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Political Failure? The Russian Shadow Fleet and the Limits of Sanction Enforcement

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Citation

Heier, E. (2026). *Political Failure? The Russian Shadow Fleet and the Limits of Sanction Enforcement*.

Version: Not Applicable (or Unknown)

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Downloaded from: <https://hdl.handle.net/1887/4289127>

Note: To cite this publication please use the final published version (if applicable).

Political Failure? The Russian Shadow Fleet and the Limits of Sanction Enforcement

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Course specialisation: Nationalism, Ethnic Conflict, and Development

Word count: 10.000

Submission date: 27.01.2026

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Abstract

This thesis examines how the Russian “Shadow Fleet” undermined the Western sanctions regime between 2022 and 2025. It applies a qualitative design combining Open-Source Intelligence and process-tracing across three sanction rounds, linking sanction shock to political effect. Findings demonstrate that fragmented sanction enforcement incentivised evasive tactics, which, in the long-term, harden into reconfigured trade flows. This, in turn, weakens future sanction leverage and lowers prospects for future conflict resolution. The Shadow Fleet exploits jurisdictional gaps, permissive registries, and alternative service to mediate sanctions and sustain Russia’s hydrocarbon export revenues. Although stronger enforcement from mid-2025 curtailed Shadow Fleet activity, it did not reverse the systemic market reorientations. Despite their economic effects, the sanctions failed to achieve their ultimate objective of inducing policy change. The thesis concludes that political change necessitates consistent enforcement, rather than comprehensive sanction design. Policy must therefore target service providers and other operational actors directly to translate legal changes into durable and enforceable constraints.

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Introduction

On February 24, 2022, Russia launched its full-scale invasion of Ukraine, provoking unprecedented Western sanctions. The economic sanctions primarily targeted Russia's energy sector, aiming to cut financing for the illegal war against Ukraine. Russia remains heavily dependent on hydrocarbon exports for its economic revenue, with oil and gas sales accounting for approximately one-third of its state revenue and two-thirds of its exports (Shevchenko, 2025). Despite extensive sanctions, seaborne crude oil exports have remained surprisingly stable. Between 2022 and 2025, Moscow accumulated more than \$975 billion in fossil fuel export revenues (Russia Fossil Tracker, 2025). Clearly, the Western-imposed sanctions fail to bite as intended.

While existing research primarily focuses on formal sanction design and economic punishment, little attention is given to how adaptive infrastructures undermine enforcement capacity. Sanction theory convincingly elaborates on sanctions' coercive functions (Peksen, 2019; Tan, 2025; Chachko & Newman, 2025), yet few studies demonstrate how enforcement fails when targeted states create parallel logistical systems, such as Russia's "Shadow Fleet". This thesis posits that its maritime adaptation exposes a broader theoretical gap: coercive pressure is limited not purely through sanction design, formality, and magnitude, but by the sender coalition's ability to translate legal restrictions into operational and durable constraints.

Puzzle and Research Question

The Western sanctions are designed to weaken Russia's economy and, downstream, its military capacity. Nonetheless, the Russian economy has proven resilient, allowing the Kremlin to continue its military campaign in Ukraine. Central to this resilience is the Shadow Fleet, which retains Russian hydrocarbon exports outside Western-controlled channels by exploiting grey-

zones of global governance. This thesis argues that, by substituting Western services and exploiting jurisdictional ambiguity, the Shadow Fleet blunts the intended effects of sanctions and undermines Western integrity and maritime enforcement. This helps stabilise Russia's overheated economy – an imperative condition for sustaining its warfighting capacity.

The existing literature does not explain why sanctions designed to constrain a state's export capacity fail when enforcement is translated from theory to practice – it overlooks how the maritime domain itself enables targets to undermine enforcement. The puzzle is therefore not why sanctions “fail”. Instead, it is why enforcement fails against adaptive infrastructures capable of exploiting regulatory ambiguity. This puzzle segways into the research question: How does Russia's “Shadow Fleet” mediate the enforcement and political effectiveness of Western sanctions, and what does this reveal about the political limits of sanction enforcement?

Implications

This thesis' primary theoretical contribution is to integrate David Baldwin's account of economic statecraft with James Kraska's analysis of maritime governance to foreground enforcement capacity and adaptive substitution as central mechanisms in sanction politics (Baldwin, 2020; Kraska, 2011). As existing theoretical frameworks underestimate how parallel infrastructures mediate coercive pressures, this analysis illustrates that sanction effectiveness cannot be understood without accounting for the interaction of enforcement gaps and adaptive logistics. By treating these as mutually constitutive processes, rather than separate analytical domains, the thesis revises conventional sanction understandings and adds to economic statecraft theory.

Empirically, this research contributes a systematic process-tracing investigation of how Russia's Shadow Fleet exploits and translates enforcement gaps into sustained hydrocarbon liftings. It identifies and demonstrates links between jurisdictional fragmentation, maritime governance loopholes, and Moscow's ability to maintain export revenues.

For policy, the findings clarify why sanction regimes characterised by fragmented jurisdictions, ambiguous compliance thresholds, and uneven coalition willingness are vulnerable to circumvention. The analysis identifies enforcement chokepoints as mattering more than sanctions' magnitude, suggesting that sanctions without coherent monitoring and sufficient service control incentivise targets to circumvent and construct parallel infrastructures.

Following this introduction, the literature review examines three strands of research and situates this study amongst them. The theoretical chapter develops an eclectic framework, conceptualises key concepts, and deduces three testable hypotheses. Next, the methodology chapter explains the research design, operationalisations, and justifications, and demonstrates the process-chain guiding the analysis. Thereafter, empirical evidence is presented, systematically documenting sanction shocks, enforcement capacity, Shadow Fleet adaptation, and trade outcomes. The theory-driven analysis synthesises these findings and evaluates the hypotheses to examine how politically effective sanctions are. This allows deducing conclusions on how the Shadow Fleet evades sanctions, and how to comprehend the political limits of sanction enforcement.

Literature review

This review consists of three strands of research-based literature to foreground sanctions as a political process. Sanctions do not simply exert economic hardship. This is a method to alter the target's behaviour, which is the ultimate reason behind economic punishment. Therefore, the review examines: (i) the enforcement dilemma; (ii) adaptive infrastructures; and (iii) realignment and resilience. In so doing, it reveals a theoretical shortcoming: existing literature convincingly explains why enforcement fails politically yet overlooks how targets operationally exploit enforcement gaps. This thesis addresses this gap by treating enforcement capacity as the central political mechanism mediating sanction outcomes.

The enforcement dilemma

Sanctions only coerce if they are effectively enforced. Yet enforcement presents a fundamental dilemma: it is often politically, economically, and strategically expensive for the sender, and operationally vulnerable to target adaptation. In his book, *The Sanctions Paradox*, Daniel Drezner treats enforcement as a coordination problem. Multilateral sanctions without institutional support are less effective than unilaterally implemented measures, as domestic politics and differing enforcement incentives enable backsliding (Drezner, 2000: 97). Institutions provide monitoring, dispute-resolution, reputational penalties, and coordination mechanisms, thereby increasing the *probability* of coordinated enforcement (Drezner, 2000: 98). Critically, Drezner's claim is political, not mechanical: institutions cannot guarantee compliance if members lack incentives for follow-through. In a 2019-article, Dursun Peksen extends this logic, positioning multilateral breadth, coherence, and realistic objectives as prerequisites for sanction impact (Peksen, 2019: 640). Together, Drezner and Peksen imply that sanction effectiveness is contingent on coalition design – assuming that political coordination translates directly into operational constraint.

Elena Chacko and Abraham Newman challenge this assumption in their 2025-article *Building norms of economic coercion*, arguing that legitimacy may substitute formal enforcement. Normative acceptance shapes the effectiveness and political viability of coercion – even under weak institutional structures (Chachko & Newman, 2025: 548). Thus, legitimacy may substitute, enable, or undermine the coordination mechanisms Drezner and Peksen discuss. This presents an inherent tension: legitimacy may preserve reputation without generating coercive pressure. Where broad multilateral enforcement is weak, legitimacy helps sustain unilateral coercion by silencing opposition while mitigating the risk of political backlash (Chachko & Newman, 2025: 552, 559). Nonetheless, normative acceptance alone does not eliminate the costs of enforcement.

Navin Bapat and Bo Kwon treat enforcement capacity as a strategic choice balancing political signalling against economic exposure (Bapat & Kwon, 2015: 132). In so doing, they posit that sanctions are often imposed in cases where enforcement would be too costly – either due to sender-target interdependence or lacking alternatives (Bapat & Kwon, 2015: 149-150). Enforcement thereby turns self-defeating for the sender, leaving sanctions as political symbolism rather than meaningful economic statecraft.

Together, these scholars reveal a critical gap in sanction theory: they discuss *why* sender coalitions fail to enforce sanctions politically, but not *how* targets operationally exploit enforcement gaps. Thus, they neglect specifying the mechanisms through which targets substitute sanctioned services or construct parallel infrastructures. This gap is specifically prevalent in the maritime domain, where enforcement depends on infrastructural and logistical control. When targets substitute or undermine services as insurers or inspection regimes, or

exploit the domain's inherent jurisdictional ambiguities, enforcement fails despite institutional and broad backing. Understanding how requires examining adaptive infrastructures.

Adaptive infrastructures

In *Marine Policy*, Watterson et al. argue that open registries (registries imposing little to no nationality requirements on vessel owners and operators) enable profit-seeking states to eliminate regulatory oversight, attracting vessel-owners through anonymous registration via proxies (Watterson et al., 2020: 1). Coupled with “flag hopping” (continuous reflagging), these practices obscure ownerships, effectively depriving enforcement actors of critical data necessary to sustain and enforce sanctions (Watterson et al., 2020: 5). In so doing, jurisdictional ambiguity serves as a structural enabler for sanction circumvention, instead of governance failure.

