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Continuity under Sanctions: Transactional Reconfiguration and the Reproduction of Russian Oil Exports

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Abstract

Why do sanctions that increase transport, insurance, financial, and market-access costs not necessarily interrupt an energy-export system? Conventional indicators such as prices, revenues, and trade volumes identify economic damage but do not explain whether a constrained material-commercial function can be reproduced.

This article distinguishes operational pressure, value compression, and functional interruption and examines Russian petroleum exports from December 2022 to 20 September 2026. Using structured event-configuration analysis, it traces constraint–response episodes affecting the recurring circuit of extraction, loading, transport, delivery, settlement, and renewed shipment. It develops the concept of **transactional reconfiguration**: the timely recombination of

operational rights, accessible assets, guarantees, counterparties, jurisdictions, and settlement arrangements through which a constrained function is reproduced. Fiscal receipts are treated as downstream evidence of monetisation rather than as direct measures of physical continuity. The evidence demonstrates substantial operational pressure, periods of value compression, and interruption at particular nodes and corridors, but not sustained interruption of the aggregate export circuit. Continuity was state-enabled but relationally co-produced through Russian coordination and external acceptance by buyers, ports, insurers, banks, and intermediary jurisdictions. Node removal becomes system-level interruption only when no operationally sufficient substitute is constituted before the viable adjustment interval expires.

Keywords: Economic Sanctions; Russian Petroleum Exports; Transactional Reconfiguration; Material-Commercial Reproduction; State Capability; Functional Interruption

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1. Introduction

Sanctions against Russian petroleum intervene at different stages through which production becomes an internationally delivered and monetised export. Import prohibitions remove destination markets; vessel and service restrictions constrain transaction capacity; and the G7 price cap conditions access to coalition maritime services on compliance with specified price

thresholds (U.S. Department of the Treasury, 2022, 2023). EU measures separately restrict imports and services associated with Russian crude oil and petroleum products (Council of the European Union, 2026a).

Assessments commonly examine prices, export earnings, fiscal receipts, production, or economic growth. These indicators identify damage but do not necessarily establish whether the export function has ceased. Building on the distinction between imposed costs and achievement of political objectives (Baldwin, 1985; Drezner, 1999; Pape, 1997), this article differentiates **operational pressure**, **value compression**, and **functional interruption**. Pressure increases the cost, risk, complexity, or duration of operation; compression reduces the usable commercial or fiscal value generated by continuing circulation; interruption occurs when an indispensable function cannot be completed or replaced within its viable interval.

The explanatory problem lies between restriction of a component and interruption of its function. Weaponised-interdependence research shows how control over central financial and infrastructural nodes enables monitoring and exclusion (Farrell & Newman, 2019). Research on circumvention documents migration through third countries and alternative commercial channels (Andreas, 2005; Early, 2015), while supply-chain research explains substitution, redundancy, inventories, and rerouting (Christopher & Peck, 2004; Sheffi, 2005; Tang, 2006). Yet neither component removal nor changed destinations explain how an alternative transaction becomes executable and repeatable. Continued petroleum circulation requires vessels, operational rights,

liability arrangements, port acceptance, buyers, contracts, and settlement channels to become jointly usable in the required sequence.

Russian adaptation also occurred within a material constraint facing sanctioning and importing states. Replacing Russian petroleum requires more than nominal production elsewhere. Alternative supply must be commercially available in sufficient volume and compatible grades, supported by usable transport, insurance, finance, and terminals, and delivered within the importer's operating interval. Rapid exclusion may therefore reduce Russian revenue while tightening global supply and raising adjustment costs for importing economies. The price cap explicitly reflected this tension by seeking to reduce Russian earnings while maintaining petroleum supply to the world market (U.S. Department of the Treasury, 2022, 2023).

This article conceptualises the resulting adaptation as **transactional reconfiguration**: the timely recombination of actors, accessible assets, effective operational rights, guarantees, jurisdictions, and settlement arrangements into an externally accepted and repeatable configuration after an established protocol becomes unusable. The concept is broader than sanctions evasion because it includes circumvention as well as lawful substitution beyond coalition-controlled services.

Transactional reconfiguration also reframes state capability. Russia did not need to own every asset in the export chain. It needed to help make heterogeneous public, private, domestic, and foreign resources operational in the required sequence. Because reconstructed arrangements

became executable only when buyers, ports, insurers, banks, registries, and intermediary jurisdictions accepted them, continuity was state-enabled but relationally co-produced.

The article asks:

How did Russia and participating external actors reconstruct the operational rights, assets, guarantees, relationships, and settlement arrangements required to reproduce petroleum-export flows across successive cycles under sanctions?

It also examines how reconstructed configurations redistributed costs, risks, and adjustment time among Russia, commercial counterparties, and importing economies.

The central argument is that sanctions produce sustained system-level interruption only when effective capacity is removed faster than replacement becomes operational and the resulting deficit persists beyond the circuit's logistical, commercial, and financial buffers. Where alternative vessels, liability arrangements, buyers, ports, contracts, and settlement channels become usable in time, sanctions may impose substantial pressure and compress value without terminating the aggregate export function.

The article makes three contributions. First, it shifts analysis from the removal of individual nodes to the reproduction of functions across successive cycles. Second, it develops transactional reconfiguration to explain how a constrained function migrates to another operational protocol. Third, it identifies the relational and unequal distribution of the costs, risks, and adjustment time required to preserve continuity.

2. Literature and Explanatory Gap

2.1 Four Partially Connected Literatures

Four bodies of literature illuminate different parts of petroleum circulation under sanctions but begin from different analytical objects.

