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

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Abstract

This thesis examines how Russia's "Shadow Fleet" contributed to undermining the Western sanctions regime (2022–2025). It applies a mixed-methods design combining Open-Source Intelligence, quantitative time-series analysis, and qualitative process-tracing across three sanction rounds, linking sanction shock to political effect (sanction shock; enforcement capacity; adaptive behaviour; trade outcomes; political effect). Findings demonstrate that fragmented sanction enforcement incentivised evasive tactics, which, in the long-term, harden into reconfigured trade flows. The Shadow Fleet exploits jurisdictional gaps, permissive registries, and alternative service providers – inherent to the maritime domain's institutional architecture – 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 such 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 the Russian energy sector, aiming to cut Moscow's financing for its 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 sanctions targeting Russia's energy- and export sector, seaborne sales of crude oil have remained surprisingly stable. Since 2022, Moscow has 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 literature 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 their coercive functions, yet few studies demonstrate how enforcement fails when targeted states create parallel logistical systems, such as the Russian Shadow Fleet. This thesis posits that Moscow's 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 lasting 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 Fleet blunts the intended effects of sanctions and undermines Western integrity and maritime enforcement. This helps stabilise Russia's overheating economy – an imperative condition for sustaining Moscow's warfighting capacity in Ukraine.

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. Typical explanations assume that sanctions restrain access to markets and thereby reduce export volumes. In so doing, they overlook how the maritime domain enables targets to undermine enforcement itself. The puzzle is therefore not why sanctions "failed". 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. 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 hydrocarbon revenues. Not exclusive to crude oil, this framework also applies to other commodity chains.

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

Following this introduction, the literature review examines three strands of research and situates this study amongst them, establishing why enforcement matters yet remains under-theorised. Next, the theoretical chapter develops an eclectic framework based on conventional economic statecraft and grey-zone theory, conceptualises key concepts, and deduces three testable hypotheses. 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 observable trade outcomes, facilitating the empirical basis for the theory-driven analysis. The analysis synthesises these findings to evaluate the hypotheses and examines the extent to which sanctions are politically effective. Finally, conclusions are deduced.

Literature review

This review consists of three strands of literature to foreground sanction enforcement as a political process, rather than pure economic pressure. Sanctions do not simply exert economic hardship. This is merely a method to alter the target's behaviour, which is the ultimate reason behind economic punishment. Therefore, the review examines: (i) sanctions as instruments of coercion; (ii) sanctions as enforcement regimes; and (iii) adaptive responses and circumvention measures.

Instruments of coercion

Sanctions are, by themselves, insufficient for political change. To achieve impact, the sender must demonstrate enforcement capacity, which is understood as a mechanism converting legal restraints into political pressure. This capacity is the sender coalition's credibility and willingness to transform legal restrictions into measurable penalties: without sufficient enforcement capacity, sanctions remain signalling, rather than coercive (Itskhoki & Ribakova, 2024: 37). This is the problem with orthodox sanction theory, which typically frames sanctions as tools for economic punishment, rather than instruments of political change. Drezner challenges this assumption, conceptualising sanctions as strategic instruments of bargaining between sender and target (Drezner, 1999: 4-5). Drezner highlights the reputational and relational dynamics between entities, arguing that success and failure are contingent on the prospects for future conflict and the willingness to absorb costs (Drezner: 4-5). Targets resist giving concessions under conditions of hostility, underlining that sanction effectiveness cannot be measured solely through economic lenses. Coercion succeeds if relationships allow cooperation, not by destroying their prospects. The case of post-2022 Russia versus the West is fitting, as increased hostility leaves less room for constructive collaboration and makes sanctions inherently harder to succeed. Giumelli broadens this perspective, arguing that

sanctions serve coercive and signalling functions (Giumelli, 2013: 17-18). Effectiveness is not merely about forcing compliance. It is about shaping expectations, limiting options, or signalling resolve. By simultaneously placing sanctions within a broader foreign policy strategy context, while considering their comparative utility to other means, sanctions may shape political outcomes – regardless of compliance levels (Giumelli:18-21). These perspectives 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. This literature neglects enforcement – the conversion of formality into operational constraints. This is the very step exploited by the Shadow Fleet. Therefore, while clarifying why enforcement matters, it does not explain how legal measures are operationalised and translated into practice. To understand this process, attention is shifted to enforcement regimes and adaptive infrastructures.

Enforcement regimes

Sanction enforcement is fundamentally political. Peksen stresses multilateral breadth, coherence, and broad, realistic objectives as prerequisites for sanction impact (Peksen, 2019: 640). Furthermore, in line with Drezner's conflict-expectation model, Peksen agrees that sanctions work better on allies than adversaries (Peksen: 643). Golovchenko challenges this perspective, championing surgical and node-focused measures (Golovchenko, 2025: 4). In the maritime domain specifically, precise vessel designations and port restrictions may compensate coalition enforcement gaps if timely and credible (Golovchenko: 4). These two perspectives are, arguably, complementary: as breadth secures reach, targeted sanctions secure leverage at critical chokepoints. Although the EU/G7 coalition appears broad on paper, formal membership does not guarantee equal uniform enforcement: legal coverage, political will, and enforcement behaviour vary widely across members and over time, as illustrated by Hungary

and Slovakia's resistance to the EU ban on Russian energy (Osmond et al., 2025). This variation is central to the analysis of enforcement capacity, as sanctions only constrain targets when adopted measures are implemented. Depending on coalition cohesion, regulatory willingness, and control over key service providers, the maritime domain itself further challenges sanction enforcement: flag registries, insurers, and port authorities are dispersed across jurisdictions (OFSI, 2025). Successful enforcement therefore requires coalition cohesion and coordination, control or credible pressure over key services, and operational capacity for practical monitoring and follow-through (inspections, detentions, designations). As theorised later, if these fail, target substitution emerges. Synthesised, enforcement regimes succeed by sustaining political coordination and fail when fragmentation allows substitution and adaptation. If so, regardless of the sanctions' formality and magnitude, they may yield only symbolic rewards. This matters directly to the research question, as coalition cohesion and maritime governance structures determine whether designations transform into operational constraints or merely remain signalling on paper. As a grey-zone instrument, the Shadow Fleet actively exploits jurisdictional ambiguity and enforcement gaps, enabling sustained exports.