But where Watterson and his team identify structural enablers, Priyal Bunwaree exposes behavioural ones. In her 2025-article, she finds that private actors undermine state enforcement capacity through profit-seeking (Bunwaree, 2025: 1145). Bunwaree argues that Protection and Indemnity (P&I) Clubs enable shadow vessels by prioritising “loss-shifting” over “loss-reduction” – minimising insurers' liability rather than preventing accidents (Bunwaree, 2025: 1145). As P&I Clubs are mutual associations with high discretion, they waive compliance with statutory requirements, thus allowing vessels with “dark history” to remain operational (Bunwaree, 2025: 1141-43, 1149). Bunwaree reveals a principal-agent problem: insurers maximise profit by serving high-risk, or outright illicit, clients. The unwillingness to self-regulate thereby externalises systemic risk onto enforcement regimes themselves.

Consistent with Bunwaree's claim, Daniel Spiro's 2025 study from *Energy Policy* illustrate the outcome of these mechanisms: Putin's Shadow Fleet transformed the G7 price cap from a binding constraint into a "partial transport embargo" (Spiro et al., 2025: 8). Although parallel infrastructures increase (initial) transport costs, the Fleet – thriving on Russia's low production costs of crude oil – ensure profitability by rerouting to non-coalition markets. However, by treating such infrastructures as reactive and case-specific, Watterson, Bunwaree, and Spiro largely neglect strategic considerations.

Dongan Tan, however, highlights these in his 2025-article *The Decoupling Dilemma*, claiming that repeated coercion incentivises the construction of permanent parallel ecosystems (Tan, 2025: 135). He continues that China and Russia increasingly institutionalise "governance decoupling" and a partial exit from the US-led order (Tan, 2025: 135). By framing adaptation not as evasion, but as systemic realignment, Tan invites the question: does infrastructural substitution merely preserve export volumes, or does it stabilise entire economies – in turn sustaining warfighting capacities? To answer this, attention is shifted to the final analytical lens.

Realignment and resilience

As weak enforcement capacity incentivises adaptive infrastructures, does such substitution produce long-lasting political-economic consequences? Daniel Drezner conceptualises sanctions as strategic bargaining instruments between sender and target (Drezner, 1999: 4-5). Success depends not only on economic punishments, but on relational dynamics: the prospects of future conflict and the willingness to absorb costs (Drezner, 1999: 4-5). If targets resist concessions under hostility, coercion succeeds if relationships allow cooperation, not by destroying their prospects.

Francesco Giumelli broadens this perspective, arguing that sanctions serve coercive and signalling functions (Giumelli, 2013: 17-18). In his research from *The Success of Sanctions*, he finds that effectiveness is not about forcing compliance, but shaping expectations, limiting options, or signalling resolve. Placing sanctions within a broader foreign policy strategy context, relative to other means, sanctions may shape political outcomes regardless of compliance levels (Giumelli, 2013:18-21). Giumelli and Drezner thereby shift the discussion from material impacts to political purpose: sanctions must be understood as political negotiations over legitimacy and influence, not as raw economic power.

Interestingly, both assume passivity and neglect the agency of the target receiving sanctions. Özge Özdamar and Ebru Shahin, however, propose in a 2021-*International Studies Review* that targets react by reorganising interdependence by establishing alternative economic hubs and strengthening relations with third-parties (Özdamar & Shahin, 2021: 1643, 1648). Such “bridging nodes” effectively weaponise interdependence, allowing circumvention rather than isolation (Özdamar & Shahin, 2021: 1664). Ultimately, this reconfigures sanctions from bi- or multilateral pressure into systemic fragmentation: coercive behaviour may permanently shift trade flows and alter dependencies.

Özdamar and Shahin’s perspectives are validated by Dursun Peksen’s works. Adding another layer to Özdamar and Shahin’s argument, Peksen finds sanctions to produce “counterproductive outcomes” (Peksen, 2019: 643). In line with Drezner’s conflict-expectation model, Peksen agrees that sanctions work better on allies than adversaries (Peksen, 2019: 643). However, he adds a critical dimension: as targets adapt and transform evasion tactics into durable and systemic reconfigurations, they also increase the cost of multilateral enforcement while reducing sanctions’ political effect (Peksen, 2019: 637).

Succinctly, Drezner and Peksen explain the drivers behind realignment, and Özdamar and Shahin describe the mechanisms. However, they do not account for how specific infrastructures, like the Shadow Fleet, serve as foundational nodes in the permanent governance decoupling. Understanding this is key to approaching maritime sanction enforcement in an increasingly multipolar world.

Together, these strands illustrate that sanction effectiveness hinges on three mutually constitutive processes: (i) capacity for coordinated enforcement; (ii) structural conditions enabling adaptive infrastructures; and (iii) governance decoupling. What they do not, however – which is the analytical framework in this study – is to combine them into one coherent, testable account of when sanctions become restraining and when they remain symbolic. That gap includes three specific shortcomings:

- (i) Existing work separates political coordination from operational enforcement, rather than treating them as interdependent mechanisms.
- (ii) Studies conflate coalition breadth with enforcement capacity. Legal coverage does not automatically translate to implementation.
- (iii) Maritime service providers are acknowledged but not theorised as mechanisms mediating, or undermining, sanction effectiveness.

This study addresses these gaps by developing a theoretical framework linking enforcement capacity, maritime governance, and adaptive infrastructures. This is applied to the Russian Shadow Fleet to identify when and how sanctions transform into binding constraints. The framework's logic applies to other sanctioned cases relying on seaborne exports, as the same core mechanisms are focal in structuring sanction evasion.

Theoretical framework

Russia's *seeming* paradox of resilience – sustained hydrocarbon revenues despite coercive economic pressure – cannot be fully explained through orthodox sanction theories. Existing theories typically explore either sender coordination (Drezner and Peksen) or target behaviour (Giumelli, Özdamar and Shahin), yet neither explains *how* targets practically circumvent sanctions, nor *why* the maritime domain structurally enables circumvention.

Understanding these dynamics requires integrating supply- and demand-side logics: David Baldwin provides the broader demand-side logic, integrating agency, adaptation, and strategic interaction into the analysis of sanction dynamics. James Kraska provides the supply-side logic, explaining how maritime governance structurally enables substitution under sanctions. By synthesising Baldwin's actor-centred account with Kraska's structural analysis, this eclectic framework explains the causal chain: sanctions incentivise substitution (Baldwin), the maritime institutional structure facilitates it (Kraska), while enforcement capacity determines whether this response transforms into hardened resilience or remains as temporary friction.

Economic Statecraft

Baldwin's framework of economic statecraft offers the foundations for analysing how states employ economic means to achieve political ends. He defines economic statecraft as "influence attempts relying primarily on resources which have a reasonable semblance of a market price in terms of money" and argues that the use of market instruments is inherently political (Baldwin, 2020: 12, 65-66).

Sanctions must be evaluated along three analytical dimensions: *means-ends linkage* (how economic pressure is expected to produce political effects); *opportunity costs and alternatives*

(what substitutes actors can access); and *effectiveness versus success* (whether sanctions translate into strategic outcomes) (Baldwin, 2020: 63, 141-144, 137-138). Together, these dimensions reveal that targets may decouple economic coercion from political effect by exploiting structural alternatives and maintaining strategic objectives despite disruption (Baldwin, 2020: 243).

In this regard, Baldwin's notion of the "strategic goods fallacy" is especially instructive, as it warns against presuming that only inherently strategic commodities determine geopolitical leverage (Baldwin, 2020: 228). Through substitution and control over infrastructures, even fungible goods can be reconstituted as strategic instruments under certain conditions – particularly when enforcement is fragmented and alternative providers exist. One such commodity is crude oil: nominally fungible, its movement becomes path- and infrastructure-dependent under sanctions. Consequently, logistical control may elevate crude into a strategic good.

Baldwin's framework thus provides the conceptual foundation for interpreting the Shadow Fleet as a form of adaptive economic statecraft. His theoretical emphasis on substitution and third-party alternatives explains why maritime adaptations are logical, scalable, and politically significant countermeasures to sanctions: targets are expected to redirect trade if enforcement raises the costs of retaining the pressured channels, and alternatives are accessible. The more fragmented enforcement, the more attractive substitution becomes as a strategy – conditioned by geopolitical climate and viable alternatives. However, to understand how the maritime domain supplies the necessary institutional room for substitution, attention is shifted to grey-zone theory.

Grey-zone theory

Grey-zone behaviour denotes actions exploiting legal ambiguity under plausible deniability, while operating below enforcement thresholds. Where Baldwin identifies why targets construct alternative infrastructures, Kraska offers a legal-institutional examination of why the maritime domain is amenable to substitution (Kraska, 2011: 1). Kraska's analysis of flags-of-state doctrines, flags-of-convenience regimes, port limits, and the variety of insurer and registry jurisdictions shows how maritime governance shapes permissive nodes for circumvention (Kraska, 2011: 169).

These loopholes may erode legal clarity and the sanction coalition's practical enforcement reach by fragmenting jurisdictional oversight, although the extent depends on coalition willingness to leverage extraterritorial enforcement instruments. The maritime domain is a particularly fragile governance space where ownership obfuscation, reflagging, permissive shipment hubs, and insurance substitution are not illicit workarounds, but institutionally enabled tactics (Kraska, 2011: 11, 413). Such practices expand Baldwin's logic by revealing how influence attempts may be hidden within seemingly commercial activities. For Kraska, this means that policing seaborne logistics and trade is inherently challenging due to the dispersed authority and fragmented oversight across flag states, port states, coastal states, and private actors – raising the political costs and constraining coordination efforts for the enforcement coalition (Kraska, 2011: 25, 101).

While Kraska's work focuses primarily on hybrid and naval operations, this thesis extends his framework to economic coercion, treating sanction evasion as a form of maritime grey-zone behaviour. In this sense, grey-zone theory connects economic resilience to strategic ambiguity, as opacity and deniability become mechanisms enabling the targeted state to maintain financial

inflows, evade enforcement, and blunt coercive pressures without escalation. Ultimately, Kraska's institutional account explains that fragmented maritime authority dilutes enforcement leverage, clarifying how adaptation is not a response to sanctions, but rather to the judicial limits of the domain itself (Kraska, 2011: 12-13).