Table 1

Contributions and Analytical Limitations of Four Literatures on Petroleum Circulation under Sanctions

Literature	Principal contribution	Remaining limitation
Sanctions and network power	Explains economic coercion and how control over central financial, technological, and logistical nodes creates leverage (Baldwin, 1985; Drezner, 1999; Hufbauer et al., 2007; Pape, 1997; Farrell & Newman, 2019)	Gives less attention to whether a constrained function can migrate to another configuration
Trade diversion and circumvention	Documents changes in destinations, intermediaries, ownership, currencies, and transaction channels (Andreas, 2005; Early, 2015; Babina et al., 2023; Johnson et al., 2023; Cardoso et al., 2025)	Identifies where trade moved without fully explaining how the alternative transaction became executable and repeatable
Supply-chain resilience	Explains routing, inventories, redundancy, substitution, and recovery from disruption	Often assumes that replacement assets remain commercially

Literature	Principal contribution	Remaining limitation
	(Christopher & Peck, 2004; Sheffi, 2005; Tang, 2006)	accessible, whereas sanctions make access legally and politically contested
State capacity	Explains coordination, infrastructural power, institutional change, revenue extraction, and resource mobilisation (Mann, 1984; Levi, 1988; Besley & Persson, 2011)	Often treats taxable activity as an existing base rather than explaining how the underlying circulation is reconstructed

Note. The authors' synthesis of the cited literature.

Research on Russian petroleum sanctions demonstrates both substantial costs and extensive adaptation. Russian crude was redirected from Europe toward China, India, Türkiye, and other destinations, while discounts, enforcement, leakage, and the expansion of tanker capacity outside coalition services shaped the results (Babina et al., 2023; Johnson et al., 2023; Cardoso et al., 2025). These findings establish trade diversion and changing costs but leave unresolved when damage to particular transaction components becomes interruption of the underlying export function.

The gap arises from a mismatch between the unit targeted and the function expected to disappear. Sanctions apply to identifiable firms, vessels, banks, insurers, technologies, traders, and buyers. Petroleum exports, however, are produced through relations among cargo rights, loading capacity, transport, liability coverage, ports, contracts, buyers, and settlement institutions. Restricting one component does not necessarily remove its function when another operational configuration can perform it.

Physical existence also differs from operational availability. A tanker may exist but remain inaccessible; insurance may be issued but rejected by a destination port; and a willing buyer may lack an acceptable settlement channel. These elements must become jointly usable in the correct sequence (Suwan-achariya, 2026). Replacement completed after production, storage, contractual, delivery, or liquidity limits have become binding cannot prevent an interruption already incurred.

2.2 Transactional Reconfiguration and Material-Commercial Reproduction

This article conceptualises the missing process as **transactional reconfiguration**: the timely recombination of operational rights, accessible assets, actors, guarantees, jurisdictions, and transaction protocols into an executable configuration after an established arrangement has been constrained.

Transactional reconfiguration differs from rerouting. Rerouting changes the path of an existing flow; transactional reconfiguration changes the institutional conditions under which that flow becomes possible. It may require simultaneous changes in vessel access, liability coverage, contractual counterparties, port acceptance, currency, settlement, jurisdiction, and risk allocation.

These conditions are conjunctural. Additional tanker capacity cannot compensate for the absence of port acceptance, while a new currency cannot reproduce settlement without an accessible bank and usable conversion arrangement. The relevant question is therefore whether enforcement removes an indispensable function faster and for longer than the targeted system and its counterparties can reconstruct it.

The higher-order outcome is **material-commercial reproduction**: the capacity to constitute the conditions of movement and monetisation repeatedly so that completion of one cycle permits another to begin. The vessels, insurers, buyers, banks, or jurisdictions may change; what must persist is the capacity to perform the critical function before the viable adjustment interval expires.

This process cannot be constituted by Russia alone. Importing states, ports, refiners, insurers, traders, banks, registries, and public authorities participate by accepting alternative documentation, guarantees, contracts, currencies, and distributions of risk. Transactional reconfiguration is therefore state-enabled, externally accepted, and relationally co-produced. The remaining analytical task is to determine when this reconstructed configuration becomes operational and repeatable, rather than merely announced or nominally available.

3. Conceptual Framework

3.1 Material-Commercial Reproduction and Effective Rights

The object of explanation is the recurring circuit through which extracted petroleum becomes a delivered and monetised export:

extraction → loading → transport → delivery → settlement → renewed shipment

The empirical unit of analysis is the **constraint–response episode** specified in Section 4. Each episode assesses whether a restriction altered or interrupted a function within this circuit.

Continuity exists when the circuit can be completed and initiated again within the relevant operational interval. Vessels, buyers, insurers, ports, currencies, and routes may change without destroying the function. **Material-commercial reproduction** occurs when completion of one

cycle preserves or reconstructs the conditions required to initiate another. A single shipment demonstrates movement; a subsequent completed cycle supported by operational replacement and monetisation capacity demonstrates reproduction.

The circuit contains three connected layers. **Material circulation** comprises extraction, loading, transport, and delivery. **Commercial monetisation** converts delivery into a usable claim or payment. **Fiscal capture** transfers part of that value to the state. Fiscal receipts therefore provide downstream corroboration that some petroleum activity generated monetisable and taxable value, but they neither measure physical continuity directly nor prove settlement of a particular cargo.

Reproduction requires an operational configuration rather than the nominal existence of individual components. Formal ownership is neither necessary nor sufficient: an owned tanker may remain unusable without a deployable charter, accepted insurance, port access, cargo authority, and settlement, while a foreign-owned vessel may become effective capacity through contractual access and external acceptance.

Drawing on property-rights research (Barzel, 1997; Schlager & Ostrom, 1992), **temporally effective operational rights** are legally, commercially, and politically usable rights over an asset or transaction that are accepted by the required counterparties and activated within the time available for reproduction. Registration, flag, charter, insurance, liability, port acceptance, contractual jurisdiction, and payment authority may be distributed across several actors and jurisdictions.