Adaptive responses

As sanctions are restrictive in nature, they trigger countermeasures: targets typically construct clandestine or parallel infrastructures to sustain trade, rather than accepting economic (and political) isolation. Previous cases (apartheid-era South Africa, post-1979/2012 Iran, Saddam's Iraq, Chávez's Venezuela, and North Korea) all created illicit trade channels (Lansing Institute, 2025). Adaptation is therefore better understood as part of a recurring pattern of countermeasures, as sanction evaders construct these alternative economic circuits to maintain revenue flows, by utilising mechanisms like re-routing, smuggling, and covert networks (Lynch, 2025: 8). In the maritime domain, its spatial diffusion, mobility, and patchwork of actors lower

the cost of evasive responses while creating jurisdictional loopholes. This structural configuration produces a feedback loop: sanctions create incentives for evasion, and latent enforcement gaps allow tactical adaptation. Following, if tactics scale into durable substitution, they strengthen the target's economic resilience, itself ultimately raising the cost of, and reducing the effectiveness of, subsequent enforcement. For Russia, its primary manifestation of adaptation is the Shadow Fleet, with tactical evasion (automatic identification system (AIS) manipulation, name- and flag changes) being the immediate response to sanctions. Left unchecked, these tactics consolidate into strategic large-scale substitution: dedicated fleets, opaque ownerships and shell companies, non-Western insurers, and market re-orientation (Caprile & Leclerc, 2024; Hilgenstock et al., 2023). The distinction between tactics and strategy is paramount for causal inference. While tactical behaviours are cheap and short-term, strategic ships are durable and raise the barrier for further enforcement. Empirically, the Shadow Fleet joins this pattern: after the first anti-Shadow Fleet sanctions, its voyages increased 82%, and the Fleet accounted for almost 40% of all seaborne exports in December 2022 to November 2023 (CREA, 2025). In 2023, roughly 70% of Russia's seaborne oil was transported by vessels fitting "shadow fleet criteria" – illustrating the scale of strategic substitution (Hilgenstock et al., 2023). Evidently, sanctions often incentivise adaptation, which thrives on maritime and judicial ambiguity, because these conditions lower the cost and raise the durability of evasive strategies. This dynamic is strongest when enforcement is inconsistent, coalition willingness diverges, and key service providers remain outside coordinated control. This resilience ultimately neutralises much of the intended political effect.

Together, these strands of literature illustrate why enforcement matters, what limits it, and how targets adapt. What they do not, however, is combine them into a coherent, testable account of

when sanctions become restraining and when they remain symbolic. That gap includes three specific shortcomings:

(i) Existing work separates intent, capacity, and response, rather than integrating them into a single framework.

(ii) Studies conflate legal coalition breadth with practical enforcement behaviour. Legal coverage does not automatically translate to implementation.

(iii) The role of maritime service providers is under-specified as an operational mechanism.

This study addresses these gaps by developing and testing a theoretical framework linking enforcement capacity, maritime governance, and adaptive infrastructures. This is later applied to scrutinise the Russian Shadow Fleet and identify when and how sanctions transform into binding constraints, and when they do not. Hopefully, the framework 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 sanction theories. Therefore, a more suitable framework combining economic statecraft and grey-zone theory is developed. 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. This eclectic framework supports the causal argument: sanctions raise the demand for substitution (Baldwin), the maritime institutional structure supplies them (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: 63, 141-144, 137-138). By decoupling economic coercion from political effect, exploiting structural alternatives, and maintaining strategic objectives despite disruption, targets transform sanctions into catalysts for innovation – both institutionally and logistically (Baldwin: 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: 228). Through substitution and control over infrastructures, even fungible goods can be reconstituted as strategic instruments. 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. Although he does not model the Fleet or maritime logistics specifically, his theoretical emphasis on substitution and third-party alternatives explains why maritime adaptations are logical, scalable, and politically significant target countermeasures. Accordingly, states facing

sanctions are assumed to redirect trade if enforcement raises the costs of retaining the pressured channels. The more fragmented enforcement, the more attractive substitution becomes as strategy. However, to understand how the maritime domain supplies the necessary institutional room for substitution, attention is shifted to grey-zone theory. Kraska's account details how fragmented authority, permissive jurisdictions, and opaque ownership structures enable alternative channels in practice.

Grey-zone theory

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). Grey-zone behaviour denotes actions exploiting legal ambiguity under plausible deniability, while operating below enforcement thresholds. 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: 169). Collectively, these loopholes erode legal clarity and the sanction coalition's practical enforcement reach by fragmenting jurisdictional oversight. The maritime domain is a uniquely fragile governance space where ownership obfuscation, reflagging, permissive shipment hubs, and insurance substitution are not illicit workarounds, but institutionally enabled tactics. 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 across flag states, port states, coastal states, and private actors – raising the political costs and constraining coordination efforts for the enforcement coalition. 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. Thus, the Shadow Fleet may be interpreted as not merely an economic workaround, but a political-strategic instrument designed to uphold revenue and avoid outright conflict, while simultaneously signalling (political) resilience – potentially being a sophisticated and deliberate policy instrument for grey-zone warfare. 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: 12-13).