Synthesised, this joint theoretical framework provides a streamlined logical causal account: Baldwin explains the strategic demand for substitutes and adaptation created by coercive pressure, while Kraska explains the institutional supply of substitutes within the maritime domain. Sanctions incentivise substitution, and the maritime domain provides the structural room for replacements. Adaptation is most likely to emerge where coercive pressure, weak enforcement, and maritime permissiveness intersect.

Conceptualisation

Integrating Baldwin and Kraska's accounts, the process can be treated as a sequential causal chain: sanction shocks impose legal changes; enforcement determines if sanctions are practical; adaptation alters behaviour (contingent on weak enforcement); trade outcomes are the results of this interaction; and political effect is the ultimate expression of whether sanctions altered the target's capacity for political and strategic manoeuvres. This structure underscores why enforcement is the core mediating variable, as it decides the effect of the imposed shock and shapes the space for the target's adaptation. The chain avoids attributing causality to any individual variable and traces how enforcement and adaptation interact in shaping political outcomes. Crucially, causality may be bidirectional and mutually reinforcing (adaptation may shape enforcement), but the primary analytical focus remains on enforcement as the mediating mechanism.

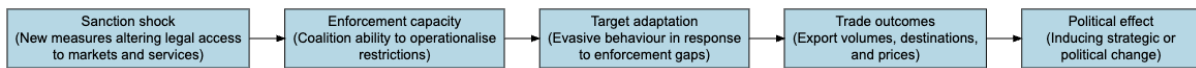


Figure 1: Visualised process-chain.

Sanction packages are treated as legal shocks, altering market and service access. Enforcement capacity is the sender coalition’s ability to operationally constrain vessels. Adaptation captures the target’s response to enforcement, thereby shaping how the intended pressure does in fact materialise. Trade outcomes reflect the observable changes and consequences of their intersection. Finally, political effectiveness documents the broader implications for state resilience and capacity vis-à-vis sanctions, deciding whether sanctions work or not. This is primarily measured through seaborne crude revenue and war-fighting capacity, albeit broader impacts (reputational signalling, long-term economic detachment, institutional change) are considered in the conclusion.

Hypotheses and expectations

This theoretical framework allows deducing three testable hypotheses. Each contains observable expectations, indicators, and falsifiers.

H1 (Enforcement credibility): The political impact of sanctions is contingent upon credible enforcement across sender coalitions.

Expectation: Fragmented enforcement reduces coercive leverage regardless of sanction magnitude.

Falsifier: Sanctions achieve their intended political or economic effects despite weak enforcement.

Indicators: Coalition enforcement cohesion, third-party compliance, enforcement timeliness.

H2 (Adaptive substitution): When enforcement capacity weakens, the target expands adaptive mechanisms to sustain trade.

Expectation: Lower enforcement capacity coincides with growth in alternative channels.

Falsifier: Enforcement gaps do not coincide with increased evasion tactics or maintenance of trade volumes.

Indicators: Shadow Fleet expansion, non-Western insurance and registry networks, AIS manipulation frequency.

H3 (Mediated resilience): Adaptive mechanisms convert enforcement gaps into sustained trade flows, so sanctions impose logistical friction rather than political constraints.

Expectation: Trade flows are sustained across sanctions rounds.

Falsifier: Strengthened enforcement reduces export revenues and adaptive measures.

Indicators: Export and fiscal data, evasion-linked logistics patterns, non-Western brokerage.

Combined, these hypotheses reflect the process-chain: strong enforcement should cut volumes (H1), while weak enforcement would encourage substitution (H2). If substitution succeeds, sanctions fail to deliver their intended political effects (H3). More precisely, H3 expects sustained export volumes, even where revenues fall, as adaptation preserves material flows *without controlling pricing*. All three hypotheses are tested to trace how changes in the following enforcement capacity-index align with adaptation patterns, trade outcomes, and political effects over time. Hence, the analysis evaluates correlation within the process-chain, rather than cross-sectional differences.

Methodology

The study employs a single-case, process-tracing logic to examine the effects of the Western sanction regime. Although taking a qualitative research design, quantitative data document temporal patterns and help contextualise, but the primary analytical strategy is mechanism-based process-tracing. This method enables within-case analysis of the causal mechanisms linking sanctions, enforcement, and mediation, and is preferable given the thesis' theoretical objective: to trace how fragmented enforcement interacts with adaptive infrastructures to mediate sanction outcomes (Beach & Pedersen, 2013: 9). Process-tracing is specifically suited for identifying whether the theorised mechanisms operate as expected, and to evaluate competing explanations (Beach & Pedersen, 2013: 52-53).

Russia's Shadow Fleet exemplifies a critical case in testing enforcement-based sanction theory (Beach & Pedersen, 2013: 145). If sanctions fail to constrain a target whose economy heavily relies on a single commodity, this suggests enforcement limitations, rather than specific irregularities (Watterson et al., 2020: 5). The maritime focus itself requires justification: by 2025, the Shadow Fleet reportedly transported 70% of Russian oil exports, so any effort to inflict economic pain must target shipping directly (Rodriguez-Diaz et al., 2025: 8). Furthermore, the sanction coalition's leverage is concentrated in maritime services, (theoretically) facilitating simplified enforcement of legal constraints. Illustratively, the *International Group of P&I Clubs* – 13 independent western insurance associations – collectively insure more than 90% of the world's deep-sea merchant fleet, which, on paper, compels these vessels to adhere to sanctions (Proinde, 2025).

Three key sanction rounds are compared: (i) the sixth EU Package in December 2022 with the G7 pricing restrictions (oil embargo and price cap); (ii) the 14th EU Package in June 2024 (first

explicit anti-Shadow Fleet measures); and (iii) the 18th Package in July 2025 (dynamic price cap, refined bans). The EU embargo and the G7 price cap are treated together, as the embargo's restrictions depend on the price cap, and, given their proximity, their effects are inseparable. These sanction rounds capture different stages of the sanction evolution – early, middle, and late – allowing structured analysis of enforcement capacity, adaptation, and effectiveness. Data from late-2025 onwards is provisional, as both enforcement actions and the Shadow Fleet continuously evolve. Therefore, such information is treated as indicative and flagged accordingly.

The Open-Source Intelligence (OSINT)-heavy design poses limitations: AIS, insurer, destination, and trade data have coverage gaps and lags, and most datasets are behind paywalls. Moreover, the thesis cannot disentangle all global price drivers (OPEC+ decisions, shipping fluctuations, demand shocks, refinery outages), observe clandestine financial transactions (shadow payments, informal brokerage fees) beyond open sources, nor access private contracts and internal Russian decision-making. The analysis interprets sanction effects cautiously, prioritising relative divergences rather than attributing absolute revenue changes solely to EU/G7 measures.

To systematically analyse the process, the thesis combines three forms of empirical leverage: (i) before/after comparisons around sanction windows to identify changes in trade patterns, enforcement capacity, and adaptation; (ii) systematic vessel-tracing to document coalition activity; and (iii) as contextual robustness checks, non-Russian crude liftings serve as a rough placebo, so Brent-Urals price spreads (global oil prices relative to Russian oil) help distance global fluctuations from Russia-specific effects. The combination of temporal comparison,

mechanism verification, and robustness checks with process-tracing strengthens causal plausibility.

Operationalisations

Three core concepts require operationalisation: sanction shock, enforcement capacity, and adaptation. Sanction shock is operationalised through Russia's export indicators, including: (i) export volumes, measured via monthly seaborne crude liftings; (ii) export revenues, documenting Russian profits from hydrocarbon sales; and (iii) the Urals-Brent differential, capturing discounts applied to Russian crude oil relative to global standards. The first and second are direct measurements of trade and thus valid indicators of sanction impact on export capacity. The third measures the market discount applied to Russian crude, illustrating how sales are affected by sanctions. Export volumes and revenue data are taken from the *Centre for Research on Energy and Clean Air (CREA)* and Urals-Brent differentials from *Trading Economics*.

Enforcement capacity is measured as the de facto ability of the coalition to impose constraints. Indicators include: (i) share of vessel/company designations issued by the EU/G7; and (ii) detentions and inspections of targeted vessels. These indicators are aggregated over three-month intervals and combined into a 0-1 index using the min-max approach: higher values indicate stronger enforcement, and vice versa. This index allows analysis of whether stronger enforcement correlates with sanction effectiveness. All indicators are weighted equally because they capture distinct and equally important dimensions of sanction enforcement: designations signal policy intent, and inspections and detentions reflect operational capacity. Without strong theoretical or empirical evidence, equal weighting avoids privileging one mechanism over another, avoiding arbitrary assumptions about what channels matter most (Nardo et al., 2005:

55). Conversely, alternative weighting schemes (for instance, privileging inspections/detentions) would have amplified “on-the-water” actions (at the expense of signalling), potentially overstating short-term operational capacity and underplaying the role of signalling in shaping longer-term market expectations. This index is preferred over alternatives, like z-score, as it standardises indicators on a common and interpretable 0-1 scale to illustrate relative differences between variables (OECD, 2008: 28). Given limited availability of precomposed datasets, designations, detentions and inspections are manually compiled by combining information from the EU’s sanction list through the *Danish Maritime Authority* with *GlobalFishingWatch* and *SeaSearcher* data, respectively.