Let □_□ denote the time required to secure effective rights and deploy replacement capacity, and □_□ the time remaining before storage, production, contractual, delivery, or liquidity constraints make the function non-viable. Timely reproduction requires:

$$□_□ < □_□$$

Capacity activated after □_□may restore later activity but cannot prevent the interruption already incurred. This inequality is a process-tracing diagnostic rather than a precisely measured production function.

3.2 Pressure, Compression, and Interruption

Sanctions effects are classified according to their consequences for the material-commercial circuit:

Table 2

Classification of Sanctions Effects on the Material–Commercial Circuit

Outcome	Diagnostic meaning	Indicative evidence
Operational pressure	The function continues but becomes more costly, risky, delayed, or institutionally difficult	Longer routes, higher transaction costs, delays, or additional intermediation
Value compression	Circulation continues but produces less usable commercial or fiscal value	Lower netbacks, export earnings, taxable value, or attributable fiscal receipts

Outcome	Diagnostic meaning	Indicative evidence
Functional interruption	An indispensable function cannot be completed or replaced within its viable interval	Failure to load, transport, deliver, settle, or initiate another cycle

Note. Developed by the authors.

These outcomes may coexist across nodes, periods, or scales. Higher transport costs establish pressure but demonstrate compression only when they reduce net usable value. Similarly, lower fiscal receipts neither establish interruption nor demonstrate a sanctions effect without distinguishing changes in prices, exchange rates, production, taxation, and other causes.

Scale must also be specified. A designation may interrupt one vessel or transaction while aggregate carrying capacity remains reproducible. System-level interruption occurs only when an indispensable function cannot be replaced at the scale and within the time required to sustain aggregate operation. Reproducibility therefore does not imply complete resilience: circulation may continue while becoming more costly, concentrated, opaque, or politically vulnerable.

3.3 The Replacement Race

The transition from pressure to interruption depends on the relationship between **effective capacity removal** and **operational replacement**. Removal occurs when enforcement makes previously usable capacity unavailable, not merely when an entity is designated. Replacement occurs when an alternative asset, right, guarantee, or relationship becomes deployable within an accepted transaction configuration, not merely when it is announced or acquired.

The central proposition is:

Sustained interruption becomes likely when enforcement removes effective capacity faster than replacement becomes operational and the resulting deficit persists beyond the circuit's buffers and viable adjustment interval.

A temporary deficit is insufficient to establish interruption. Inventories, spare assets, storage, fiscal reserves, contractual flexibility, delayed delivery, and public guarantees may extend adjustment time. These buffers temporarily preserve operation but do not reproduce the missing function.

Replacement capacity is relationally produced. A vessel, insurer, buyer, or settlement channel becomes effective only when the necessary registries, ports, banks, counterparties, and authorities accept the reconstructed arrangement. The decisive question is whether an operationally sufficient and externally accepted configuration becomes usable before the circuit's buffers or viable interval are exhausted.

4. Research Design

4.1 Strategy, Scope, and Unit of Analysis

The study employs qualitative **structured event-configuration analysis**, combining process tracing, structured comparison, and configurational analysis (Beach & Pedersen, 2019; George & Bennett, 2005; Ragin, 2008). It does not estimate an average sanctions effect or combine heterogeneous measures into an intensity index. Restrictions on vessels, insurance, finance, ports, buyers, and technology affect different functions through different mechanisms and temporal sequences.

The analysis instead reconstructs **constraint–response episodes**. Each episode begins with an implemented restriction affecting an identifiable function and traces effective capacity removal, operational responses, external acceptance, and subsequent reproduction or interruption. The approach is structured because common questions are applied to each episode; event-based because restriction, response, activation, and subsequent operation are ordered chronologically; and configurational because outcomes depend on combinations of rights, assets, guarantees, counterparties, and permissions.

The principal case is Russian seaborne crude-oil exports, supplemented by petroleum-product episodes where sufficiently detailed evidence is available. The observation period extends from the implementation of the EU embargo and G7 crude-oil price cap in December 2022 to 20 September 2026. Earlier evidence establishes the pre-restriction configuration, while measures announced before December 2022 are included only when they affected transactions during the observation period.

The empirical unit of analysis is the **constraint–response episode**; the recurring material-commercial circuit is the object whose reproduction each episode assesses. Measures implemented together and affecting the same configuration are treated as a linked episode. Distinct functions affected through different mechanisms are traced separately. Episodes are retained whether substitution succeeds, fails, is delayed, or remains indeterminate.

4.2 Event Selection and Evidence

Events are selected purposively when verifiable evidence indicates that they either constrained a function required for petroleum circulation or created or activated an alternative arrangement for transport, insurance, contracting, guarantees, settlement, or cargo disposition. Selection is based on operational relevance rather than observed success. A response is not classified as replacement merely because it followed a restriction; evidence must connect it temporally and functionally to the capacity constrained.

External shocks—including OPEC+ decisions, exchange-rate movements, demand changes, infrastructure attacks, and maritime disruption—are coded as contextual events when they affect prices, routes, replacement capacity, or incentives to accept alternative arrangements. They are not treated as sanctions unless they directly restrict Russian transactions. Technology measures expected to affect production only beyond the observation period are classified as prospective constraints.

Evidence combines legal and regulatory documents; government and intergovernmental data; shipping, customs, port, and commodity information; corporate and institutional records; and reputable specialist reporting. Legal documents establish the scope and timing of restrictions, while operational records are required to assess loading, transport, port entry, discharge, settlement, and repeated use.