Synthesised, this theoretical eclecticism 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 these replacements. Adaptation emerges 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. This sequence mirrors the theoretical

presumptions: Baldwin explains why sanctions and coercive pressure incentivise substitution, and Kraska highlights how maritime enforcement gaps allow this adaptation. The chain thereby avoids attributing causality to any individual variable and traces how enforcement and adaptation interact in shaping political outcomes. This chain is a simplification, as causality may be bidirectional and even mutually reinforcing (adaptation may shape enforcement).

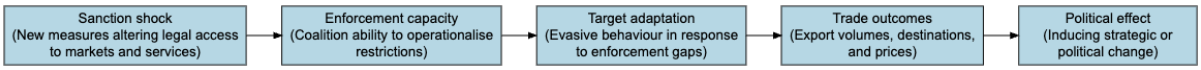

Figure 1: Visualised process-chain.

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 and revenues 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 and port activity.

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. Importantly, enforcement capacity is not simply a control variable, but the key political mechanism of the framework: variation in enforcement determines if legal shocks transform to durable constraints or instead initiate large-scale substitution.

Methodology

The thesis applies a single-case, mixed-methods design to trace the chain from sanction shocks to political effectiveness in limiting Russia's hydrocarbon revenues. Mixed-methods strengthens causal inference: statistics identify when and where impacts occurred, and process-tracing establishes the sequence and mechanisms linking enforcement to outcomes.

Three key sanction rounds are compared: (i) the sixth EU/G7 Package in December 2022–February 2023 (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 combined into one event, 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 comparison of enforcement capacity, adaptation, and overall efficiency. 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, designation, and trade data have both coverage gaps and lags, and certain datasets are behind paywalls. Moreover, the thesis cannot disentangle all global price drivers (OPEC+ decisions, 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, multiple tests are applied: (i) interrupted time-series analysis of export volumes, prices, and revenue data to identify deviations post sanctions; (ii) before/after comparisons around sanction windows to identify changes in trade patterns; and (iii) case-specific verification of enforcement actions and operational behaviour to document coalition activity. Contemporary major shocks, as OPEC+ decisions, global demand swings, and shipping fluctuations, challenge the validity of these tests and must be controlled for. As a robustness check, non-Russian crude liftings serve as a rough placebo, and Brent-Urals price spreads (global oil prices relative to Russian oil) help distance global fluctuations from Russia-specific effects. The combination of Brent-Urals differentials, placebo checks, and process-tracing of maritime adaptation strengthens causal plausibility. Besides, causal checks are applied where evidence permits: Straw-in-the-wind tests check suggestive indicators (AIS manipulation and post-designation reorientations); hoop tests eliminate alternatives (enforcement action preceding behavioural change); and smoking-gun tests when proximate mechanisms are directly observed (detentions interrupting voyages, plausibly causing revenue loss).

The maritime focus requires justification: again, the Shadow Fleet transports 70% of Russian hydrocarbon exports, so any effort to inflict economic pain must target shipping directly. 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).

Operationalisations

Three core concepts require operationalisation: sanction impact, enforcement capacity, and adaptation. Sanction impact is operationalised through Russia's export indicators. These include: (i) export volumes, measured via monthly seaborne crude liftings; and (ii) the Urals-Brent differential, capturing discounts applied to Russian crude oil relative to global standards. The first, monthly seaborne liftings, is a direct measurement of physical trade and thus a valid indicator of sanction impact on export capacity. The second measures the market discount applied to Russia's crude, capturing how sales are affected by sanctions.

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. Importantly, 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. 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 primarily due to the relatively small size of the dataset (n=100). This method provides comparable numbers with clear interpretational values.

Adaptation captures Russia's evasion tactics to circumvent and mitigate sanctions. Three core adaptation mechanisms structure the empirical indicators: opacity, 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. Additionally, 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, and AIS manipulation. 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 pattern changes. These markers facilitate consistent detection of Shadow Fleet adaptation within the process-tracing chain and show how enforcement gaps mediate the overall export outcomes.

Data analysis

The study draws upon both primary and secondary sources, triangulating findings across the literature. Secondary research, institutional reports, and official statistics contextualise sanctions and policies. Contemporary media coverage and OSINT investigation document enforcement events and vessel behaviour. The qualitative work uses process-tracing and official reports (policy documents, insurer advisories, port-denial notices) to establish event sequences and plausible mechanisms. Vessel tracking is conducted through AIS-based shipping databases, including *Lloyd's List*, *SeaSearcher*, and *GlobalFishingWatch*. The quantitative work uses monthly time-series (exports, volumes), vessel-level examination, mediation tests with the enforcement index, and placebo checks on non-Russian dynamics. Data is collected from the outbreak of the Ukraine war 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 the baseline to ensure changes were not ongoing pre-enforcement. Urals prices (Russian oil) are controlled against the Brent (global oil) to isolate the impact on Russia's trade. 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: survivorship and selection biases are inherent risks. The sample is therefore drawn randomly from the population of EU-sanctioned vessels as of October 2025 to capture within-case temporal variation while avoiding deliberate selection outcomes. Randomness lowers selection bias but does not eliminate survivorship bias. Theoretically, some ships elude observability through scrapping, delisting, reflagging, AIS

manipulation, or outright “pauses”. Nonetheless, 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.

