	$2.0 \pm 1.4$	No change	
Netherlands	4	1	1	4.0 ± NA	+3.0	
Taiwan	4	2	4	$1.0 \pm 0.0$	No change	
United States	4	4	4	$1.0 \pm 0.0$	No change	

Table 21 shows the increases (+) and decreases (-) in vessel numbers between the ISH and GUO level for the top owner countries for Oceanian vessels. Most vessels are ultimately owned by Oceanian companies (73.7%), though this marks a decrease of 7.2 percentage points compared to analysis at the ISH level (Table S39, APPENDIX). At the same time, Asian companies' ownership of Oceanian fishing vessels increases from 9.3% to 14.4% (+5.1%). South Korean GUOs capture an additional 9 vessels (+150%) through corporate ownership of Oceanian fishing companies. See Table S39 (APPENDIX) for an overview of delta values for all owner countries.

Table 21. Increase (+) and decrease (-) in the number of vessels between analysis at the ISH vs. the GUO level for the top owner countries of Oceanian LSF vessels. Only the top 5 increasing and decreasing countries are included. The delta ( $\Delta$ ) indicates the absolute difference in vessel counts (+ or -) between the two levels, along with the corresponding percentage change. Shaded in grey: countries that are among the top 10 GUO countries of Oceanian LSF vessels.

+/-	Owner country	Vessels owned by ISHs	Vessels owned by GUOs	∆ (no. vessels)	Δ(%)
+	South Korea	6	15	9	150
	Japan	2	5	3	150
	Netherlands	1	4	3	300
	Italy	0	3	3	NA
	Ukraine	0	2	2	NA
-	Kiribati	12	7	-5	-42
	Vanuatu	40	36	-4	-10
	Solomon Islands	3	0	-3	-100
	New Zealand	45	43	-2	-4
	Micronesia (Fed. States of)	8	6	-2	-25

Figure 22 shows the country shifts between the flag and the GUO level for the top 10 Oceanian flag states in the sample. A country shift was recorded for 30.9% of Oceanian vessels (n=73) – an increase of 6.7 percentage points compared to analysis at the ISH level. Most of these vessels were ultimately owned by companies in South Korea (20.5%), followed by Japan (6.8%)<sup>23</sup> (Table S40, APPENDIX). Asian GUOs accounted for about half (46.6%) of country shifts.

<sup>&</sup>lt;sup>23</sup> Note: for Asia and Oceania, these percentages do not directly correspond to the sizes of the GUO country rectangles on the right side of the alluvial plots. This discrepancy arises because the plot includes only the top 10 flag states where the vessel's flag differs from the GUO's country of registration. In these regions, numerous smaller flag states collectively contribute to shifts, which are not fully captured in the visualization.



GUO country

Figure 22. Oceania – alluvial plot indicating the shift in country of registration between the first (vessel flag) and the third analytical level (GUO). Only deviations for the top 10 Oceanian flag states are included in the figure. (note that there were no country shifts for vessels flagged to Micronesia). Numbers on the left indicate, for each flag country, the percentage of vessels for which GUO country  $\neq$  flag country. The statistics between brackets on the left indicate, for each flag country. Only GUO countries for which the total number of vessels is greater than 1, are labeled.

Thirty-two percent (32%) of Vanuatuan vessels (n=16) are ultimately owned by foreign companies (+6% compared to the ISH level) in 10 countries, mostly in the Netherlands, Taiwan, and Japan. Fifty-seven percent (57%) of vessels flagged to the Cook Islands (n=13) (-4%) are owned by foreign GUOs in 11 countries, and 64% of vessels flagged to Kiribati
(n=7) (+46%) are owned by foreign GUOs in three countries (South Korea, Taiwan, and Hong Kong) (Table S41, APPENDIX).

# 4.6.3 Ownership concentration

In the previous sections, we detailed how Oceanian vessels (n=236) were flagged to 14 flag states, directly owned by 167 ISHs in 35 countries, and ultimately owned by 156 GUOs in 34 countries.

The left plot in Figure 23 shows the Lorenz curves for each of these levels, indicating the inequality in fishing vessel distribution between countries. Inequality increases from the flag (Gini = 0.556) to the ISH level (Gini = 0.694), and then slightly goes down at the GUO level (Gini = 0.675). At the flag level, the top 20% of flag countries capture ca. 48% of sampled vessels. At the GUO level, this is ca. 73%. Analysis shows that GUO companies in Australia, New Zealand, Vanuatu, and South Korea collectively own the most vessels (61.9% of sampled Oceanian vessels). Inequality is considerably lower when corporate entities are considered (Figure 23, right plot). At the GUO level, the top 20% of corporations owned ca. 45% of vessels.

There were no GUO companies owning  $\geq$  10 Oceanian-flagged vessels. The two largest GUO companies, 'Sanford Limited' (New Zealand) and 'A. Raptis & Sons Proprietary Limited' (Australia) each owned 8 fishing vessels (Table S42, APPENDIX).



Figure 23. Oceania – Gini coefficients and Lorenz curves indicating inequality in the distribution of fishing vessels between countries (left) / corporate entities (right) at three (two) analytical levels (Flag country), ISH country, GUO country).