Adaptation captures Russia’s evasion tactics to circumvent and mitigate sanctions. Three adaptation mechanisms structure the empirical indicators: obfuscation, jurisdictional substitution, and logistical rerouting. Key indicators are taken from vessel proxies: (i) growth of the Shadow Fleet, the vessels’ operational behaviour (name- and flag changing); (ii) service substitution (non-Western insurers, registrations, ownerships); and (iii) rerouting (shifts in trade patterns). Through these mechanisms, illicit or sanction-evading trade continues below enforcement thresholds. They indicate how enforcement gaps mediate actual export outcomes while illustrating the mechanisms behind sanction failure. A distinction is made between tactical and strategic adaptation. Tactical refers to quick and cheap short-term evasive behaviour, such as name- and flag changes. Strategic adaptation involves longer-term restructuring to enhance resilience, like Shadow Fleet expansion, shifts in registered ownerships, persistent utilisation of non-coalition service providers, and lasting destination changes. These markers facilitate consistent detection of Shadow Fleet adaptation within the process-tracing chain and show how enforcement gaps mediate the trade outcomes. The vessels’ flag- and name changes and investigation of their registration companies are manually tracked

and compiled from *SeaSearcher*. Shifts in trade patterns are taken from official reports, drawing on AIS-based voyage tracking.

Data analysis

Data is collected from the outbreak of the full-scale invasion in February 2022. To this baseline, the ships' behaviour is analysed after being designated by the EU's sanctions lists, beginning from June and December 2024 to February, May, and July 2025. Data is also examined before designations to ensure changes were not ongoing pre-enforcement. While sanction lists and data are limited before 2024, data from late-2025 is too recent to observe changes. Importantly, this thesis attempts not to promote predetermined policies and narratives but rather to offer a critical and empirically grounded analysis of this politically complex and multifaceted issue.

A note on the vessel sample ($n=100$) is warranted: while random selection from the population of EU-sanctioned vessels (as of October 2025) mitigates deliberate selection bias, it cannot eliminate survivorship bias (Geddes, 1990: 135). Some, if not most, vessels successfully circumvent sanctions through evasive tactics, skewing the population. Due to data availability, other exit-forms cannot be systematically documented. To mitigate this, the analysis focuses on aggregate patterns, rather than individual trajectories, therefore treating such elution as a structural limitation (Geddes, 1990: 133, 149).

Empirical evidence

This chapter investigates the process-chain from sanction shock to trade outcomes, facilitating the theory-driven analysis of sanctions' political effectiveness in the ensuing chapter. First, it describes the three sanction rounds and their consequences. Second, it measures enforcement

capacity – as the mediating variable – to understand how the sanction coalition translated legal rulings into practical constraints. Third, it investigates how the Shadow Fleet responded to these legal constraints. Fourth, it outlines how Russian trade was affected across the three sanction packages.

Sanction shocks

The Western sanctions have two main objectives: to hinder access to Russia's traditional markets while suppressing global crude oil prices. Although Russia is legally permitted to sell its crude above the imposed price cap, the coalition's dominance of maritime infrastructure – ports, insurers, and registries – limits Moscow's practical opportunities. All Western maritime service providers must ensure that their ships comply with the sanction coalition's constraints (Sverdrup & Parlov, 2024: 229). Crucially, the EU embargo only applies to seaborne oil, and Russian pipeline exports to Europe continue.

In June 2022, and effective from December 2022, the EU introduced its sixth sanction package, an embargo on seaborne Russian crude, complemented by the G7 price cap introduced in December 2022 at \$60/barrel, to limit Russia's crude earnings without disrupting the global market and preventing soaring energy prices (European Commission, 2022). Before the war, the EU imported Russian oil for approximately \$10 billion/month, compared to around \$1 billion/month by the end of 2023 (McWilliams et al., 2024). In response, Russia attracted alternative buyers through discounts: during the first half of 2023, its Urals crude sold for \$45-50/barrel (CREA, 2025). Since July 2023, however, the crude has sold almost consistently above the price cap, reaching \$84/barrel in September 2023 (CREA, 2025).

On June 24, 2024, the EU launched its 14th sanction package to tackle the latent enforcement issues: since December 2022, Shadow Fleet voyages increased by 82% (European Commission, 2024; CREA, 2025). Until November 2023, the Shadow Fleet accounted for 38% of all Russian oil exports (CREA, 2025). The 14th package targeted individual vessels “adopting deceptive shipping practices in complete disregard of international standards”, representing the first direct anti-Shadow Fleet measures (European Commission, 2024).

On July 18, 2025, the 18th package focused on strengthening anti-circumvention measures by sanctioning an additional 105 vessels, bringing the contemporary designated fleet to 444 ships (European Commission, 2025a). Besides expanding port and service bans, the EU pressured diplomatic channels, reaching out to flag states to ensure that the Shadow ships were restrained from adopting their flags (European Commission, 2025a). More importantly, the package included a dynamic price cap, adjusting it to remain 15% lower than the price of Russia’s Urals crude over the last six-month average (European Commission, 2025a).

Enforcement capacity

This section measures enforcement capacity through a 0-1 index. It is based on a thorough investigation of 100 EU-sanctioned (Danish Maritime Authority, 2025) vessels between June 2024–July 2025 (as individual designations did not occur until the 14th package), across seven three-month windows (Apr-Jun, Jul-Sep, Oct-Dec 2024; Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec 2025). The index posits that higher values indicate stronger enforcement, and vice versa. It combines two indicators for each three-month window: (i) proportion of new designations; and (ii) aggregate inspections and detentions. Raw numbers for each window are:

- (i) new designations = 21, 0, 24, 14, 19, 22, 0;
- (ii) inspections and detentions = 0, 1, 5, 9, 10, 13, 11.

Both components are min-max scaled for comparison across all windows. The subsequent composite is the mean of the two scaled indicators.

Period	Raw Values		Normalised (0-1)		Composite
	New Designations	Insp./Det.	Norm. Designations	Norm. Inspections	Index (0-1)
Apr-Jun 2024	21	0	0.875	0.000	0.438
Jul-Sep 2024	0	1	0.000	0.077	0.038
Oct-Dec 2024	24	5	1.000	0.385	0.692
Jan-Mar 2025	14	9	0.583	0.692	0.638
Apr-Jun 2025	19	10	0.792	0.769	0.780
Jul-Sep 2025	22	13	0.917	1.000	0.958
Oct-Dec 2025	0	11	0.000	0.846	0.423

Table 1: Enforcement index.

Across the seven timeframes, the sanction coalition moves from a designation-heavy start to a period in mid-2025 where inspections and detentions dominate. The index fell from 0.438 (Apr-Jun 2024) to 0.038 (Jul-Sep 2024), rose to 0.958 (Jul-Sep 2025), and finished at 0.423 in the final window.¹ This transformation illustrates the raw numbers: designations average 20 each window (excluding those without any, sanction package contingent), while inspections and detentions increased from near zero to a Q3 2025 peak of 13 before settling at 11 in Q4.² The dip in the second window reflects the absence of new designations, and the last dip is due to no sanction announcements at the time of data collection and because the observation period was still ongoing.

¹ Data for Q4 2025 is provisional; cut in November.

² Data cut in November.

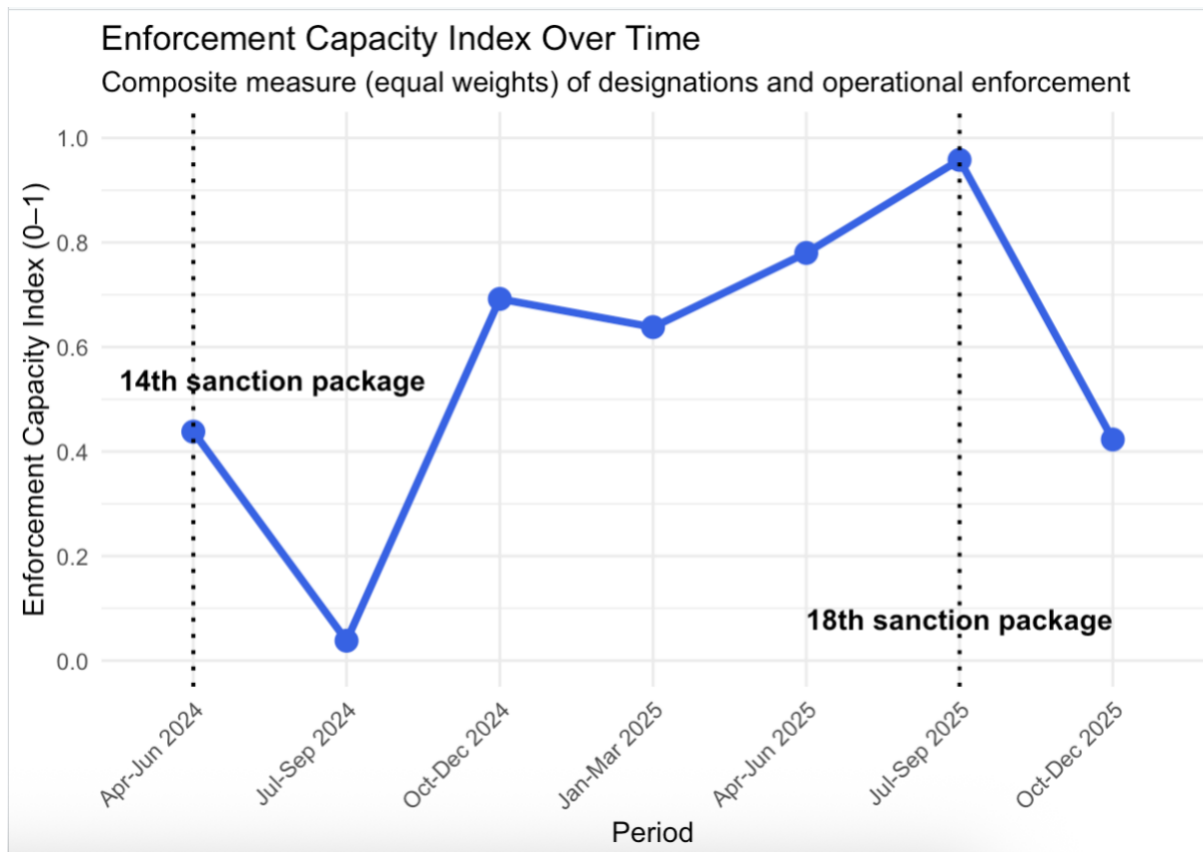


Figure 2: Enforcement capacity index over time.³

Shadow Fleet adaptation

Before 2022, Russia exported more than 80% of its seaborne oil with vessels relying on Western services (Cardoso et al., 2025: 1). After the first sanctions of 2022, this dependency lessened as alternative infrastructures, like the Shadow Fleet, emerged: by October 2025, the Shadow Fleet counted 557 vessels (European Commission, 2025b). In December 2022, it transported 0.14 million tonnes/day of Russian crude, compared to the record-high 0.45 million tonnes/day in July 2024 (CREA, 2025). Following the 14th package and the beginning of individual designations to combat this increase, the voyages of sanctioned tankers skyrocketed,

³ The two dips post-sanction rounds are largely due to no further designation rounds. Additionally, the latter window was ongoing during data collection.

and their transported volumes increased from 0.01 million tonnes/day in June 2024 to 0.38 million tonnes/day in October 2025 (CREA, 2025). From January 2025, Shadow Fleet volumes dropped from 0.33 million tonnes/day to 0.02 million tonnes/day in November 2025 (CREA, 2025). Comparably, shipments by *already sanctioned* tankers increased from 0.07 million tonnes/day in January 2025 to 0.37 million tonnes/day in October 2025 (CREA, 2025). The increase in transport by sanctioned tankers illustrates the reallocation of volumes within the broader Russian trade fleet, as designated vessels replaced the declining Shadow Fleet tankers.