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, being 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, and finally, it outlines how Russia’s trade balance was affected across the three sanction packages.

The EU has, to date, imposed 19 increasingly restrictive sanction packages on Russia, intended to constrain its warfighting capacity in Ukraine. The sanctions have two main objectives: to hinder access to Russia’s traditional markets while suppressing crude oil prices sold elsewhere. The sanction rounds have primarily targeted Russia’s energy-dominant economy, with over 2,700 individuals sanctioned, including politicians, businesspeople, oligarchs, propagandists, military personnel, and those responsible for the operations of the Shadow Fleet (European Council, 2025). Importantly, all Western maritime service providers must ensure that their ships comply with the sanction coalition’s constraints (Sverdrup & Parlov, 2024: 229). Therefore, 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 – effectively limits

Moscow's practical opportunities. As the European Commission noted in December 2022: "EU operators will be prohibited from insuring and financing the transport […] of oil to third parties. This [makes it] difficult for Russia to continue exporting its crude oil […] to the rest of the world since EU operators are important providers of such services" (European Commission, 2022). Nevertheless, after three years of sanctions, their impacts remain widely contested.

Sanction shocks

This section elaborates on the immediate reactions post-sanctions, focusing on the Urals-Brent price spread and short-term changes in export volumes and revenues – indicative of market pressure on Russia's crude and overall pricing. After Russia's full-scale invasion of Ukraine, the EU – Russia's principal trading partner – ended most of its hydrocarbon trade with Russia. In June 2022, the sixth EU sanction package banned all imports of Russian oil, effective from December 2022, and oil products from February 2023 (McWilliams, 2024). The embargo was accompanied by the G7 price cap, set in December 2022 at $60/barrel, to constrain Russia's crude earnings without disrupting the global market and preventing soaring energy prices (European Commission, 2022). At the beginning of 2022, the EU imported Russian oil for approximately $10 billion monthly, compared to around $1 billion by the end of 2023 (McWilliams et al., 2024). In response, Russia attracted alternative buyers by giving substantial discounts. During the first half of 2023, its Urals crude sold for $50/barrel, occasionally dipping to $45/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).

Since the sanctions of December 2022, Shadow Fleet voyages increased by 82% (CREA, 2025). Between December 2022 and November 2023, the Shadow Fleet accounted for 38% of all Russian oil exports (CREA, 2025). Therefore, on June 24, 2024, the EU launched its 14th

sanction package to tackle the latent enforcement issues (European Commission, 2024). These measures targeted individual vessels, representing the first direct anti-Shadow Fleet measures. These ships became subject to port access bans and the provision of services. The European Commission aimed the measures at "tankers part of Putin's dark fleet" which circumvented the EU and Price Cap Coalition's caps, "while adopting deceptive shipping practices in complete disregard of international standards", as examined later (European Commission, 2024).

On July 18, 2025, the EU presented its 18th package of sanctions against Russia. The package focused on further cutting Russian energy revenues and strengthening anti-circumvention measures (European Commission, 2025a). The Union sanctioned an additional 105 vessels, bringing the total designated fleet, at the time, to 444 ships (European Commission, 2025a). Besides expanding port and service bans, the EU leveraged diplomatic channels by reaching out to flag states to ensure that the Shadow ships were restrained from adopting their flags (European Commission, 2025a). More importantly, the package also 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 (Bank of Finland, 2025).

Across the sixth, 14th, and 18th sanction packages, the immediate effects manifested in Russia's crude pricing relative to the Brent, the price caps, short-term export volumes (Figure 2), and revenues. Combined, these adjustments form the foundation against which enforcement measures must be comprehended. They demonstrate that each package produced limited shocks, but did not, on its own, alter the overarching structure of Russia's export systems. The next section describes how enforcement capacity evolved across sanction rounds.

Enforcement capacity

Again, sanctions only bite if the sender coalition effectively translates legal rulings into operational constraints. Such actions include public designation lists, insurer advisories, port denials, service bans, inspections and detentions, and diplomatic outreach. This section measures enforcement capacity through a 0-1 index. It is based on a thorough investigation of 100 EU-sanctioned 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). Data is taken from *SeaSearcher* – a subscription-based global maritime vessel tracker database subordinated *Lloyd's Intelligence* and cross-referenced with open-access data from *GlobalFishingWatch*. 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 therefore the mean of the two scaled indicators.

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], as illustrated in Table 2 below. 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

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

peak of 13 before settling at 11 in Q4.[2] The dip in the second window reflects the absence of new public 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. However, inspections and detentions remain high, suggesting continued high enforcement capacity.

	Raw Values		Normalised (0-1)		Composite
Period	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.

What changed across the three packages? As vessel designation did not occur until the 14th sanction package, the sixth package delivered market-level measures only, as previously described. The 14th sanction package introduced the first anti-circumvention measures, explicitly targeting the Shadow Fleet. The first designations and port/service bans marked the beginning of observable vessel-level enforcement alongside an increase in inspections and detentions. The 18th sanction package drastically heightened measures, adding 105 new vessels to the designation list, broader value-chain listings, a tightened and dynamic price cap, and diplomatic outreach to third parties and service providers. These measures coincided with the

[2] Data cut in November.

index's peak, itself driven by simultaneous increases in designations, inspections and detentions.