### 4.7 The global sample revisited: key insights across continents

#### **Key findings**

- At the GUO level, 16.3% of sampled fishing vessels were owned by companies owning 10 or more vessels, with most of these companies located in China, Spain, and Russia.
- European companies accounted for the highest share of Flag-to-GUO mismatches (48%). They dominated the mismatches in the Americas (40%), Africa (62%), and Europe (69%).
- At the GUO level, foreign ownership of vessels was highest in Africa (29%) and Oceania (26%), with European firms owning most vessels in Africa (~20%) and Asian firms in Oceania (~15%). In the Americas, 18% of vessels were foreign owned, about 10% of which by European GUOs. In contrast, Europe and Asia had minimal foreign ownership (<3%).</li>
- In Africa and Oceania, the proportions of Flag-to-GUO mismatches were the highest as a percentage of sampled vessels by continent, at 32% and 31% respectively.
- The LSF fleets of Mozambique (86.4%), Honduras (79.7%), Belize (77.4%), and Panama (76.7%) have the highest proportions of foreign ownership. Panamanian-flagged vessels have the highest number of ownership shifts and is used by companies from 25 countries, highlighting its global significance as a flag state. However, most of the Panamanian-flagged vessels used by foreign GUOs were owned by GUOs in Asia (38.0%).
- Spanish companies are responsible for the largest share (27%) of Flag-to-GUO mismatches for the ten most common flags of convenience in the sample (Table 22).
- The largest fishing companies (in terms of vessel numbers) are primarily located in Asia (China) and Europe (Spain), together capturing almost three quarters (73.2%) of vessels owned in ≥10 vessel structures. Asia alone accounted for 47.5%. Cross-border ownership is minimal for the largest Chinese fishing companies, while Spanish companies heavily rely on foreign subsidiaries.

# 4.7.1 A global assessment of country shifts

In section 4.1, we found that a total of 1,098 fishing vessels in our sample were ultimately owned by a company registered in a country other than the vessel's flag country, corresponding to ca. 16% of sampled vessels globally.

These 1,098 vessels are unevenly distributed across continents (Figure 24). Most mismatches between the flag state and the GUO country were identified for the Americas (n=404) (ca. 33% of mismatches identified globally), followed by those flagged to African countries (n=294) (ca. 24%), and European countries (n=231) (ca. 19%). Within the Americas, the largest share of Flag-to-GUO mismatches were found in Central America & the Caribbean (n=249), followed by South America (n=129), and North America (n=26).

As a percentage of sampled vessels by continent, Africa and Oceania had the highest proportions of Flag-to-GUO mismatches, at 32% and 31%, respectively. The difference between analysis at the ISH and the GUO level was the greatest for Africa (+10.6%; see section 4.5.2), and Oceania (+6.7%; see section 4.6.2).



Figure 24. Distribution of country mismatches at the Flag-to-ISH level (n=823) and the Flag-to-GUO level (n=1,098) across continents.

Spanish companies ultimately owned up to 250 foreign flagged LSF vessels, accounting for almost a quarter (23%) of all identified shifts in the global sample<sup>24</sup>. Of these 250 vessels, ca. 69% were foreign flagged vessels owned by Spanish GUOs through the corporate ownership of foreign subsidiaries (Table S43, APPENDIX) – i.e., rather than being directly owned by Spanish subsidiaries. For comparison, this share is below 50% for South Korea,

<sup>&</sup>lt;sup>24</sup> Note that this is about a quarter more than the 198 Spanish-flagged vessels they collectively own.

the U.S., and the Netherlands, which are ranked 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup>, respectively). While further research is needed, this suggests a deliberate strategy by Spanish companies to expand their market share through the ownership of local subsidiaries.

Figure 25 visualizes the Flag-to-GUO mismatches by continent. Overall, nearly half of vessels with Flag-to-GUO mismatches (n=530; 48%) were ultimately owned by European companies. European GUOs were dominant in the Americas (40% of Flag-to-GUO mismatches in the Americas), Africa (62%), and Europe (69%). Asian GUOs made up the second-largest group (n=276; 25%). Asian GUOs dominated in Asia (64%), and Oceania (47%).

Our analysis above focuses on the 1,098 vessels for which a Flag-to-GUO country mismatch was recorded. However, the broader significance of these findings becomes clear when examining them relative to the sample as a whole<sup>25</sup>:

- In Africa, approximately 29% of vessels were ultimately owned by companies outside the continent, with nearly 20% owned by European firms. GUOs registered in Spain own by far the most African vessels (126 vessels), followed by China (12 vessels). The key flag countries associated with foreign ownership were Mozambique (86% foreign owned, mainly by Spanish and Chinese GUOs), Namibia (27%, mostly Spanish and South African GUOs), and Morocco (13%, primarily Spanish and Bahraini GUOs).
- In Oceania, 26% of vessels had foreign owners outside the continent, with almost 15% held by Asian companies. Ownership at the GUO level was less concentrated compared to other continents (Gini=0.675), but the most prominent foreign GUO countries were South Korea (15 vessels), followed by Japan (5 vessels). The key flag countries associated with foreign ownership were Kiribati (64% foreign owned, mostly by South Korean, Taiwanese, and Hong Kong GUOs), Cook Islands (57%, particularly by GUOs from Ecuador, South Africa, and Kiribati), and Vanuatu (32%, primarily by GUOs from the Netherlands, Taiwan, and Japan).
- The share was lower for the Americas (ca. 18%), with about 10% of vessels owned by European GUOs. The main foreign GUO countries were Spain (98 vessels), Taiwan (29 vessels), South Korea (28 vessels), and the United States (28 vessels). At the flag level, Panama (77% foreign owned), Belize (77%), and Argentina (36%) were the most associated with foreign ownership, primarily by companies based in Spain, South Korea, Taiwan, and China.