Nevertheless, the use of “G7+” tankers remained relatively steady from the 14th sanction package onwards, although experiencing a minor decline until January 2025 (CREA, 2025). Since then, the decline reversed, and licensed tankers are again transporting between 0.1-0.2 million tonnes/day (CREA, 2025). Overall, the volumes transported by legit G7+ tankers

Period	Identity Changes (Post-Sanction)	
	Name Changes	Flag Changes
Apr-Jun 2024	1	1
Jul-Sep 2024	12	10
Oct-Dec 2024	4	3
Jan-Mar 2025	5	26
Apr-Jun 2025	9	27
Jul-Sep 2025	20	32
Oct-Dec 2025	3	6

Table 2: Identity manipulation.

remain consistent, contrasting the fluctuating activity of the grey-zone, and outright illicit, voyages of sanctioned and Shadow tankers.

The Shadow Fleet demonstrated significant identity manipulation across the seven time windows in response to enforcement. This behaviour did not commence with the introduction of individual sanctions: since the outbreak of the war until the 14th sanction package, the same 100 vessels had undergone 149 flag changes and 97 name changes, averaging 26.5 per yearly quarter. Identity manipulation was therefore common practice before formal sanctions. Against this background, three patterns emerge from the 14th sanction package in mid-2024: First, there

was a significant drop in name- and flag changing with quarterly averages of two in Q2 2024, 22 in Q3, and seven in Q4. However, given the introduction of vessel-level sanctions on June 24, 2024, the effective window of Q2 spans one week and should subsequently be weighted less in any analysis. Second, 2025 experienced acceleration, as all windows registered over 30 aggregate changes. Third, the adaptiveness peak occurred in Q3 2025, with 52 aggregated name- and flag changes (20 and 32, respectively) – coinciding with the most hectic enforcement period (index: 0.958). Again, the Q4 2025 figures remain provisional, but the numbers as of November 2025 suggest that adaptation continued – adding to the substantial pre-sanction baseline. As operators and vessels frequently switched flags and names also in advance, the (to be) Shadow Fleet entered the sanction period with a high degree of obfuscation. Therefore, 2025 represented a coordinated escalation, rather than initiation.

After sanctions, the flags increasingly concentrated on permissive jurisdictions. In the 100-vessel sample, unique flags fell from 38 pre-sanctions to 24 post-sanctions. Among these 24, the most common were Russia, Barbados, Gambia, Comoros, and Gabon.⁴ All flags tied to the sanction coalition (Germany, Greece, and Cyprus) disappeared in the post-designation sample. Also the vessels' registration companies were based in permissive jurisdictions – of the 100 vessels, only two were linked to companies registered in sanction-compliant states. These two exceptions were the United Kingdom and Cyprus – the Cypriot company is previously designated for transporting arms from North Korea to Russia (War Sanctions, 2024). The companies were typically located in the Seychelles, Russia, Hong Kong, the Marshall Islands, Oman, and Liberia – states known for loose regulations and monitoring (Watterson et al., 2020: 2).⁵ Among the 81 different companies, only three had more than ten vessels registered, and

⁴ See Appendix for complete list.

⁵ See Appendix for complete list.

the remaining 78 had a single ship registered. Five vessels were not registered with any company.

Trade outcomes

Before the war, Russia exported crude oil for approximately €420 million/day (Russia Fossil Tracker, 2025). Russian crude revenues surged to remarkable heights before the EU embargo and price cap implementation took effect in December 2022, peaking above €12 billion/month in June-July 2022 (Russia Fossil Tracker, 2025). After the sixth package, monthly export revenues were halved (McWilliams et al., 2024). Yet, by 2024, revenues stabilised and sold consistently above the cap: revenues returned to €8-9 billion/month (Russia Fossil Tracker, 2025). In total, Russian crude oil export revenues fell by approximately 33% between October 2022 (€10.6 billion) and January 2023 (€7.2 billion), marking the steepest contraction to date (Russia Fossil Tracker, 2025).

By mid-2024, Moscow had reoriented to new markets, notably China, India, and Turkey. Although monthly revenues remained below the 2022 peaks, exports again yielded significant income, recovering from the early 2023 dip. Since early 2022, when India imported 3.000 tonnes of Russian crude, its imports increased to 300.000 tonnes the following year (CREA, 2025). China nearly doubled its imports across the same period while paying close to pre-sanction levels (CREA, 2025). The 14th sanction package, hitting the growing Shadow Fleet, had limited, yet important, economic impacts, indicated by the recession in Figure 4.

The 18th sanction package introduced the dynamic price cap, lowering the price to \$47.6/barrel for Russian crude from September 3 (to March 2026), almost \$10 lower than the Urals price at the end of November 2025. Consequently, Moscow's oil discounts dropped from \$66 to

\$54/barrel between September and November 2025 (CREA, 2025). In September 2025, Russian fossil fuel export revenues were half of the September 2022 numbers – despite a mere five percent drop in export volumes (Raghunandan, 2025). Since the adjusted price cap, Russia’s crude, the Urals, has traded for between \$52-66/barrel – never dipping *below* the new cap (Trading Economics, 2025). Still, there has been a steady decline of almost three percent between October–November 2025, and of nearly 18% relative to the Brent since November 2024 (Trading Economics, 2025).

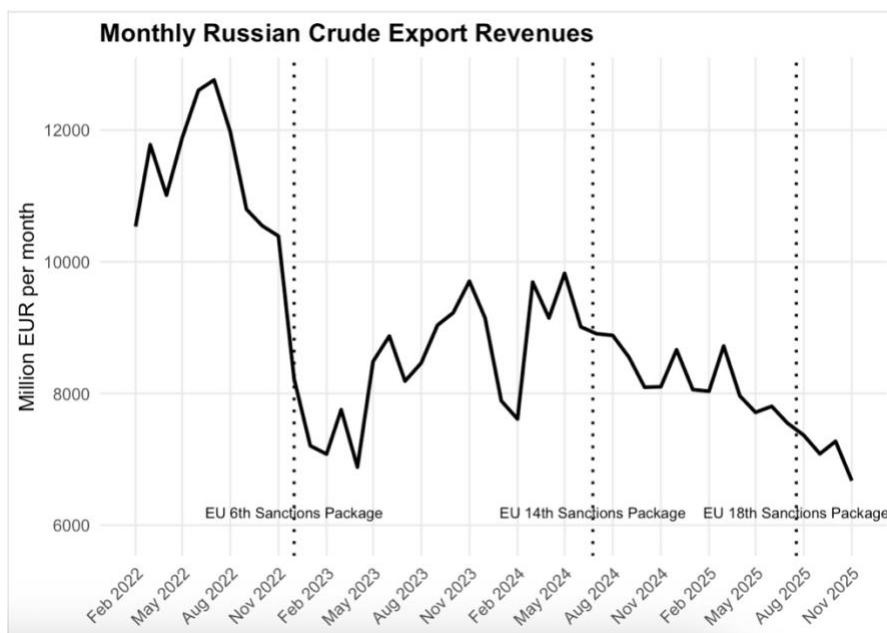


Figure 3: Crude export revenues in million euros/month.

Given the loss of the European market, sales to China and Turkey, but particularly to India, increased (Spiro et al., 2025: 4). Collectively, the three states account for two-thirds of Russia’s exports (Korppoo & Lanshina, 2024: 13). Also exports to Africa and Latin America grew. Illustratively, Ghana, Libya, Tunisia, and Togo doubled their Russian crude imports – symptomatic of Russian crude exports to Africa quadrupling between 2022–2023 – while Brazil imported crude directly from Russia for the first time in September 2023 (Korppoo & Lanshina, 2024: 13).

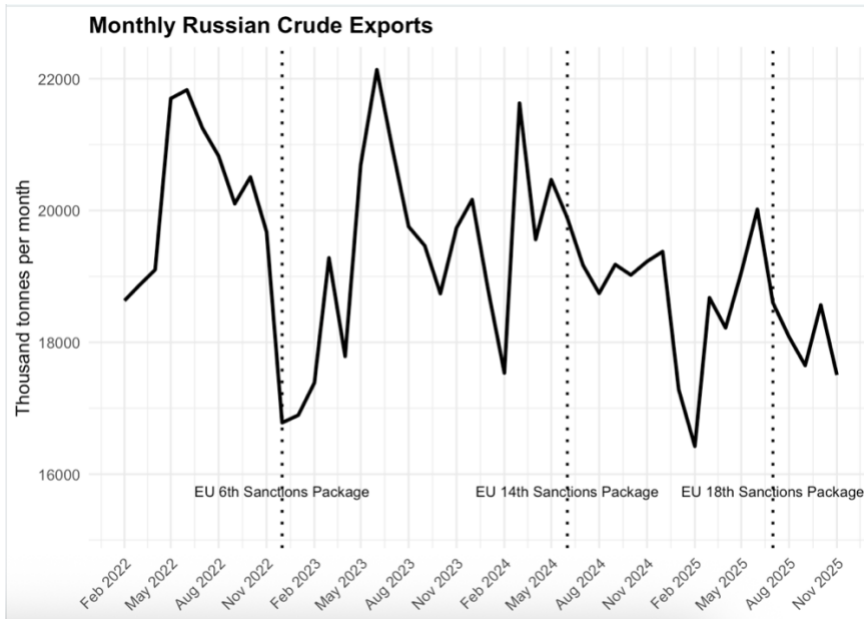


Figure 4: Crude export volumes in thousand tonnes/month.