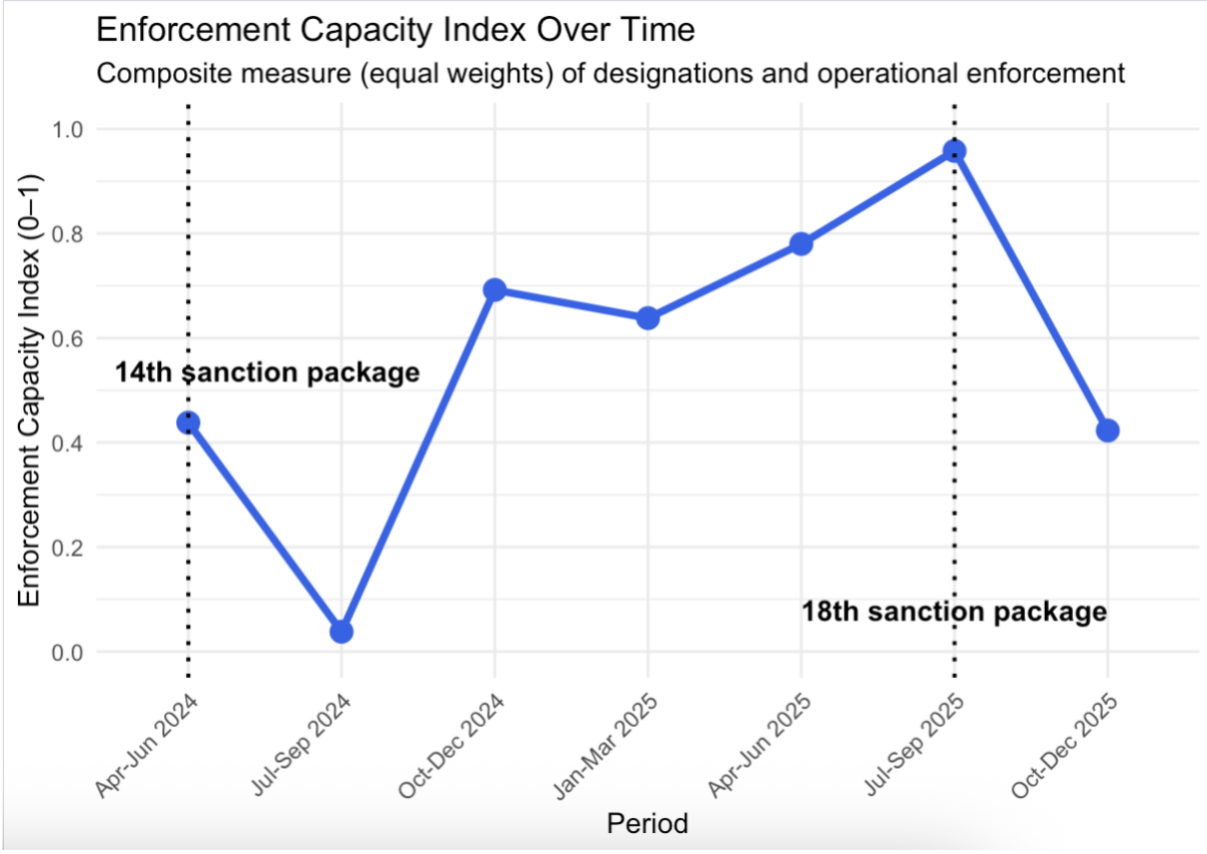

Figure 2: Enforcement capacity index over time.[3]

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 and maritime channels, as the Shadow Fleet, emerged. By October 2025, the Shadow Fleet counted 557 vessels (European Commission, 2025b).

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

Since the sixth sanction package, Shadow Fleet transports increased significantly. In December 2022, they 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 utilisation of sanctioned tankers skyrocketed, as their transport increased from 0.01 million tonnes/day in June 2024 to 0.38 million tonnes/day in October 2025 (CREA, 2025). From January 2025, the usage of Shadow Fleet tankers 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 of G7+ tankers remain consistent, contrasting the fluctuating activity of the grey-zone, and outright illicit, voyages of sanctioned and Shadow tankers. Plausibly, the same ships continue operations, although moving from Shadow to sanctioned tankers once designated.

	Identity Changes (Post-Sanction)	
Period	**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.

The Shadow Fleet demonstrated significant identity manipulation across the same seven time windows in response to enforcement. However, 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 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

[4] See Appendix for complete list.

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 – all known for loose regulations and monitoring.[5] Among the 81 different companies, only three had more than ten vessels registered, and the remaining 78 had a single ship registered. Five vessels were not registered at any company. This concentration in permissive jurisdictions exemplifies the flag-of-convenience dynamics Kraska highlights: fragmented maritime authority provides institutional cover for evasion.

Trade outcomes

Before the sixth sanction package, Russia exported crude oil for approximately €420 million/day (Russia Fossil Tracker, 2025). Russian crude oil 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 – partly due to extensive front-loading by Germany and Italy (Russia Fossil Tracker, 2025). Importantly, the EU embargo only applies to seaborne oil, and Russian pipeline exports to Europe continue today. After the sixth package, Russia's oil export revenues were halved, and for the first six months of 2023, Russian oil traded below the price cap (McWilliams, 2024). Monthly crude revenues fell sharply since late 2022 as sanctions materialised, yet stabilised throughout 2023 and 2024 with crude selling consistently above the cap – monthly revenues returned to €8-9 billion, signalling adaptation of Russia's export system (Russia Fossil Tracker, 2025). In total, Russian crude oil export revenues fell by approximately 33% between October 2022 (€10.6 billion) and January 2023

[5] See Appendix for complete list.