<sup>&</sup>lt;sup>25</sup> Here in fact the adjusted sample – i.e., minus the 142 vessels with unknown flag; n=6,820.

In Europe and Asia, ownership of vessels by GUOs outside the continent was comparatively low (<3% for both continents). In Europe, the key flag countries associated with foreign ownership were France (19% foreign owned), the United Kingdom (12%), and Russia (8%), with vessels primarily owned by companies based in the United States, Ukraine, Norway, and Spain. In Asia, the few shifts observed were associated with vessels flagged to Georgia (52% foreign owned), Indonesia (3%), and China (2%), mostly owned by firms in Turkey, South Korea, and Australia.</li>

While not exhaustive, this analysis reveals clear regional patterns and highlights the extent of foreign corporate ownership of LSF vessels in several key flag states, particularly in Africa, Oceania, and the Americas. We emphasize that these figures are based on a sample representing 37% of the estimated global LSF fleet and should therefore be interpreted with caution, acknowledging potential biases and underrepresentation in the underlying data.



Figure 25. Directional flows of Flag-to-GUO country mismatches by continent: (a) Americas (n=404 mismatching vessels), (b) Africa (n=294), (c) Europe (n=231), (d) Asia (n=96), (e) Oceania (n=77). Arrows indicate the number of vessels flagged within each continent that are ultimately owned by entities based in the continents shown. Intracontinental flows are represented with labels only (no arrows).

## 4.7.2 Countries targeted by multinational fishing companies

An in-depth analysis of what makes certain countries attractive to foreign investors was beyond the scope of this research. Yet, our findings suggest that the benefits offered by socalled 'flags of convenience' (FoCs) and 'tax haven jurisdictions' play a major role in the choice of flag state and country for subsidiary registration. This aligns with findings by Galaz et al. (2018), Petrossian et al. (2020), and Ford and Wilcox (2019), among others (see section 5 'Conclusions' for further discussion). In this sub-section, we examine the distribution of foreign ownership through an analysis of Flag-to-ISH and Flag-to-GUO mismatches in the sample.

Among the top 10 vessel flags most associated with foreign ownership at the GUO level, the highest proportions of foreign-owned LSF vessels sampled are observed in Mozambique (86.4%) (n=38), Honduras (79.7%) (n=51), Belize (77.4%) (n=65), and Panama (76.7%) (n=92) (Table 22). Notably, Panama also records the highest absolute number of shifts of any flag state in the sample and is utilized by companies in a wide range of countries (n=25), underscoring its global significance as an FoC. Other known flags of convenience prevalent in the sample but not included in Table 22 include St. Vincent & the Grenadines (23 occurrences as an FoC at the GUO level), Guinea-Bissau (n=20), Mauritania (n=19), and Vanuatu (n=16) (van Fossen, 2016; Ford and Wilcox, 2019; Petrossian *et al.*, 2020).

Table 22. Top 10 flag countries most associated with foreign ownership at the GUO level. The table presents absolute and relative contributions of these flag states to global Flag-to-GUO mismatches (n=1,098), as well as the proportion of mismatches within their own national LSF fleets sampled. Most of these flags are commonly known as 'flags of convenience', due to the legal, financial, and regulatory advantages they offer, such as lower taxes, relaxed labor laws, and minimal oversight on vessel operations.

	FoC according to ITF	FoC according to	o	% of global mismatches	LSF vessels	essels	
Flag country	criteria in Ford &	Petrossian et al.			sampled for	% of sampled national LSF fleet	
	Wilcox (2019)	(2020)			(flag country)		
Panama	Х	Х	92	8.4	120	76.7	
Russia			77	7.0	1,002	7.7	
Argentina		Х	67	6.1	188	35.6	
Belize	Х	Х	65	5.9	84	77.4	
Honduras	Х	Х	51	4.6	64	79.7	
Mozambique		Х	38	3.5	44	86.4	
Morocco		Х	34	3.1	268	12.7	
Namibia		Х	28	2.6	104	26.9	
Senegal		Х	27	2.5	65	41.5	
Georgia	Х		25	2.3	48	52.1	

Spanish companies are responsible for 27% of Flag-to-GUO mismatches for these ten FoCs. For comparison, Taiwan is ranked second with 7% (Figure 26). Spanish GUOs are responsible for the majority of shifts involving Argentinian vessels (n=43, corresponding to 64% of all mismatches for Argentina), and vessels flagged to several African countries: Senegal (n=18; 67%), Mozambique (n=34; 63%), Namibia (n=17; 61%), Morocco (n=15; 44%). Despite being utilized by foreign GUOs in 21 countries, Taiwanese GUOs capture the majority of shifts involving Honduran vessels (n=19; 37% of shifting Honduran vessels in the sample).