Across the three packages, a pattern emerges: sanctions produced immediate shocks which were systematically mediated through adaptive infrastructures. After the sixth package, revenues fell by one-third, yet stabilised from mid-2023 onwards due to market reorientations, primarily toward China, India, and Turkey. Until mid-2024 and the first anti-Shadow Fleet measures, enforcement capacity remained minimal. The enforcement capacity index peaked at 0.958 in Q3 2025 following the 18th sanction package – driven by simultaneous designations, inspections and detentions. Shadow Fleet adaptation corresponded, as flag- and name-changes surged to 52 in the same quarter – concentrated in permissive jurisdictions. By late-2025, Moscow’s hydrocarbon export revenues were half of 2022-levels, although export volumes remained stable. This pattern, indicating friction rather than disruption, forms the empirical baseline for the analysis.

Analysis

The previous chapter described patterns in Russia's seaborne crude exports before, during, and after the EU's sixth, 14th, and 18th sanction packages. Against this backdrop, the analysis reinvents the central question of how the Shadow Fleet mediates the enforcement and political effectiveness of Western sanctions, and what this reveals about the structural limits of sanction enforcement. The empirical record suggests three analytically different levels of impact: economic, structural, and political. Arguably, the sanctions achieved their economic objectives, but not the others.

By applying the theoretical framework developed earlier, leveraging Baldwin's demand-logic and Kraska's supply-logic, the pattern clarifies: sanctions incentivised substitution, while the maritime domain provided Moscow with the institutional room of manoeuvre. Baldwin's economic statecraft framework explains why targets seek substitutes when coerced, and Kraska's grey-zone account explains how fragmented maritime governance supplies the means. In turn, enforcement gaps transformed into a viable parallel logistics system, rather than meaningful coercive pressure.

Enforcement credibility

H1 posited that sanctions' political impact hinges upon credible enforcement. Fragmented enforcement reduces coalition leverage, despite potentially extensive sanction design. The evidence *broadly* supports this claim, yet reveals critical nuances: the enforcement capacity index fluctuated widely, dropping to 0.038 in Q3 2024 before peaking at 0.958 in Q3 2025. The early periods signify "legalism without teeth" (designation activity with little operational follow-through), mid-2025 marks "legalism with teeth," and late-2025 is characterised by

“teeth but slower legal updates”. This temporal covariance suggests enforcement influenced vessel behaviour, but it cannot establish definitive causality.

Three patterns complicate H1’s causal interpretation. First, exports by G7+ tankers remained relatively stable, even during periods of low enforcement. This stability, fluctuating between 0.1-0.2 million tonnes/day throughout 2025, indicates that some vessels complied – despite weak enforcement. Applying Baldwin’s opportunity-cost logic demonstrates that compliance reflects financial calculations, such as retaining Western insurance access. Second, the surge in sanctioned tankers may reflect relabelling rather than enforcement success. Vessels previously deemed part of the Shadow Fleet were reclassified as “sanctioned” but continued operations under new identities. Volumes shifted categories without overall capacity reduction, challenging whether enforcement constrains behaviour or merely monitoring. Third, external market dynamics probably confound the analysis, and disentangling their effects is methodologically unfeasible. Thus, H1 remains plausible, albeit not definitive: enforcement capacity correlates with behavioural shifts, yet causality cannot be isolated from alternative drivers.

The mechanism remains ambiguous: did enforcement suppress Shadow Fleet activity, or did Russia pre-emptively shift volumes to already-designated vessels? The latter supports Baldwin’s substitution logic, yet undermines H1’s enforcement-credibility claim. Alternatively, Kraska’s framework suggests that maritime governance fragmentation may render enforcement sporadic. If so, Russia may exploit temporal gaps, not weak enforcement, per se. This underlines the proposed causality: legal measures only matter if they are translated into credible, durable, and operational constraints – supporting Baldwin’s notion of signalling versus coercion (Baldwin, 2020: 101-102). Sanction enforcement fundamentally centres on

translating legal rulings into operational constraints, not merely obtaining political coordination nor normative acceptance.

Adaptive substitution

Substitution evolved from tactical (identity manipulation) to strategic (systemic shifts) – consistent with Baldwin’s argument that repeated coercion incentivises institutionalised substitution to reduce dependencies (Baldwin, 2020: 222). Pre-sanctions, identity manipulation was common practice, yet intensified after the 14th sanction package. The pre-sanction baseline – 149 flag changes and 92 name changes between February 2022 and June 2024 – complicates H2’s causal claim: adaptation may therefore reflect broader strategic considerations rather than enforcement responses. H2 (Adaptive substitution) *partially* holds: weak enforcement appears to have incentivised expansion of Russia’s alternative logistical infrastructure channels, but was not the only, or necessarily the primary, driver. Kraska grey-zone theory explains the mechanism: flags-of-convenience regimes (Russia, Gabon, Comoros) offer rapid reflagging and minimal oversight, with fragmented authority providing institutional cover for evasion. The 78 single-vessel companies registered in the Seychelles, Hong Kong, and the Marshall Islands exemplify that dynamic, although standard maritime practice may partly explain this pattern beyond Russia-specific evasion.

Together, these tactics evolved into systemic resilience, particularly as markets shifted from Europe to, notably, India, China, and Turkey – signalling a long-term disengagement from the EU. This systemic reconfiguration – with two-thirds of exports concentrated at three buyers by 2024 – extends beyond logistical substitution to geopolitical realignment. As theorised by Baldwin and Tan, this infrastructural shift suggests a long-term decoupling trajectory that could lower the prospects for post-war economic re-engagement with Western actors (Baldwin, 2020:

222; Tan, 2025: 144). However, heightened dependence on India and China grants them monopsony power, potentially limiting Russia's long-term pricing leverage (Azar & Marinescu, 2024: 492). Critically, H2's partial confirmation reveals a key insight: adaptive substitution succeeds where structural alternatives exist (fungible commodities, fragmented governance) but may fail where "chokepoints" are concentrated (semiconductors, banking).

Mediated resilience

H3 predicted sustained trade flows, but the evidence only confirms maintained volumes, not revenues. The Urals-Brent discount widened to \$10-20/barrel post-sanctions, peaking at \$25/barrel in early 2023 – illustrating monopsony dynamics, as fewer buyers gained pricing leverage (Azar & Marinescu, 2024: 492). The evidence, therefore, *partially* aligns with H3 (Mediated resilience): Moscow's adaptive mechanisms mediated enforcement gaps to sustain export volumes, but could not prevent declining revenues – a critical caveat to H3's expectations. Thus, adaptation translates enforcement gaps into logistical resilience. Yet it cannot neutralise market-driven pricing pressures.

The revised cap of July 2025 addressed this by lowering the prices to 15% below the Urals' six-month average. The Russian crude never dipped below the cap (\$47.6/barrel), yet the 18% decline – relative to Brent – indicates that the cap affected market dynamics. Drawing on Baldwin's substitution logic, tightening caps without strengthening enforcement may accelerate alternative infrastructure investments (Baldwin, 2020: 222, 242). Arguably, if Moscow foresees stricter measures, it might pre-emptively expand its Shadow Fleet or other alternatives as anticipatory adaptation.

However, 50% revenue loss indicates significant economic impact, even as volumes remain stable. Thus, H3's expectation of sustained revenues is falsified. Whether preserving volumes while losing half of its revenues means "resilience" or "partial failure" depends on the metrics measuring success: for warfighting capacity, volumes may matter more; for economic sustainability, revenues matter more. Kraska explains the logistical circumvention: third-party facilitators – insurers, flag registries, brokers, and ports – outside the sanction coalition's jurisdiction undermined enforcement capacity. These actors enabled shipping without controlling pricing, making the Shadow Fleet's adaptation succeed logistically, although failing economically.

How politically effective are sanctions?

What, then, does this reveal about the limits of sanction enforcement? The evidence reveals a critical distinction between economic, structural, and political effects: the sanction coalition raised costs and cut Russian revenues by 50% (economic effect), yet triggered market reorientation (structural change) and failed in inducing behavioural change (political effect). The theoretical framework explains this divergence: Baldwin anticipates that targets redirect trade when enforcement raises the costs of utilising the existing channels if alternatives exist; Kraska explains how the maritime domain facilitates the necessary infrastructure (Baldwin, 2020: 222; Kraska, 2011: 11-12). Taken together, their joint framework predicts Russia's logistical adaptation, yet it did not anticipate the revenue-volume divergence, nor why economic pressure failed to translate into political effect.

Three alternative explanations deserve attention. First, regime resilience is decoupled from hydrocarbon revenues: the Kremlin's resilience to withstand sanctions and sustain its military operations in Ukraine may depend more on domestic resource mobilisation (conscription,

production) than export revenues. Second, the structural change – market and governance decoupling from Europe – may impose longer-term costs invisible to the investigated data: the concentrated dependence on Asia theoretically grants them considerable monopsony power, arguably weakening Russia’s future leverage. Third, sanctions may have succeeded in preventing worse outcomes: although counterfactual and speculative, if sanctions prevented €12 billion/month inflows continuously, the cumulative revenue could have exceeded €500 billion by late-2025.