(€7.2 billion), marking the steepest contraction to date (Russia Fossil Tracker, 2025). This immediate downturn illustrates the combined effects of the sixth sanction package and the G7 price cap, which together lowered Western demand and constrained shipping access.

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 one year later (CREA, 2025). Additionally, 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. Until the 18th package, in July 2025, monthly revenues fluctuated within the €7-10 billion range (CREA, 2025).

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). Again, emphasis is put on relative divergences in pricing and trade patterns, rather than attributing revenue changes solely to EU/G7 measures.

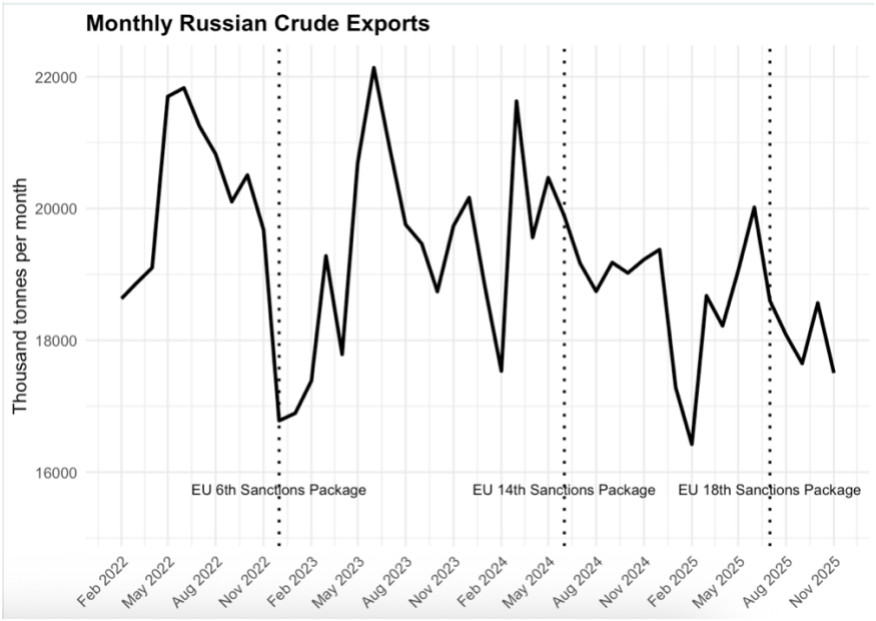

Figure 3: Crude export volumes in thousand tonnes/month.

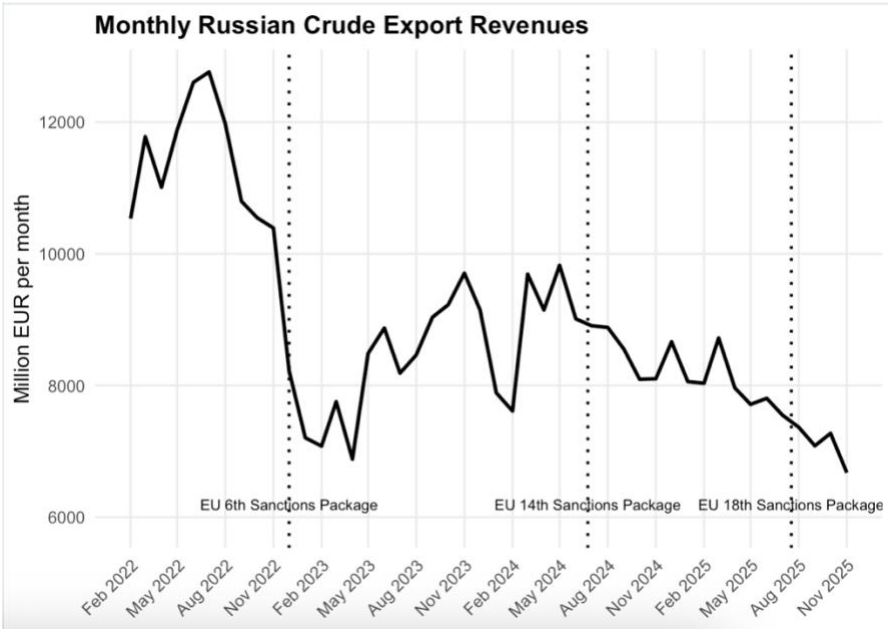

Figure 4: Crude export revenue in million euros/month.

The most significant rerouting involves shifts away from Europe to Asia. Compared to 2021, the EU decreased its imports of Russian oil more than fivefold during 2023 (Korppoo & Lanshina, 2024: 13). The loss of the European market increased sales to China, the emergence of India as a major buyer, and tripled sales to Turkey – combined accounting for two-thirds of Russia's exports (Korppoo & Lanshina: 13). Also exports to Africa, the Middle East, and Latin

America grew. Illustratively, Ghana, Libya, Tunisia, and Togo doubled their Russian crude imports – symptomatic of the Russian crude exports to Africa quadrupling from 2022 to 2023 (Korppoo & Lanshina: 13). In South America, Brazil imported Russian crude for the first time in September 2023 (Korppoo & Lanshina: 13).

Across the three packages, a pattern emerges: revenues initially plummeted but recovered due to rapid market reorientation and Shadow Fleet expansion. Regardless of extensive sanctions, theoretically hitting hard, adaptation flourished under weak enforcement but stalled as enforcement arose. There was a sharp revenue drop after the imposition of the sixth package in December 2022, followed by partial stabilisation throughout 2023–24 with lasting high-level exports and reorientation towards a few large buyers and new markets. By late-2025, after the 18th sanction package, revenues were roughly 50% below September 2022 levels, despite the insignificant reduction in overall export volumes. This pattern forms the empirical baseline for the theory-driven analysis: Russia's resilience reflects how enforcement gaps, rather than sanctions themselves, shaped the political limits of the sanction regime.