In comparison, where Panama and Belize acted as FoCs, vessels were more evenly distributed. The Panamanian flag was used by foreign GUOs across 25 countries – mostly in Asia (38.0%), followed by the Americas (31.5%), Europe (26.1%), and Africa (4.3%). Most were owned by GUOs in South Korea and Spain (18.5% and 16.3%, respectively). The Belizean flag was used by foreign GUOs in 34 countries. GUOs in the Americas (33.8%), Europe (32.3%), and Asia (23.1%) made up the largest shares.



Figure 26. Stacked bar plot representing the distribution of country-shifting vessels across GUO countries, for the top 10 flag countries most associated with foreign ownership at the GUO level. Horizontal axis: flag countries (number of shifting vessels between brackets) – vertical axis: absolute number of vessels – categories: GUO countries. Any GUO country owning less than 10 vessels is represented in the category 'Other'.

In what follows, we examine a subset of vessels that simultaneously exhibit two types of country mismatches in their ownership structure: a Flag-to-ISH mismatch, and an ISH-to-GUO mismatch. These cases offer insight into potential strategic use of subsidiary locations for business or fisheries-related advantages. At least 107 vessels in the global sample (ca. 1.5%) were directly owned by a company in a jurisdiction different from both the vessel's flag and the country of its ultimate corporate owner<sup>26</sup>. These vessels were registered under 44 different flags and owned by ISHs in 41 countries, 14 of which are considered tax haven jurisdictions<sup>27</sup> registration (Galaz *et al.*, 2018). About half of the vessels involved are owned by ISHs in such jurisdictions (n=51 vessels; 48%). Overall, the main ISH countries in terms of the number of vessels involved were Panama (12 vessels), South Korea (9 vessels), Belize (8 vessels), Liberia (6 vessels), and Norway (6 vessels). For 42 of the 107 vessels (39%), the flag country and the GUO country were the same. Most vessels in such ownership structures were flagged to North Korea (n=9), Spain (n=8), the U.S. (n=6), China (n=5), and South Korea (n=4).

- At the ISH level, the North Korean vessels were owned by seven South Korean companies, which were in turn owned by a single North Korean GUO representing the North Korean Government ('Korea North Govt').
- The Spanish vessels were directly owned by five companies across several African countries (Senegal, Mozambique, Cameroon, and Angola), and ultimately owned by four Spanish GUOs.
- The U.S. vessels were directly owned by five companies, four of which in tax haven jurisdictions (Vanuatu, Panama, Barbados, Belize). The fifth ISH company was registered in Norway. The vessels are ultimately owned by four GUO companies in the U.S. Interestingly, further examination of the ownership structure for the two vessels ultimately owned by 'Tri-Marine International Incorporated' shows that each vessel is owned by similarly named ISH companies, 'Cape Breton Fishing L.P.' and 'Cape Ferrat Shipping SA', registered to, respectively, Vanuatu and Panama<sup>28</sup>.
- All five Chinese vessels were directly owned by ISH companies in tax haven jurisdictions 4 vessels by three separate companies in Hong Kong, and 1 vessel by an ISH in Belize. The vessels were ultimately owned by four Chinese GUO companies.

<sup>&</sup>lt;sup>26</sup> At least, because this assessment excludes 142 vessels for which the flag country was not known.

<sup>&</sup>lt;sup>27</sup> Antigua & Barbuda, Barbados, Belize, British Virgin Islands, Curaçao, Cyprus, Hong Kong SAR China, Liberia, Malta, Marshall Islands, Panama, Seychelles, St. Vincent & Grenadines, Vanuatu.

<sup>&</sup>lt;sup>28</sup> Further examination of the full ownership structure of 'Tri-Marine International Incorporated' reveals three more similarly named companies, all registered in the U.S. ('Cape Finisterre Fishing LP', 'Cape May Fishing LP', and 'Cape Fisheries Holdings L.P.').

# 4.7.3 The world's largest fishing companies

At the GUO level, a total of 1,137 vessels in the sample were owned by fishing companies owning 10 or more fishing vessels. This corresponds to 16.3% of sampled fishing vessels. Most of these were owned by companies in China, Spain and Russia (Figure 27).





The largest companies were found in Asia and Europe, together capturing almost three quarters (73.2%) of vessels owned in  $\geq$ 10 vessel structures. Asia alone accounted for 47.5%.

The largest company in Asia (and therefore in the sample) was the Chinese 'Pingtan Marine Enterprise, Ltd.' holding 77 Chinese flagged fishing vessels via a single Chinese owned subsidiary, 'Fujian Pingtan County Ocean Fishery Group Company Limited' (Table 23). The second and third largest companies were also Chinese (holding 57 and 47 vessels, respectively). Cross-border ownership of fishing vessels is minimal for these three

companies: aside from 14 foreign flagged vessels (ca. 8% of the combined fleet) ultimately owned by the Chinese government ('Government of China') all vessels are registered under the flags of China or Hong Kong. All three companies have an exclusively Chinese ownership structure.