The Shadow Fleet has been the key mediator: it is the mechanism converting Western enforcement gaps into an alternative, sustainable logistical system. The maritime governance fragmentation – dispersed flag state authority, profit-seeking registries, private insurers outside coalition jurisdictions – is a structural enabler which legal designations alone cannot overcome. However, although this explains logistical adaptation, it does not explain the political consequences, or more specifically, why preserving export volumes does not translate into sustained political leverage. Sanctions lacking sufficient enforcement function primarily as expensive and symbolic signalling, while strong enforcement without broad coalition reach is fragile. Crucially, even strong enforcement may be insufficient: the Q3 2025 enforcement peak (0.958) coincided with continued adaptation (52 flag- and name changes), suggesting that enforcement suppresses observable evasion but not underlying capacity. To achieve the coalition’s intended political-coercive ends, both strong enforcement and control over third-party facilitators are necessary conditions to impose political pressure beyond revenue attrition, but may still be insufficient if regime resilience is structurally decoupled from hydrocarbon revenues.

Conclusively, Russia's resilience is therefore not a paradox. It showcases innovation and is, simply, a predictable outcome given the Western mismatch between legal ambition and political-operational capacity. The Shadow Fleet mediates sanctions by converting enforcement gaps into logistical resilience, enabling Moscow to preserve export volumes despite revenue losses. This highlights three political limits of sanction enforcement. First, maritime governance fragmentation creates structural circumvention opportunities that legal restrictions cannot close alone. Second, coercive pressure incentivises adaptive substitution if alternatives exist. Third, revenue attrition does not automatically translate into political effects, suggesting that the framework's causal chain requires extension to, for instance, incorporate regime type and domestic political economy.

The evidence illustrates that Western sanctions reshaped Russia's economic circuits without imposing their intended political constraints. Whether this represents enforcement failure, framework limitations, or unrealistic expectations of what sanctions achieve vis-à-vis a nuclear-armed state in a perceived existential war remains an open question beyond this thesis' empirical scope. However, it reveals the political limits of sanction enforcement: without coordinated and sustained control over maritime service nodes and actors, sanctions depress revenues but may still fail to inflict the intended political pressure and induce behavioural change if the target absorbs economic costs, substitutes markets, and insulates its warfighting capacity from financial shocks.

Conclusion

How, then, does Russia's Shadow Fleet mediate the enforcement and political effectiveness of Western sanctions, and what does this reveal about the political limits of sanction enforcement?

This study suggests that the Shadow Fleet exploits the maritime domain's institutionalised ambiguities to mediate the coercive effect of the Western sanction regime. Russia's scale of hydrocarbon exports, reliance on seaborne trade, and dependence on Western services and infrastructure make this finding especially revealing for how enforcement capacity translates, or fails to translate, into political effect. As an adaptive mechanism, the Shadow Fleet appears to transform legal pressure into logistical friction, rather than political constraints. Under fragmented sanction enforcement, this study demonstrated that the Shadow Fleet expands through evasive tactics: identity manipulation and strategic use of permissive jurisdictions to create parallel export systems sustaining hydrocarbon revenues. Although this alternative infrastructure shrank economic gains, it largely preserves export volumes.

Analytically, this separates three levels of effectiveness: economic (raising costs and reducing revenues), structural (systemic recalibration), and political (inducing behavioural change). The evidence in this study suggests economic success, but political failure, with the unintended consequence of accelerating Russia's decoupling from Europe. The gap between financial disruption and political effect reveals a crucial limit of the sanction coalition: without credible, sustained, and multilateral enforcement, sanctions impose economic hardship, but may not alter state behaviour – particularly so if targets undertake long-term structural reconfigurations. This may, in the future, lower the prospects for conflict resolution. The Shadow Fleet exposes the institutional boundaries of what sanctions can achieve when operational and systemic control are limited.

Theoretical contributions

This thesis provides two key theoretical takeaways. First, economic statecraft logics cannot be understood alone – they must be read alongside institutional supply conditions, as incentives

without permissive facilitation do not allow substitution. By combining Baldwin and Kraska's respective logics of demand and supply, the eclectic framework explains how Russia was incentivised, and simultaneously, enabled to construct a resilient alternative infrastructure. Their integration exposes a gap in the existing sanctions literature: while scholars explain why enforcement fails politically, they underspecify how targets operationally exploit enforcement gaps. Baldwin's framework anticipated adaptive substitution under coercion; Kraska's framework explained how the institutional architecture of the maritime domain facilitated exploitation while supplying the means. Both are necessary, as the combination clarifies why sanctions shaped Russia's economic circuits without imposing political constraints.

Second, enforcement capacity is the core political variable – not an empirical covariate. Outcomes are not determined by formal sanction design. Instead, it is the sender coalition's ability to convert this into recurring, targeted chokepoints across actors and jurisdictions. The coercive chain, from shock to result, is only as strong as its weakest (operational) link. Sanctions create incentives to restructure, and targets react to these pressures. Especially so in the maritime domain, the international system's institutional architecture – spanning from policing capacity to regulatory fragmentation and actors' incentives – decides whether the target's reaction is a short-term countermeasure or a long-term systemic reconfiguration.

Limitations and methodological reflections

First, causal inference is constrained by both observability and confounding. The thesis' OSINT-heavy design cannot fully capture clandestine mechanisms or vessels successfully evading detection. Relatedly, the survivorship bias is inherent to the methodology, as the most "effective" Shadow vessels avoid sanctions. These considerations ultimately limit claims about the Shadow Fleet's greater scope and effectiveness. Second, alternative explanations cannot be

comfortably disregarded. Russia's ability to sustain military operations may hinge more on domestic factors, such as resource mobilisation, than export revenues and trade dynamics. If so, the causal chain breaks at the trade-politics link, rather than the enforcement-adaptation link. Additionally, external market dynamics – OPEC+ decisions, customer demand fluctuations, and refinery outages – confound patterns. This makes it methodologically unfeasible to isolate sanctions' effects from global energy dynamics. Third, generalisability is limited by case-specific conditions. The framework applies more robustly to maritime-dependent commodity exports under fragmented governance. It may not generalise to sectors with concentrated chokepoints (semiconductors, banking) or goods requiring Western certification, like dual-use technologies.

Future research and policy implications

Future research should examine the institutional politics of sanction evasion in greater detail. Particularly in the maritime domain, a thorough understanding of how non-coalition service providers, registries, insurers, and brokers operate and why they conform or resist is necessary to close enforcement gaps and render sanctions politically effective. Comparative studies on other sanctioned exporters may clarify whether the enforcement-adaptation mechanisms identified in Russia's case are generalisable across commodity-dependent states. Further studies should also investigate the effects of sanction-induced trade reorientations, particularly how Russian crude and refined oil products are re-exported into Europe through intermediaries.

For policy, the findings hint at cautious optimism about sanctions' economic effects, but scepticism about their political efficacy without broader strategic coordination (Giumelli, 2013; Baldwin, 2020; Özdamar & Shahin, 2021). The Western sanctions cut Russian crude export revenues by 50%, demonstrating economic leverage. Regardless, this attrition did not translate

into battlefield withdrawal, suggesting that economic punishment is insufficient to alter behaviour under perceived existential scenarios – a pattern consistent with research on sanctions against authoritarian regimes (Drezner, 1999; Peksen, 2019). Whether this illustrates enforcement failure, framework limitations, or unrealistic expectations of what economic sanctions can achieve – against the world’s most heavily nuclear-armed state – remains disputed. Nevertheless, the analysis advocates that without sustained control over third-party facilitators and maritime service nodes (Kraska, 2011; Watterson et al., 2020; Bunwaree, 2025), sanctions may limit revenues yet fail to induce their intended political objectives – particularly so when targets absorb costs, substitute markets, and isolate behaviour from financial shocks.