Claims are classified as documented observations, corroborated reports, reported estimates, analytical inferences, or unresolved. The classification applies to individual claims

rather than entire sources. An official measure may establish legal scope without proving operational removal, while vessel movement may establish delivery without revealing ownership, insurance, or payment. Public silence is therefore treated as indeterminate unless the missing trace would normally be observable and its absence has substantive meaning.

4.3 Episode Coding and Outcome Inference

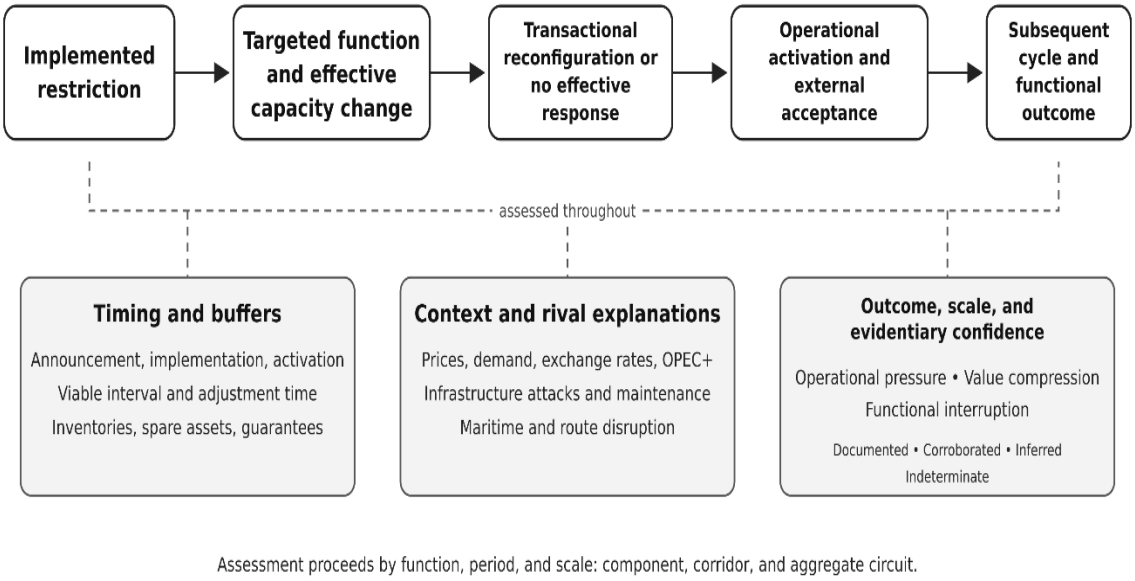

Figure 1. Structured Event-Configuration Analysis of a Constraint–Response Episode.

Note. Constructed by the authors.

The figure traces an implemented restriction, changes in effective capacity, transactional reconfiguration or the absence of an effective response, operational activation and external acceptance, and the subsequent functional outcome. Timing, buffers, rival explanations, outcome scale, and evidentiary confidence are assessed throughout.

Each episode records the targeted function; the authority and timing of the restriction; the pre-existing configuration; effective capacity removed or otherwise affected; the observed response; external acceptance; subsequent flow, settlement, and initiation of another cycle; the functional outcome; rival explanations; and evidentiary confidence.

Legal designation is treated as an intervention rather than an operational outcome. A designated tanker represents removed capacity only when previously usable carriage becomes unavailable. Likewise, the acquisition or authorisation of a substitute does not establish replacement until it is deployed and accepted by the counterparties required for operation.

Events within an episode are coded as restriction, reconfiguration, flow, buffer, or context. These categories identify positions within a causal sequence rather than independent observations. Reconfiguration requires functional correspondence with the constrained component, a temporal connection to the restriction, and operational activation. One successful use demonstrates activation; completion of a subsequent cycle demonstrates initial reproduction; and repeated use, or transition to another effective configuration without interruption, supports a finding of sustained reproduction.

Outcomes follow the definitions established in Section 3: operational pressure, value compression, or functional interruption. They are coded by function, period, and scale—component, corridor, or aggregate circuit. Higher transaction costs establish operational pressure but indicate value compression only when evidence demonstrates a reduction in net usable value. Functional interruption is recorded only when an indispensable function cannot be completed or

replaced within its viable interval. Indeterminate is an evidentiary classification, not a fourth substantive outcome.

Where evidence permits, the analysis records the dates of announcement, implementation, and operational replacement. Replacement is timely when it becomes operational before storage, production, contractual, delivery, inventory, or liquidity constraints make the function non-viable. A response completed before implementation is classified as anticipatory reconfiguration only when evidence connects it to an announced or expected restriction. Because the viable interval is rarely observed directly, it is approximated from inventories, operational schedules, contractual deadlines, voyage windows, liquidity requirements, and reported operational urgency.

4.4 Causal Inference and Limitations

A sanctions-related explanation receives strongest support when evidence connects an implemented restriction to loss, delay, withdrawal, or additional cost in a necessary function; identifies a temporally and functionally related response; and establishes the activation, external acceptance, and subsequent performance of any substitute. Where sanctions interact with market or logistical shocks, the analysis permits conjunctural rather than single-cause attribution.

Claims are assessed against disconfirming evidence. Reconfiguration is weakened when substitutes remain undeployed, lack external acceptance, or fail to support subsequent operation. Continuity is weakened by repeated failures of delivery, settlement, or renewed operation, whereas aggregate-interruption claims are weakened when the constrained function is reassigned within its viable interval.

Episodes record observable transaction costs, but incidence is assigned only when contractual, pricing, or fiscal evidence identifies the actor bearing them.