In Europe, the largest companies were found in Spain – the largest holding 30 vessels ('Pescanova SA'), the second largest 28 vessels ('Abanca Corporación Bancaria SA'). Foreign flagged vessels make up 97% and 96% of these companies' fleets, respectively (each only own one Spanish-flagged vessel). As was mentioned earlier on, foreign ownership of subsidiaries is a key characteristic of the Spanish firms examined here. Eighty percent (80%) of Pescanova's fleet (n=24) is owned through foreign subsidiaries in Argentina (n=17), Chile (n=3), the UK (n=2), and Namibia (n=2). For Abanca, this is 96% (n=27), owned by subsidiaries in Mozambique (n=22)<sup>29</sup>, and Uruguay (n=5). The largest Russian companies, 'Vladkonek' and 'Murmanrybprom Joint Stock Company', each held 16 vessels. All vessels except one were flagged to Russia. Both companies have an exclusively Russian ownership structure.

In the Americas, there was one superstructure in the United States holding 37 vessels ('Trident Seafoods Corporation') (<3% foreign flagged), and a handful of large companies in Chile (16 vessels and 15 vessels) (no foreign flags), and Ecuador (15 vessels, of which 4 flagged to Panama). All these companies furthermore have purely national ownership structures<sup>30</sup>.

In Africa, the largest fishing companies were found in Morocco (the largest one, 'Omnium Nord Africain Group of Companies' holding 34 fishing vessels), Ivory Coast (25 vessels), and South Africa (23 vessels). The Moroccan company owns only Moroccan-flagged vessels within a purely Moroccan ownership structure. This structure is straightforward, featuring a direct 1:1 relationship between the ISH and the GUO, where the ISH is fully owned by a parent company. A similar pattern is observed across all major Moroccan fishing companies, with some cases where the ISH and the GUO are the same entity. The South African company, 'Brimstone Investment Corporation Limited', owns only locally flagged vessels through a single subsidiary, maintaining a direct 1:1 ownership structure. In contrast, the second-largest South African GUO owns four Namibian fishing vessels and one Angolan vessel through five different Namibian subsidiaries. The largest company in Ivory Coast, 'Bertrand Pêche Export' (at the same time ISH and GUO), owns 13 locally flagged vessels and 9 vessels flagged to St. Vincent & the Grenadines, a known flag of convenience (Ford and Wilcox, 2019).

<sup>&</sup>lt;sup>29</sup> This statement assumes that all Pescanova vessels have been sampled, which had not been confirmed at the time of writing this report. However, it cannot be ruled out that some vessels, such as non-IMO vessels, may also be part of Pescanova's ownership structure.

<sup>&</sup>lt;sup>30</sup> Same remark as in footnote 29.

In Oceania, only one large fishing company was sampled; the Australian company 'A. Raptis & Sons Proprietary Limited' owning 11 fishing vessels (8 of which flagged to Australia, and 3 to Indonesia). Two of the Indonesian vessels are owned through an Indonesian subsidiary.

GUO Name	GUO country	ISH name	ISH country	Flag country	No. vessels
Pingtan Marine Enterprise, Ltd.(n=77)	China	Fujian Pingtan County Ocean Fishery Group Company Limited	China	China	77
	China	China Anustia Dradusta Caultad	China	China	14
		China Aquatic Products Co., Ltd.		Mozambique	10
		Cnfc Overseas Fisheries Co.,Ltd	China	China	15
		Shanghai Dier Deep Sea Fisheries Co.,	China	China	5
		Ltd.		Morocco	2
		Shanghai Doon Soa Eicharias Co. Ltd	China	China	3
Government of China $(n=57)$		Shanghai Deep Sea Fisheries Co.,Etu	China	Poland	1
		Yantai Beijing Deep-Ocean Fishery Company	China	China	3
		China Yantai Marine Fisheries Corporation	China	China	2
		Zhongyu Global Seafood Corp.	China	China	1
		China Yantai Pelagic Fisheries Company	China	Poland	1
	- ral - ed China -	Cnfc Overseas Fishery (Yantai) Company Limited	China	China	10
		Zhanjiang Marine Fisheries Company	China	China	4
		China National Fisheries Yantai Marine Fisheries Corporation	China	China	3
		Shandong Ocean Fisheries Corporation	China	China	3
China National Agricultural		Zhoushan Marine Fisheries Company	China	China	3
Development Group Company Limited (n=45)		Zhoushan No. 2 Ocean Fishing Shipping Company	China	China	3
		Zhoushan Ocean Going Fishery Shipping Company	China	China	3
		Zhouyang Fishery Company Limited	China	China	2
		Dalian Marine Fisheries Corporation	China	China	2
		Dandong Changxing Shellfish Cultivation Company Limited	China	China	2
		Shanghai Marine Fisheries Company	China	China	2

#### Table 23. The 10 largest fishing companies (GUOs) in the global sample, their subsidiaries and their fishing vessels.