Analysis

The previous chapter described what happened to Russia's seaborne crude exports before, during, and after the EU's sixth, 14th, and 18th sanction packages. Against this backdrop, the analysis reinvites the central question of how the Shadow Fleet mediates the enforcement and political effectiveness of the Western sanctions, and what this reveals about the structural limits of sanction enforcement. The empirical record suggests that the Western sanctions altered Russia's economic influxes, but also its economic infrastructure, thereby failing to decisively constrain Moscow's political room of manoeuvre.

Russian revenues collapsed by roughly one-third after the sixth sanction package, with the EU embargo and $60 cap forcing Urals discounts and diverted trade flows. Within months, however, the system recalibrated: Moscow's circumvention tactics hardened into systemic resilience. By mid-2023, the Urals traded consistently above the imposed price cap, and by late-2025, export volumes were merely five percent lower than the pre-war baseline, although revenues were 50% lower than pre-sanctions levels. 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 the institutional room of manoeuvre. In turn, enforcement gaps transformed into a viable parallel logistics system, rather than meaningful coercive pressure. Putin's post-2022 strategy mirrors this synthesis: while Western sanctions imposed substantial costs on Russia's hydrocarbon sector, Moscow developed alternative infrastructures sustaining its hydrocarbon export revenues. The Shadow Fleet manifests as the empirical intersection of these logics: a demand-driven invention enabled by the maritime domain.

Enforcement credibility

Where enforcement was weak and fragmented, substitution scaled. 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". Importantly, these patterns are assessed through temporal covariance and plausibility evaluation of the observed enforcement-adaptation mechanisms, rather than through strict experimental tests. The observed pattern supports H1 (Enforcement credibility): fragmented enforcement undermined the intended coercive effect of the sanctions, regardless of their extensive design. The data demonstrates that early windows were designation-heavy but

operationally light, as the index dropped to 0.038 in Q3 2024. During this low-enforcement window, adaptation accelerated. Conversely, as enforcement capacity recovered and rose by mid-2025 – designations, inspections and detentions peaked with the index hitting 0.958 – the Shadow Fleet's measurable tonnage fell, and Shadow tanker transportations shifted towards both sanctioned tankers and G7+ tankers. This adaptive resurgence in low-enforcement windows is the exact expectation of H1, as operational pressure failed despite the signalled intent of the sanction coalition. 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.

Adaptive substitution

The adaptiveness of the Fleet demonstrates that substitution did not remain tactical. Already before sanctions, identity manipulation was common practice but further intensified after the 14th sanction package. Therefore, H2 (Adaptive substitution) holds: weak enforcement incentivised expansion of Russia's alternative logistical infrastructure channels. The concentration of flags and ownerships in permissive jurisdictions mirrors the hypothesis, which anticipated broader substitution as enforcement capacity lowered. This also pertains to registration companies and flag registries, as they were essential facilitators of the Fleet. Providing rapid reflagging, opaque ownership structures, and overall minimum oversight, they contributed to operational gaps and reduced transparency for the sanction coalition. Arguably, as most companies had a single vessel registered, located in permissive states, they functioned as shell companies to further obscure ownerships and diffuse vessel-ties to Russia. Together, these tactics evolved into systemic resilience, specifically so as markets shifted from Europe to, notably, India, China, and Turkey – signalling a long-term disengagement from the European community. As theorised by Baldwin and Drezner, this infrastructural shift suggests

a long-term decoupling trajectory that could lower the prospects for post-war economic re-engagement with the EU and G7. Instead, the emerging system facilitates increased interaction with non-abiding coalition states, while lessening dependence and willingness to constructively engage with the West.

Mediated resilience

This dynamic simultaneously explains the revenue-volume divergence. Russia preserved its exports by rerouting trade flows to alternative buyers, although offering significant discounts as illustrated by the Urals-Brent price spread. While these discounts may be perceived as unexpected, sanction-induced repercussions, they are consistent with economic monopolisation theory, as a concentrated set of buyers obtained greater price concessions. This concentration translated into volume resilience: two-thirds of exports concentrated in India, China, and Turkey by early 2024, with exports remaining despite lower prices. This pattern *partially* aligns with H3 (Mediated resilience): Moscow's adaptive mechanisms mediated enforcement gaps to sustain export volumes, although it could not prevent declining revenues. This partial confirmation underscores the central claim, that adaptation turns enforcement gaps into logistical resilience (preserving volumes) but cannot neutralise price-driven economic dynamics without stronger and more precise enforcement. Nonetheless, almost every barrel of crude was sold above the price cap. Interestingly, the dynamic price cap from the 18th sanction package onwards effectively tightened the revenue discounts, as the Urals price fell from $66 to $54 between September and November 2025. In line with recent studies, stricter price caps undermine Moscow's fiscal influxes: analysts propose to lower the price cap while allowing "Russia to export virtually unlimited volumes of oil, but at a much more rigorously enforced price discounts" – but greater attention, and resources, must be put into enforcement (Dubrovskiy & Nixey, 2025: 1). Measures like the price cap only bites when properly enforced.