The principal limitations are opaque ownership, chartering, insurance, pricing, and settlement; incomplete vessel information; delayed and multiply determined data; and strategic reporting. Triangulation, confidence classification, and retention of indeterminate cases reduce but cannot eliminate these problems. The study therefore identifies causal sequences and operational conditions rather than average sanctions effects, counterfactual outcomes, or the indefinite durability of reconstructed arrangements.

5. Russia's Response as Distributed Reconfiguration

Russia's response to petroleum sanctions was neither a single countermeasure nor a fully designed replacement system. It emerged through legal intervention, public guarantees, regulatory adaptation, private acquisition and chartering, destination substitution, and participation by third-country firms and authorities. Its strategic character lay in the cumulative direction of these measures rather than implementation of a complete architecture at one moment (Ihoshkina & Suwan-achariya, 2026).

Presidential Decree No. 961 of 27 December 2022 prohibited, from 1 February 2023, petroleum supplies under contracts applying the coalition price-cap mechanism (President of the Russian Federation, 2022). Presidential Decree No. 771 of 11 October 2023 and implementing measures subsequently imposed repatriation and currency-sale requirements on specified exporters (President of the Russian Federation, 2023; Government of the Russian Federation,

2023). Because these requirements were later modified, they are treated as time-bounded interventions rather than permanent features of the reconstructed system.

These measures altered contractual and financial rules but did not themselves supply vessels, insurance, port access, buyers, or settlement capacity. Law could authorise an alternative arrangement and redistribute authority or risk; material continuity depended on whether the necessary assets, services, counterparties, and payments became jointly operational.

Russia therefore did not restore the pre-sanctions network. It sought to reproduce functions previously performed through Western-centred maritime, insurance, financial, and commercial institutions. Existing research documents the redirection of crude toward China, India, and Türkiye and the expansion of tanker capacity operating outside the Western-services regime (Babina et al., 2023; Cardoso et al., 2025). The analysis below examines how these components became connected in repeatable transaction configurations.

5.1 From Legal Countermeasures to Reduced Infrastructural Dependence

Before the principal restrictions, Russian producers controlled petroleum production but relied heavily on G7-centred chartering, protection-and-indemnity insurance, reinsurance, classification, commodity trading, correspondent banking, and destination markets. The price cap conditioned access to coalition maritime and financial services on compliance with specified thresholds, while EU measures restricted imports and associated transport, technical, brokering, and financial services (U.S. Department of the Treasury, 2022, 2023; Council of the European Union, 2026a).

Reconfiguration occurred across complementary functions. Maritime carriage shifted toward purchased, chartered, or managed tankers operating partly or wholly outside coalition services. Russian and third-country insurance, public backing, and alternative guarantees supported liability allocation and selective port acceptance. Alternative traders and buyers redirected cargoes toward Asian and intermediary markets. Non-coalition banks, currencies, and correspondent arrangements facilitated settlement, while repatriation, taxation, and public-support rules connected export proceeds to corporate liquidity and fiscal capture. Cap-compliant, hybrid, and non-coalition transactions consequently coexisted rather than forming a single replacement system.

The evidence does not establish direct Russian state ownership or control of every participating vessel, insurer, trader, or bank. Nor does acquisition alone establish operational capacity. Ownership, insurance, and cargo-level settlement often remain opaque. The stronger finding is that Russian exporters obtained access to heterogeneous public, private, domestic, and foreign resources that were repeatedly connected to the export circuit.

State capability operated through regulation, guarantees, diplomatic engagement, currency rules, infrastructure, and risk absorption. Yet domestic authorisation remained insufficient. Alternative arrangements became operational only when foreign ports, buyers, banks, registries, insurers, and authorities accepted or tolerated them. Reconfiguration was therefore state-enabled but relationally completed across jurisdictions.

Buyer incentives also mattered. Refinery requirements, limited substitutes, or disruption of alternative routes increased the value of deliverable Russian cargoes and the willingness to accept alternative transaction protocols. These incentives did not eliminate sanctions risk; they affected whether bearing that risk was preferable to losing access to supply.

The outcome was reduced dependence on particular coalition-controlled infrastructures rather than autonomy. Russia remained dependent on foreign demand, internationally circulating vessels, ports, repair facilities, maritime passages, payment conversion, and political decisions in intermediary jurisdictions. Reconfiguration relocated dependence and diversified some service channels while increasing concentration in others, particularly destination markets.

5.2 Insurance and Fleet Access as Relational Capacity

Insurance and shipping demonstrate why replacement capacity cannot be measured by domestic institutional creation, vessel ownership, or flag registration alone. A tanker becomes operational only when exporters can access and deploy it and when its registration, documentation, liability coverage, and contractual arrangements are accepted by the authorities and counterparties required for loading, entry, discharge, and reuse.

Western protection-and-indemnity clubs provided more than compensation after an accident. Their coverage was embedded in recognised systems of reinsurance, claims administration, legal enforcement, and port acceptance. Withdrawal of Western P&I therefore constrained an institutional relationship connecting vessels to registries, ports, cargo owners, and buyers.

Russia responded by expanding domestic insurance, reinsurance, and public backing. These measures increased nominal coverage but did not guarantee usability abroad. Effective insurance required a valid policy, credible financial or public backing, accepted documentation, and recognition by the relevant port and buyer. Failure at any indispensable point could leave formally valid coverage operationally ineffective.

India illustrates selective recognition. In May 2025, Indian authorities approved three additional Russian insurers—Sberbank Insurance, Ugoria Insurance Group, and ASTK Insurance Company—to provide marine P&I coverage at Indian ports, bringing the number of recognised Russian providers to eight. The approvals were valid until 20 February 2026 (Verma, 2025). They did not create universal recognition of Russian insurance; they converted specified policies into usable coverage within a major destination jurisdiction for a defined period.