GUO Name	GUO country	ISH name	ISH country	Flag country	No. vessels
		Zhoushan Putuo Fishery (Group) Shipping Company Limited	China	China	2
		Dalian Hong Da Steamer Company	China	China	1
		Xiamen Fishing Company	China	China	1
		Dalian Haiyang Island Frozen Aquatic Product Transport Company	China	China	1
		Yantai Municipal Deep-Sea Fishery Development Corporation	China	China	1
		Dalian Zhangzi Island Fishery Group Company	China	China	1
		Ningbo Marine Fishery Company	China	China	1
		China Kingdom Shipping Limited	Hong Kong SAR China	China	1
		Qinhuangdao General Ocean Fishery Company	China	China	1
Fujian Yihai Investment Co., Ltd. (n=41)	China	Fuzhou Honglong Ocean Fishing Co., Ltd.	China	China	41
	South Korea	Sajo Industries Co.,Ltd.	South Korea	South Korea	28
		Sajo Cold Storage Company Limited		South Korea	4
			South Korea	St. Vincent & Grenadines	1
Sajo Industries Co.,Ltd. (n=40)		Kiribati & Sajo Fisheries Company Limited	Kiribati	Kiribati	4
		Sajo Seafood Company Limited	South Korea	South Korea	2
		Tong Young Industries Company Limited	South Korea	South Korea	1
Trident Seafoods Corporation (n=37)	United States	Trident Seafoods Corporation	United States	Belize	1
				United States	31
		Royal Viking Inc	United States	United States	5
Omnium Nord Africain Group of Companies (n=34)	Morocco	Omnium Marocaine De Peche (Ste)	Morocco	Morocco	34
Rbl Fishing Corporation (n=30)	Philippines	Rbl Fishing Corporation	Philippines	Philippines	30
		Arge Nova Sa	Argentina	Argentina	17
Pescanova SA (n=30)	Spain	Pescanova Sa S	Spain	Mozambique	5
				Spain	1

GUO Name	GUO country	ISH name	ISH country	Flag country	No. vessels
		Pesca Chile S.A.	Chile	Chile	3
				Falkland	
		Polar Limited	United Kingdom	Islands/Malvinas	2
				(United Kingdom)	
		Pescanova Fishing Industries of	Namihia	Namihia	2
		Namibia (Proprietary) Limited	INdITIDId	Indifilua	2
Dalian Longtai Chuangye Investment	China	Dalian Oceanic Fishing Tuna Fishing	China	China	30
Co., Ltd. (n=30)	China	Co., Ltd.	China		

In this study, we have focused on the country mismatches between the vessel flag and two subsequent levels of ownership (the ISH and the GUO). While a systematic analysis of ownership structure is beyond the scope of this study, it is important to note that corporate ownership of subsidiaries can be widespread regardless of whether this involves a country shift. We found that the registered and ultimate owners are different corporate entities for 25.4% of sampled vessels (n=1,768) (Table 24). In other words, multi-level ownership of LSF vessels is widespread, with the highest prevalence in Europe and Asia, while slightly lower in Africa.

Flag continent	Total	ISH = GUO	%	ISH ≠ GUO	%
Europe	2,571	1,996	77.6	575	22.4
Americas	1,726	1,331	77.1	395	22.9
Asia	1,364	968	71.0	396	29.0
Africa	923	606	65.7	317	34.3
Oceania	236	180	76.3	56	23.7
Unknown	142	113	79.6	29	20.4
Total	6,962	5,194	74.6	1,768	25.4

Table 24. Distribution of sampled LSF vessels by flag continent, showing the absolute number and the proportion of vessels for which the ISH and the GUO are the same entity, versus cases where they differ.

# 5 Conclusions

This study provides the first comprehensive global analysis of corporate ownership in the large-scale fishing fleet, covering 6,962 IMO-registered fishing vessels flagged to 146 countries across five continents. The primary objective of the study was to quantify the extent to which vessel flag states differ from the countries of registration of their registered (ISH) and ultimate corporate owners (GUO) – a proxy for geographic shifts in control and benefit distribution in industrial fisheries.

#### Key findings and implications

Transnational ownership of LSF vessels is widespread: approximately 16% of vessels in the sample are ultimately owned by companies headquartered in a country different from their flag country (Flag-to-GUO mismatch). Ownership is unevenly distributed, both geographically and across industry actors. A small number of companies based primarily in Europe and Asia control a disproportionate share of the global LSF fleet, including vessels flagged in Africa, Latin America, and Oceania. These patterns suggest a directional flow of ownership – and associated benefit flows – from resource-holding to resource-seeking countries (Campling *et al.*, 2024), with firms in wealthier nations consolidating control over fisheries operating in lower-income regions. This is consistent with prior findings (e.g., McCauley et al., 2018; Campling et al., 2024; Kinds et al., 2025).