Without credible backing, the cap risks remaining a superficial constraint. Also tightening the cap alone raises incentives for rerouting, obfuscation, and non-coalition insurance, effectively accelerating substitution, unless coupled with measures pressuring service nodes and operational spaces for evasion. The late-2025 revenue decline demonstrates that stricter rules may influence fiscal inflows, but H3 holds because the adaptation continued to cushion Russia's export capacity. Thus, the hypothesis explains Russia's resilience despite initial logistical frictions, although failing to account for the fall in revenues: though economically efficient, policies as the price cap do not hinder the regime's ability to sell its crude and other oil products. Kraska's account explains why: third-party facilitators – insurers, flag registries, brokers, and ports – remained outside the sanction coalition jurisdiction, in turn undermining enforcement capacity. Therefore, Moscow leveraged the maritime domain and its inherent fragmentation and judicial ambiguity to circumvent the sanctions.

How politically effective are sanctions?

What, then, does this reveal about sanctions' political effectiveness? The unprecedented sanctions achieved partial financial effect, but not political. Analytically, there is a distinction between narrow and broad effects: the sanction coalition has undoubtedly raised costs and cut Russian revenues, although failing to induce policy reversal. The evidence illustrates that the sanctions have been effective in this narrow, economic sense, but have failed in the broader, political sense of altering Russia's operations in Ukraine. While revenues are significantly cut, the sanctions have not induced the explicit political intent of constraining Russia's export capacity in a way that forces behavioural change on the battlefield. Conversely, they have distanced Moscow from the West, arguably also in the foreseeable future. Putin's structural readjustment has lessened dependence on both Western markets and infrastructures, thereby helping to consolidate Russia's ability to engage in long-term sanction evasion and lowering

the prospects for future cooperation. The Shadow Fleet has been the key mediator: it is the mechanism converting Western enforcement gaps into an alternative, sustainable logistical system. In some respects, the regime's autonomy from Western rules has arguably strengthened, as the perceived incentives to comply with Western-dominated regimes have diminished. Succinctly put, sanctions lacking sufficient enforcement merely function as expensive and symbolic signalling, and enforcement without broad coalition reach is fragile. To achieve its intended political-coercive ends, both are necessary conditions to induce political pressure beyond revenue attrition.

If the aim is to translate economic pressure into political constraints, policy must be revised. To complement the formal designation lists and sanction designs, the sanction coalition must also exert pressure on service providers and facilitators, in addition to controlling chokepoints. For instance, the coalition should supervise and penalise non-compliant service providers, apply diplomatic pressure to permissive registries, enforce binding port denials and credible detention threats enforced through collective port-state control, in addition to continuous maritime surveillance and prosecution of evasion networks. While adjusting the price caps is a sensible intensification to cut income, the theoretical framework posits that more tightening incentives further adaptation and substitution. This may ultimately strengthen Russia's resilience and decouple Moscow from European markets, overall lowering cooperation outlooks, also after an eventual peace deal in Ukraine.

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 evidence illustrates that Western sanctions reshaped Russia's economic circuits without imposing their intended political constraints. Being a

product of coercive incentives and maritime permissiveness, the Shadow Fleet defined the limits of sanctions' political effectiveness. Returning to the research question, it becomes clear that the Shadow Fleet mediates enforcement and undermines sanctions' political effectiveness by exploiting maritime grey-zones. This is done by converting enforcement gaps into resilient export structures, as short-term tactics petrify into systemic resilience. In so doing, it reveals the political limits of sanction enforcement: without coordinated and sustained control over maritime service nodes and actors, sanctions depress revenues but fail to inflict the intended political pressure and behavioural change.

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? Putin's 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 Fleet transforms legal pressure into logistical friction, rather than political constraints. Due to weak sanction enforcement, the Shadow Fleet expands and deploys tactics like identity manipulation and strategic use of permissive jurisdictions to create a parallel export system sustaining hydrocarbon revenues. Although this alternative infrastructure shrank economic gains, it largely preserved export volumes. Analytically, this separates narrow (raising costs and reducing revenues) from broad effectiveness (inducing behavioural change): the evidence suggests economic success but political failure. The gap between financial disruption and

political effect reveals a crucial limit of the sanction coalition: without credible, sustained, and coalition-wide enforcement, sanctions impose economic hardship, but do not alter state behaviour, as intended, given the long-term structural reconfiguration. The Shadow Fleet exposes the institutional boundaries of what sanctions are capable of when operational and systemic control are limited.

These findings indicate that the Western economic sanctions only have a limited effect on Russia's financing of the Ukraine War. In a larger geopolitical perspective, economic sanctions against the world's second-largest gas producer and third-largest oil producer require a longer-term perspective: they are insufficient in stopping Russia's greater ambitions of dividing Europe into exclusive spheres of interest or changing the existing balance of power. However, if integrated into a broader arsenal of mutually reinforcing instruments, tangible political effect may be achieved.

This thesis provides two key theoretical takeaways. First, economic statecraft logics cannot be understood alone – it 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. Both are necessary: Baldwin explains why substitution is profitable, and Kraska clarifies how the maritime domain is a structural weakness undermining the constraining capacity of sanction regimes. Second, enforcement capacity is the core political variable, rather than an empirical covariate. Outcomes are not determined by formal sanction design. Instead, it is the 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.

Future research may 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. 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. Other comparative studies on sanctioned exporters may clarify how far these mechanisms are generalisable beyond Russia.

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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
9339337	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	Zelitiko Shpping Comp. Ltd. (Cyrpus)	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 Shpping 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	Investneftetrade LLC (Russia)	Russia
9640528	Russia	Russia	Investneftetrade 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 Lttle Ltd. (Hong Kong)	Hong Kong
9301524	Vietnam	Sierra Leone	Insist Line Ltd. (Seychelles)	Seychelles