The same logic applies to tanker capacity. The relevant capability is not the number of vessels owned by the Russian state but the carrying capacity that exporters can charter, manage, document, insure or guarantee, load, discharge, and reuse. "Shadow fleet" estimates cannot be treated as directly comparable because they apply different criteria, including non-coalition insurance, opaque ownership, flags of convenience, tracking practices, or prior participation in sanctioned trade.

KSE Institute data nevertheless illustrate the fleet's heterogeneous structure. In February 2026, 109 unique tankers carried Russian crude oil, of which KSE classified 72 per cent as shadow-fleet vessels. A further 174 tankers carried petroleum products, with 37 per cent classified

in the same category. The Russian flag's share of shadow-fleet transport volume rose from 3 per cent in May 2025 to 21 per cent in February 2026, while foreign flags remained significant. KSE also identified at least 33 shadow-fleet tankers covered by five Russian insurers (KSE Institute, 2026).

These observations indicate growing Russian institutional involvement without demonstrating state ownership or control of the entire operating pool. Foreign-owned or foreign-registered vessels contributed to Russian export capacity where exporters possessed effective contractual access and the necessary ports, insurers, registries, and buyers accepted the arrangement. Conversely, a Russian-owned vessel did not constitute effective capacity if complementary rights or recognition were absent.

Coalition designations and service restrictions reduced vessel choice and raised compliance, insurance, and reorganisation costs. Their system-level effect, however, depended on whether designated capacity could be replaced within the shipment interval. Acquisition, chartering, reflagging, management changes, alternative coverage, and destination acceptance formed the countervailing process.

The evidence supports a bounded conclusion: Russian exporters and their partners assembled sufficiently adaptable insurance and tanker arrangements to prevent withdrawal of Western services and vessel designations from producing sustained aggregate interruption during the observed period. This capacity remained costly and externally dependent on second-hand vessel markets, foreign registries, ports, repair facilities, buyers, maritime passages, and

politically contingent recognition. It constituted distributed relational capacity rather than an autonomous Russian fleet and insurance system.

5.3 Hybrid Transactions and Conditional Value Realisation

Reconfiguration did not divide the oil market into autonomous coalition and non-coalition systems. It produced partial institutional bifurcation with a substantial hybrid middle. Some transactions continued to rely principally on coalition shipping, insurance, finance, and price-cap documentation. Others combined alternative insurance, third-country traders, mixed correspondent banking, or reorganised contracts with selected coalition-linked services. A further group operated mainly through non-coalition vessels, insurers, banks, currencies, and contractual arrangements.

These are analytical configurations rather than separate markets or permanent classifications of vessels and firms. Transactions could combine elements from several configurations, while assets and counterparties could move between them as sanctions status, documentation, insurance, prices, and commercial incentives changed. Transactions outside coalition services were also not necessarily unlawful: legal status depended on the actors, services, and jurisdictions involved rather than simply on the use of non-Western vessels, currencies, or banks.

The configurations remained connected through benchmark prices, refinery demand, freight markets, tanker availability, maritime chokepoints, and competition for physical supply. Bifurcation was therefore operational and jurisdictional, not a separation into independent

petroleum markets. It concerned which combination of rights, services, documentation, and external acceptance made a transaction executable.

Sanctions continued to raise freight, compliance, insurance, settlement, and maritime risks. Once alternative protocols became operational, however, their effects increasingly took the form of higher costs, selective capacity removal, and possible value compression rather than automatic exclusion. Compression was not inevitable: increased transaction costs could coexist with higher destination prices when scarcity, route disruption, crude quality, or buyer competition increased the value of deliverable Russian petroleum.

September 2026 price assessments illustrate this conditional outcome. Argus data reported by *Kommersant* assessed ESPO delivered to Shandong at USD 117.11 per barrel in the week ending 13 September, a USD 12.50 premium to ICE Brent futures. Urals delivered to Shandong carried a reported premium of approximately USD 6, while Urals delivered to India carried a premium of approximately USD 2.25 to Dated Brent (*Kommersant*, 2026). Reuters subsequently reported ESPO above USD 120 during volatile mid-September conditions (Reuters, 2026).

These assessments cannot be interpreted as a pure reliability premium. They concern different grades, destinations, dates, delivery bases, and benchmarks. ESPO's quality and comparatively short Kozmino–China route differ from Urals, while delivered prices incorporate freight and destination costs absent from Russian-port free-on-board assessments. The premium therefore reflected an inseparable combination of grade, location, freight, scarcity, delivery timing, transaction risk, and benchmark construction.

The price evidence nevertheless shows that sanctions status alone did not determine commercial value. An operational Kozmino–China corridor gained value when competing supplies and routes became less reliable. Transactional reconfiguration made delivery possible; external scarcity increased the value of that deliverability.

Quantity evidence further demonstrates the unevenness of continuity. Russian seaborne crude exports fell by 12 per cent month on month in August 2026 to approximately 3.84 million barrels per day, although they remained 12 per cent above their August 2025 level. Exports to China increased by 9 per cent from July to approximately 980,000 barrels per day but remained 17 per cent below their year-earlier level (Washington & Griffin, 2026). The aggregate decline demonstrates operational stress, while the increase toward China is consistent with redistribution toward an operational corridor. Neither change can be attributed exclusively to sanctions or treated as proof of deliberate prioritisation.

The evidence therefore supports a bounded interpretation. Reconstructed Russian–Chinese relations continued to deliver crude, and particular grades realised destination premiums under scarcity. These findings do not show that sanctions costs disappeared, that all corridors possessed equivalent capacity, or that the premium measured Russian state capability. They show that sanctions-related costs could be temporarily outweighed at particular destinations by the value of timely access to physical supply.