The results of our study reinforce the notion that strategic choices about vessel registration and corporate structuring play a key role in shaping global industrial fisheries. Notably the strategic use of jurisdictions like Panama, Belize, and Vanuatu is key. These choices are influenced by institutional, economic, and ecological factors, including access to fish stocks and fishing grounds, regulatory frameworks, and cost (Campling, 2012; Campling et al., 2024). Notable hotspots where fishing activity and foreign corporate concentration intersect include Ecuador (Seto et al., 2023; Chinacalle-Martínez et al., 2024), Argentina (Miller and Sumaila, 2014; Park et al., 2023), and Vanuatu (Léopold et al., 2017; Park et al., 2023), where a combination of productive waters, relative political and economic stability, permissive labor markets, and established port and processing infrastructure facilitates foreign investment and vessel registration. In contrast, Panama and Belize are primarily attractive for their open registries and permissive business environments, which enable corporations to minimize tax liability while evading regulatory oversight (Warner-Kramer, 2004; Gianni and Simpson, 2005; EJF, 2009; Miller and Sumaila, 2014; Ford and Wilcox, 2019; Petrossian et al., 2020; Copeland and Ralby, 2022). Compared to Vanuatu, Ecuador and Argentina enforce significantly stricter frameworks for foreign fishing access and corporate registration. Both countries require foreign companies to operate through joint ventures or charter agreements with domestic entities, mandating that vessels fly the national flag and comply with stringent licensing and monitoring protocols (see https://faolex.fao.org/fishery/ for details). These measures aim to ensure genuine local participation and enhance oversight of fishing activities within their EEZs. In the case of Ecuador, our sample reflects a relatively limited extent of foreign ultimate ownership (10% of vessels; n=8). However, this figure does not capture minority ownership below the 50.01% threshold, such as that found in joint venture agreements. A closer examination of the ownership structure of Ecuador's largest tuna operator 'Negocios Industriales Real S.A.' (NIRSA) (15 vessels in our sample representing 20% of Ecuadorian-flagged vessels) reveals four beneficial owners, three of which are U.S.-based trusts: Saltwater Trust Agreement (32.95%), Atlantic Trust Agreement (32.95%), Bluefin Trust Agreement (33.95%), and an Ecuadorian national, Jaime Andres Holguin Espinel (0.12%). This ownership arrangement raises important questions about whether NIRSA can genuinely be considered an Ecuadorian company and highlights broader debates around how national affiliation should be defined. Additional indicators – such as employment, tax contributions, and supply to the local market – should also be incorporated to gain a fuller picture of corporate presence and impact.

#### Limitations of the study

Ownership data coverage in our study varied substantially across countries, with notably low representation of vessels flagged to Mexico (6.1%) and Colombia (3.7%). Coverage was also comparatively low for key fishing nations China (29.4%) and Spain (22.0%). As such, our findings should be interpreted with caution in underrepresented jurisdictions, and future work should prioritize closing these critical data gaps. China does not appear as prominently in the results as expected based on the literature (Gutiérrez *et al.*, 2020; Pauly *et al.*, 2022), due to limited data coverage in Orbis. The reasons for this could not be fully explored within the scope of this study, but recent regulatory developments – including the introduction of a national beneficial ownership information (BOI) filing system in 2024<sup>31</sup> – suggest a gradual shift toward greater corporate transparency, which may improve data availability in the future. Similarly, our approach may have underestimated the true size of Spain's industrial fleet. We estimated the Spanish LSF fleet at 921 vessels, while the 2024 Annual Economic Report on the EU Fishing Fleet (STECF, 2024) reports that Spain's large-scale fleet includes 3,337 vessels, of which 199 are classified as DWF vessels.

This study focused exclusively on majority corporate ownership, excluding cases where control is exercised through minority stakes, which may lead to an underrepresentation of certain forms of foreign influence. For example, prior studies indicate widespread Chinese involvement in Ghana's industrial trawl sector through joint ventures (EJF, 2018), which is not reflected in our results. Neither did the study account for beneficial ownership (BO) –

<sup>&</sup>lt;sup>31</sup> See, among others, <u>https://www.china-briefing.com/news/beneficiary-owner-filing-in-china-ga-i-what-is-a-beneficiary-owner/</u> and <u>https://www.loc.gov/item/global-legal-monitor/2024-05-21/china-rules-on-filing-of-beneficial-ownership-information-issued/</u> (accessed 24/04/2025)

i.e., the natural persons who ultimately own or control a company. Access to reliable BO data would allow for more precise assessments of accountability, as well as benefit flows. Furthermore, the analysis did not consider other forms of vertical or contractual relationships that shape control in the fisheries sector, such as vessel chartering arrangements, lease agreements, or forward and backward contracting in fish supply chains (Pinkerton and Edwards, 2009; Belhabib *et al.*, 2015; Edwards and Pinkerton, 2019; Andriamahefazafy *et al.*, 2024; Campling *et al.*, 2024). These mechanisms may allow firms to exert operational or financial control over vessels or supply chains without appearing as formal owners.

Finally, there are a couple of important notes regarding the scope of our analysis. First, using the global IMO fishing fleet as a proxy for the global LSF fleet entails certain limitations. It presumes that all eligible vessels are registered with the IMO, which, as several studies have shown, is not the case (FAO, 2010b; EJF and FishWise, 2013; Park et al., 2023), with estimates of coverage ranging from 13% to 15%. According to the FAO's 'Global Record of Fishing Vessels' (https://www.fao.org/global-record/en/) IMO numbers "have been allocated to over 23,000 fishing vessels worldwide"<sup>32,33</sup>. A closer review of the initiative's information system (https://globalrecord.fao.org/) reveals that, as of 29 April 2025, slightly more than half of these vessels (n=12,227) were included in the database. Another point of attention with respect to the scope of our study (i.e., targeting large-scale fishing vessels) is that some IMO vessels included in the dataset may not strictly meet the definition of 'large', given variation in the IMO's eligibility criteria (see Pew, 2017). Second, in our analysis of shifts, we have explicitly not counted the shift from a territory's flag state to its sovereign country as a mismatch, assuming these cases reflect administrative reclassifications rather than genuine shifts in operational control. However, another reading is that the use of these flag states reflects (post-)colonial ties, which could justify their inclusion in our analysis of country shifts. If included, the number of Flag-to-GUO mismatches would increase from 1,098 to 1,208 (17% of sampled LSF vessels).