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Appendix

Vessel ID	Pre-sanction	Post-sanction	Registration company	Company registration
9289520	Bahamas	Cook Islands->Barbados-> Sao Tome-> St. Maarten	NB Shipping Company Limited (Russia)	Russia
9179842	Russia	Russia	NB Shipping Company Limited (Russia)	Russia
8517839	Russia	Russia	Ibex Shipping Inc. (Cyprus)	Cyprus
9915090	Russia->Panama	Russia	Saam FSU Ltd. (Hong Kong)	Hong Kong
9915105	Panama	Russia	Arctic Transshipment (Russia)	Russia
9353113	Germany->Saint Kitts and Nevis->Mongolia	Gabon->Tanzania	-	-
9402471	Marshall Islands	Panama->Djibouti->Oman	Tulia Maritime (Seychelles)	Seychelles
939337	Liberia	Gabon->Barbados->Comoros->Oman	Azurite Shipholding Ltd. (Seychelles)	Seychelles
9318553	Liberia	Gabon->Barbados->Comoros	Gismo Navigation (Seychelles)	Seychelles
9318541	Liberia->Gabon	Barbados	Pharos Seaways Company Ltd. (Seychelles)	Seychelles
9333436	Liberia	Gabon->Barbados->Comoros->Oman	White Agate Marine SPC (Oman)	Oman
9161003	Russia	Russia	MG Flot (Russia)	Russia
9358010	Russia	Russia	MG Flot (Russia)	Russia
9830769	Marshall Islands	Panama	Guangdong Nanfeng Group Co., Ltd. (China)	China
9259185	Panama	Comoros	Loire Shipping Inc. (Panama)	Panama
9079169	Russia	Russia	Nord Project (Russia)	Russia
9331141	Libya	Cook Islands->Barbados->Sao Tome and Principe->Comoros->Sierra Leone	Stella Brite Shipping (Marshall Islands)	Marshall Islands
9394935	Marshall Islands	Cook Islands->Barbados->Comoros->Sao Tome and Principe->Sierra Leone	Zorren Depth Shipping Ltd. (Marshall Islands)	Marshall Islands
9331153	Libya	Cook Islands->Barbados->Comoros	Rocca International Ltd. (Marshall Islands)	Marshall Islands
9144782	Cameroon	Cameroon	Crystal Crest (Seychelles)	Seychelles
9277735	Greece->Liberia->Marshall Islands	Guinea-Bissau->Tanzania	Winky International (Marshall Islands)	Marshall Islands
9299666	Liberia	Gabon->Djibouti->Comoros->Gambia	Reef Marine Inc. (Seychelles)	Seychelles
9256602	Bahamas->Singapore	Palau->Bonaire->Russia	Zara Shipholding Company (Liberia)	Liberia
9273052	Liberia	Gabon	Doxa Shipping Line Inc. (UAE)	UAE
9323376	Marshall Islands	Cook Islands->Tanzania->Comoros	Clarita Shipping Ltd. (Marshall Islands)	Marshall Islands
9737187	Cyprus	Panama->Russia	Zelitko Shipping Comp. Ltd. (Cyprus)	Cyprus
9413547	Liberia->Gabon	Barbados->Comoros->Oman	Citrine Marine SPC (Oman)	Oman
9296391	Marshall Islands->Panama->Cook Islands	Barbados->Comoros	Ealink Shipping Ltd. (Marshall Islands)	Marshall Islands
9274331	Syria	Eswatini	Alhouda Holding Ltd. (Seychelles)	Seychelles
9274343	Syria->Tanzania	Eswatini	-	-
9385233	Syria	Eswatini->Gambia->Togo	Bayaze Shipping Ltd. (Marshall Islands)	Marshall Islands
9826902	Liberia->Gabon->Barbados	Tanzania->Comoros->Oman	Anda Seaway Inc. (Seychelles)	Seychelles
9511533	Liberia->Gabon	Barbados->Oman	White Agate Marine SPC (Oman)	Oman
9341081	Liberia->Gabon	Barbados->Oman	Serpentine Marine SPC (Oman)	Oman
9306794	Liberia->Gabon	Barbados->Comoros->Oman	Citrine Marine SPC (Oman)	Oman
9292204	Liberia->Gabon	Barbados->Comoros->Oman	Citrine Marine SPC (Oman)	Oman
9299692	Liberia->Gabon	Barbados->Comoros->Oman	Serpentine Marine SPC (Oman)	Oman
9413561	Liberia->Gabon	Barbados->Comoros->Oman	Citrine Marine SPC (Oman)	Oman
9333424	Liberia->Gabon	Barbados->Sao Tome and Principe->Gambia	Carmi Tanker Ltd. (Seychelles)	Seychelles
9412347	Liberia->Gabon	Barbados->Comoros->Oman	Serpentine Marine SPC (Oman)	Oman
9610781	Liberia->Gabon	Barbados->Comoros->Oman	Kalsoy Shipping Ltd. (Liberia)	Liberia
9299898	Indonesia->Cook Islands	Honduras->Tanzania->Comoros	Chatori Navigation Ltd. (Cook Islands)	Cook Islands
9422445	Liberia->Gabon	Barbados->Comoros	White Agate Marine SPC (Oman)	Oman
9421972	Liberia->Gabon	Barbados->Comoros->Oman	Citrine Marine SPC (Oman)	Oman
9265756	Hong Kong->Marshall Islands	Barbados->Comoros->Gambia	Sunny Maritime Services & Trading Inc. (Saint Kitts and Nevis)	Saint Kitts and Nevis
9301419	Cyprus	Panama->Comoros->Gambia	Comitana Shipping HK Ltd. (Hong Kong)	Hong Kong
9412359	Liberia->Gabon	Russia	NS Bravo Shipping Inc. (Liberia)	Liberia
9411020	Liberia->Gabon	Russia	NS Burgas Shipping Inc. (Liberia)	Liberia
9901037	Cyprus->Panama	Barbados->Comoros->Gambia	-	-
9301421	Cyprus->Panama	Barbados->Comoros->Gambia	Vimena Shipping HK Ltd. (Hong Kong)	Hong Kong
9301407	Cyprus	Panama->Comoros->Gambia	Castellario Shipping HK Ltd. (Hong Kong)	Hong Kong
9301380	Cyprus	Panama->Russia	Insania Shipping HK Ltd. (Hong Kong)	Hong Kong
9301392	Cyprus	Panama->Russia	Glimmer Shipping HK Ltd. (Hong Kong)	Hong Kong
9231212	Panama	Panama	Merluza Group Ltd. (Hong Kong)	Hong Kong
9350654	Marshall Islands	Panama->Comoros->Zimbabwe	Brighton Pier Company Ltd. (Marshall Islands)	Marshall Islands
9332822	Liberia->Marshall Islands->Hong Kong	Panama->Gambia->Cameroon	Sea Swift Company Ltd. (Marshall Islands)	Marshall Islands
9251274	Saudi Arabia	Panama	Crius Ltd. (Hong Kong)	Hong Kong
9319703	Marshall Islands	Gabon->Gambia->Oman	Davao Shipping Inc. (Mauritius)	Mauritius
9404948	Panama	Djibouti->Comoros->Gambia	Acropora Marine Inc. (Seychelles)	Seychelles
9233741	Vietnam	Sierra Leone->Comoros->Gambia	Frina Express Corp. (Seychelles)	Seychelles
9934498	China	Panama	Guangdong Nanfeng Group Co., Ltd. (China)	China
9638197	China	China	Tianjin International Marine Engineering Comp. Ltd. (China)	China
1021570	Panama	Panama	Guangdong Yaqing Shipping Comp. Ltd. (China)	China
9901025	Cyprus->Panama->Comoros	Gambia	-	-
9378618	Singapore	Panama->Russia	Loengo Shipping & Trader Ltd. (Seychelles)	Seychelles
9392822	Bahamas	Panama	Gifted Peak Ltd. (Hong Kong)	Hong Kong
9248801	Malta->Saint Kitts and Nevis->Panama	Djibouti	Yuragi Ltd. (Mauritius)	Mauritius
9292060	Liberia->Gabon->Djibouti	Comoros->Gambia	Ametrine Navigation Ltd. (Seychelles)	Seychelles
9322968	Liberia->Gabon	Barbados->Comoros->Gambia	Rhona Marine Inc. (Seychelles)	Seychelles
9655470	Russia->Palau	Russia	Prime Shipping LLC (Russia)	Russia
9435363	Russia	Russia	SBK Dolina LLC (Russia)	Russia
9435375	Russia	Russia	SBK Dolina LLC (Russia)	Russia
9640516	Russia	Russia	Investnefttrade LLC (Russia)	Russia
9640528	Russia	Russia	Investnefttrade LLC (Russia)	Russia
9749154	Russia	Russia	Middle Volga Shipping Comp. (Russia)	Russia
9171175	Russia	Russia	RP-Shipping LLC (Russia)	Russia
9105140	Russia	Russia	Svarog Shipping & Trading Comp. Ltd. (UK)	UK
9289752	Marshall Islands->Gabon	Djibouti	Sagara Ltd. (Seychelles)	Seychelles
9436018	Liberia->Panama	Palau->Mozambique->Cameroon	Eurus Shipping Company Ltd. (Hong Kong)	Hong Kong
9313498	Liberia	Panama	Ocean Voyage Comp. Ltd. (Marshall Islands)	Marshall Islands
9255830	Vietnam	Vietnam	Lan Dung Sea Freight Service Comp. Ltd. (Vietnam)	Vietnam
9297371	Marshall Islands->Saint Kitts and Nevis->Panama	Comoros->Benin	Morong Shipping Inc. (Mauritius)	Mauritius
9290309	Malta->Panama	Sao Tome and Principe	Sanda Goda Ltd. (Hong Kong)	Hong Kong
9304825	Malta->Saint Kitts and Nevis->Gabon->Panama	Guinea-Bissau	Naag Maritime Inc. (Seychelles)	Seychelles
9260067	Liberia->Palau	Gambia	-	-
9299733	Marshall Islands->Gabon->Djibouti	Sao Tome and Principe->Sierra Leone	Devta Ltd. (Seychelles)	Seychelles
9352195	Liberia->Gabon	Panama	Tunasan Shipping Inc. (Mauritius)	Mauritius
9314882	Liberia->Gabon->Panama	Palau->Benin	Shompen Shipping Ltd. (Seychelles)	Seychelles
9315654	Bahamas->Liberia	Panama	Changtai Shipping Ltd. (Marshall Islands)	Marshall Islands
9345623	Liberia->Panama->Gabon->Panama	Palau->Sierra Leone	Baitarani Shipping Ltd. (Seychelles)	Seychelles
9234501	Panama	Panama	Marine Spirit Global FZE (UAE)	UAE

9315654	Bahamas->Liberia	Panama	Changtai Shipping Ltd. (Marshall Islands)	Marshall Islands
9345623	Liberia->Panama->Gabon->Panama	Palau->Sierra Leone	Baitarani Shipping Ltd. (Seychelles)	Seychelles
9234501	Panama	Panama	Marine Spirit Global FZE (UAE)	UAE
9368223	Singapore->Saint Kitts and Nevis	Panama	Siraj Maritime LLC (Oman)	Oman
9319686	Marshall Islands	Panama->Sierra Leone	Beryl Marine Inc. (Seychelles)	Seychelles
9630028	Liberia->Gabon->Barbados	Comoros	Scalpay Shipping Ltd. (Liberia)	Liberia
9630004	Liberia->Gabon->Barbados->Comoros	Oman	Boreray Shipping Ltd. (Liberia)	Liberia
9285847	Marshall Islands->Panama	Comoros	Estrella Comp. Ltd. (Marshall Islands)	Marshall Islands
9297888	Malta->Panama	Palau->Benin	-	-
9832559	Liberia->Panama	Comoros->Gambia	East Honest Hong Kong Ltd. (Hong Kong)	Hong Kong
9264570	Panama	Palau	Domi Little Ltd. (Hong Kong)	Hong Kong
9301524	Vietnam	Sierra Leone	Insist Line Ltd. (Seychelles)	Seychelles