Price and destination data establish corridor operation and conditional value realisation more directly than aggregate reproducibility. The latter requires combined evidence from repeated shipments, replacement capacity, monetisation, and subsequent operation.

5.4 Principal Finding: Reproduced Function under Pressure

The evidence supports a narrower conclusion than the binary claim that sanctions either "worked" or "failed." Between December 2022 and 20 September 2026, sanctions constrained vessels, insurers, maritime services, buyers, payment channels, and destination markets. They increased costs, altered routes, narrowed access to recognised services, and periodically compressed commercial and fiscal value, but did not produce sustained interruption of Russia's aggregate petroleum-export function.

Russian and associated commercial actors preserved substantial export capacity through alternative vessels, insurance or guarantees, port recognition, intermediaries, destinations, contracts, and settlement arrangements. The principal finding is therefore:

Russia maintained a reproducible petroleum-export function because alternative combinations of assets, guarantees, counterparties, and transaction channels became operational rapidly enough to sustain delivery and monetisation across successive cycles.

This is a configurational inference rather than a claim that every transaction stage is observable. Evidence is strongest for loading, transport, destination change, discharge, and repeated route use; settlement remains less transparent. Continuing trade and petroleum-related

fiscal receipts are consistent with aggregate monetisation and fiscal capture but cannot be linked to particular cargoes.

The outcome is best classified as **reproduced continuity under operational pressure and variable value compression**. Continuity was uneven because individual vessels, transactions, and corridors were interrupted while aggregate capacity persisted. It was also relationally co-produced: reconstructed arrangements required acceptance by foreign shipowners, ports, insurers, banks, traders, refiners, and authorities. Reconfiguration relocated rather than eliminated dependence, increasing reliance on concentrated buyers and politically contingent intermediaries. Continued delivery also did not imply unchanged welfare, since higher transaction costs could reduce net value even when volumes persisted.

The resulting structure was a **partially parallel and hybrid export operating system**. Some functions moved outside coalition-controlled institutions, while others remained dependent on foreign demand, circulating vessels, intermediary jurisdictions, and selected Western-linked services.

During the observed period, replacement became operational before capacity losses exhausted the buffers sustaining the aggregate circuit. This conclusion is bounded by scale and time: it demonstrates functional reproduction under observed conditions, not continuity of every transaction or permanent resilience against future restrictions.

6. Discussion: Transactional Reconfiguration and Uneven Continuity

The findings shift attention from sanctioned units to the functions they perform. Removing a vessel, insurer, bank, trader, or buyer does not necessarily eliminate carriage, risk allocation, settlement, intermediation, or purchasing capacity. Component exclusion becomes functional interruption when an operationally sufficient substitute cannot be constituted within the relevant adjustment interval.

In Russia, sanctions increased costs, redistributed risks, altered destinations, and constrained established services without producing sustained aggregate export interruption during the observed period. The outcome depended on enforcement reach, replacement time, buffers, and external acceptance.

6.1 Network Power, Policy Design, and the Replacement Constraint

Energy sanctions pursue different objectives through import prohibitions, entity and vessel designations, and restrictions on maritime and financial services. The G7 price cap explicitly sought to preserve global petroleum supply while reducing Russian revenue. Coalition services remained available for sales at or below the applicable cap under required compliance procedures (U.S. Department of the Treasury, 2022; Van Nostrand & Morris, 2024).

The cap sought to separate material circulation from exporter value capture. Exporters could comply or assemble alternative shipping, insurance, finance, documentation, and contracts. Its leverage depended on alternatives remaining more costly, limited, or unreliable than

compliance. As exporters gained effective access to non-coalition arrangements, transactions became less dependent on covered services, limiting the cap's operational reach.

This qualifies weaponised-interdependence theory. Network centrality enables surveillance, exclusion, and cost imposition (Farrell & Newman, 2019), but durable leverage depends on continued functional indispensability. Centrality within an original configuration does not guarantee control over functions transferable to externally accepted, sufficiently scalable alternatives.

Energy sanctions also face a material replacement constraint. Alternative petroleum must be available in sufficient volumes and compatible grades, supported by usable routes, insurance, and finance, and delivered within importers' operating intervals. Scarcity, incompatible infrastructure, or maritime disruption raises the cost of rejecting Russian supply and encourages acceptance of reconstructed protocols.

Two limits therefore matter: the price cap's deliberate preservation of supply and the structural difficulty of replacing a major supplier without imposing substantial adjustment costs on importers.

Export patterns are consistent with these limits. Russian crude and condensate exports declined from approximately 4.8 million barrels per day in 2024 to 4.3 million in the first half of 2025. Europe's share fell from 51 per cent in 2020 to 12 per cent in 2024, while Asia and Oceania received 81 per cent (U.S. Energy Information Administration, 2025). These figures indicate pressure and geographical reorientation more clearly than removal from global circulation.

Sanctions increased the value of existing alternatives and accelerated their integration, relocating rather than eliminating dependence. The theoretical implication is:

Network-based coercive leverage weakens when a constrained function can be reconstructed outside the controlled network, obtains sufficient external acceptance, and becomes operational before available buffers and adjustment time are exhausted.

Sanctions may still remove assets, impose costs, and compress value, but exclusion becomes less readily convertible into sustained functional interruption.

Transactional reconfiguration extends beyond evasion to include lawful transactions outside coalition jurisdiction, recognised alternative insurance, currencies, guarantees, destinations, and contracts. Functional reproduction, legal compliance, and external acceptance remain separate analytical questions.

Currency substitution likewise need not express ideological de-dollarisation. Firms may switch currencies because established channels cannot execute necessary transactions at acceptable cost and risk. Substitution becomes institutional change when repeated use generates usable liquidity and supports subsequent cycles; de-dollarisation may emerge without being participants' initial objective.