#### Towards a new paradigm for fisheries governance

The findings of this study underscore the need for an ownership-based analytical framework to support transparent and data-driven fisheries governance. Moving beyond the traditional focus on flag states as the primary unit of analysis (e.g., Swartz et al., 2010; McCauley et al., 2018; Tickler et al., 2018) this approach offers a more accurate lens through which to examine the complex, transnational nature of corporate influence and control in industrial fisheries. This shift reflects a broader movement toward a more

<sup>&</sup>lt;sup>32</sup> However, it is unclear whether this figure reflects the total since the inception of the IMO Ship Identification Number Scheme in 1986, or its amendment explicitly extending its scope to fishing vessels in 2013 (Resolution A.1078(28)) (see <u>https://www.imo.org/en/OurWork/IIIS/Pages/IMO-Identification-Number-Schemes.aspx?utm\_source=chatgpt.com</u>).

<sup>&</sup>lt;sup>33</sup> Note that the total number of IMO fishing vessels included in Orbis was consistent with this number, totaling 24,223 vessels.

integrative paradigm – one that approaches fisheries governance through a political economy lens (Campling, 2012; Campling *et al.*, 2012, 2024; Standing, 2015), or situates governance challenges within frameworks of equity, justice, and fairness – drawing attention to the uneven geographies of benefit and control that shape global fisheries (Cohen *et al.*, 2019; Hicks *et al.*, 2019, 2022; Okafor-Yarwood *et al.*, 2022; Basurto *et al.*, 2025).

While the implications of reorienting analysis from vessels and flag states to the countries of corporate owners were not tested empirically in this study, the need for such a shift is evident. Misattributions of fishing capacity, landings, and effort may result from relying solely on flag-based data (see Kinds et al., 2025). More broadly, an ownership lens may help reveal hidden dimensions of fisheries, such as compliance (IUU fishing), the organization of certain operational aspects (see Bengtsson et al., 2024), and benefit distribution. The latter may include financial flows such as subsidies (Skerritt *et al.*, 2023) or profits (OECD, 2013; Garcia-Bernardo *et al.*, 2017; Galaz *et al.*, 2018), but critically, also the flow of marine resources and nutrients with direct consequences for food security (Hicks *et al.*, 2019).

#### Future research directions

While this study has focused on country-level realignment, future research should delve into the identities and strategies of specific corporate actors to better understand how they exert influence and control in particular fisheries. Attributing landings, capacity, or effort to countries - whether to the flag state or to the country of the ultimate corporate owner - implicitly assumes that the state plays a central role in shaping strategic decisions around fishing operations and investment, as well as in capturing the resulting benefits. While this assumption may hold in contexts where state-owned enterprises account for a significant portion of the fleet, such as in China, it overlooks the broader reality that it is companies not countries - that catch fish (Carmine et al., 2020; FAO, 2022a). A shift in focus from states to firms is therefore essential to accurately assess patterns of control, accountability, and benefit distribution in global industrial fisheries. That said, continued analysis of country-level dynamics remains essential for understanding the regulatory environments that enable or constrain corporate strategies. While much attention has been given to FoCs (Warner-Kramer, 2004; Gianni and Simpson, 2005; EJF, 2009; Miller and Sumaila, 2014; Ford and Wilcox, 2019; Petrossian et al., 2020; Copeland and Ralby, 2022), and, to a lesser extent, enabling business environments (van Fossen, 2015; Galaz et al., 2018; Ford et al., 2022; Kinds et al., 2025), there is a need for deeper analysis of the political economy of industrial fisheries. This includes both the incentives provided by resource-holding states in the Global South and the outward-oriented policies of countries in the Global North (e.g., subsidies, tax incentives) (Campling et al., 2024).

#### Recommendations

The method used in this study has proven sound and adaptable, having now been tested across multiple contexts: in the French Atlantic fishing sector (Kinds, 2021), the EPO tuna industry (Kinds et al., 2025), and at the global level (present study). However, its long-term usefulness will depend heavily on improvements in data collection, disclosure, and quality. In the years ahead, coordinated efforts will be needed – at the level of states, RFMOs, and intergovernmental organizations – to improve the coverage, consistency, and transparency of ownership data. This includes expanding and harmonizing databases such as Seasearcher and Orbis, while supporting the development of a public global registry of vessel ownership.

Reaffirming earlier calls by Ford et al. (2022) and Bengtsson et al. (2024), we emphasize that policy interventions should mandate the collection and disclosure of ownership and beneficiary information at key points in a vessel's lifetime – such as initial registration, sale, reflagging, and license applications. An integrated and accessible system tracking flag and ownership histories is essential for uncovering hidden linkages and ambiguous corporate structures. Initially, such a system should be designed primarily for use by states and RFMOs to improve fisheries governance, but should ideally be made public to enhance transparency over who ultimately benefits from the exploitation of shared fishery resources.

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