Repeated restrictions may consequently increase the expected cost of network dependence and encourage investment in alternatives. Established systems retain advantages in liquidity, enforceability, expertise, scale, and recognition, while substitutes may remain fragmented, expensive, opaque, or politically vulnerable.

Transactional reconfiguration thus identifies a conditional endogenous limit of network coercion: sanctions can change the structures and incentives on which their leverage depends. That limit becomes operational when externally accepted, sufficiently scalable substitutes become usable before the constrained function's viable interval expires. Russia's adaptation partially relocated the institutional conditions of petroleum circulation while leaving substantial Western network power and external dependence intact.

6.2 State Capability and External Operational Acceptance

Russia's continued exports do not demonstrate immunity from sanctions. Higher freight costs, longer routes, buyer concentration, insurance uncertainty, payment delays, and discounting establish operational pressure and, where net usable value declined, value compression. They do not by themselves establish functional interruption.

The relevant state capability was not ownership of every asset in the export chain. It was the capacity to help transform heterogeneous public, private, domestic, and foreign resources into an operational configuration capable of performing functions formerly supplied through Western-centred institutions. Public authority could enable private or foreign assets through regulation, guarantees, diplomatic coordination, export and currency rules, infrastructure, finance, and risk absorption.

This capability was nevertheless relational rather than unilateral. A vessel became effective capacity only when it could be chartered, documented, insured or guaranteed, loaded, discharged, and reused. Coverage became operational only when relevant ports, buyers, and

authorities accepted it, while settlement required participating banks and jurisdictions to process the transaction. Domestic coordination was therefore completed through external operational acceptance.

Three stages can be distinguished:

state enabling → operational constitution → external acceptance

State enabling comprises public authorisation, coordination, finance, guarantees, or risk absorption. **Operational constitution** occurs when assets, rights, contracts, coverage, and settlement arrangements are assembled and activated. **External acceptance** occurs when foreign counterparties and authorities permit the configuration to complete and repeat its function.

These stages clarify attribution. State enabling without operational constitution represents latent capability; an assembled configuration without external acceptance remains incomplete. Conversely, adaptation generated entirely through private commercial action may preserve exports without demonstrating state capability. Attribution therefore requires evidence connecting public intervention to a configuration that became externally usable within the viable interval.

Complete transaction-level visibility is not always possible. Port entry, loading, discharge, repeated route use, continuing buyer relations, and aggregate monetisation can provide operational traces, but they do not reveal every ownership, insurance, or payment relationship. Confidence increases when evidence independently corroborates several stages.

Legal measures formed part of state enabling but were not the material content of continuity. Law could authorise guarantees, alter settlement rules, regulate export proceeds, and

redistribute authority or risk. It could not independently transport, sell, discharge, or settle petroleum. Its causal importance lay in making alternative arrangements permissible, enforceable, financeable, or credible.

Russian state capability was consequently coordinated domestically but **relationally completed across jurisdictions**. This avoids reducing capability either to state ownership or to commercial adaptation without public authority. It also explains why the resulting structure remained partially parallel and hybrid rather than autonomous.

State capability under sanctions exists when public authority helps convert dispersed resources into an operational configuration that receives sufficient external acceptance to reproduce a critical function within its viable interval.

Its limits arise when external acceptance is withdrawn, substitutes cannot reach sufficient scale, replacement becomes operational too late, or the cost of maintaining the configuration exhausts the value required for subsequent reproduction.

6.3 Uneven Reconfiguration and Cost Distribution

The European Union provides a structured contrast rather than a second case. Russia had to reconstruct outward market access after losing established services and destinations, whereas the EU retained Western-centred transaction institutions but had to replace an established supplier. Russia's share of EU oil imports fell from 25.8 per cent in 2021 to 2.2 per cent in 2025, with increased imports from the United States, Norway, Kazakhstan, and other suppliers compensating

for much of the reduction (Council of the European Union, 2026b). The EU therefore demonstrated substantial aggregate replacement capacity.

The two sides required different capabilities. Russia possessed petroleum and export infrastructure but needed alternative vessels, insurance, buyers, and settlement channels. EU purchasers possessed finance but depended on compatible petroleum, transport, routes, storage, and delivery becoming available in time.

Aggregate European success concealed internal inequality. Member states differed in pipeline geography, port access, refinery configuration, storage, and capacity to absorb higher prices. Temporary exemptions for pipeline crude imports by states with specific geographical dependence and no viable alternatives made these differences legally visible (Council of the European Union, 2026a). Both sides therefore relocated rather than eliminated dependence: Russia relied more heavily on Asian demand and non-coalition intermediaries, while the EU became more dependent on alternative exporters and extended import logistics.

This comparison defines uneven continuity: an aggregate function may be reproduced while constituent actors experience interruption, higher costs, or longer adjustment. The initial payer of an adjustment cost need not bear its final incidence, and states possess unequal capacities to absorb, transfer, or defer such burdens.

The United States occupied a comparatively advantageous position because record crude production of 13.6 million barrels per day in 2025, inventories, fiscal capacity, and regulatory flexibility provided broader adjustment options than those available to import-dependent

economies (U.S. Energy Information Administration, 2026a, 2026b). This did not confer energy autonomy but increased its capacity to sustain policy while some costs appeared abroad through compliance, repricing, rerouting, insurance, and finance. Such externalisation is structural rather than necessarily intentional and remains limited by coalition cohesion, inflation, and incentives to develop alternative institutions.

Scope Implication: Continuity without Developmental Reproduction

For energy-importing developing economies, continued production may coexist with weakened development when higher energy and transaction costs divert resources from investment and technological upgrading. This constitutes continuity without developmental reproduction: present operations are preserved through adjustments that erode capabilities required for later development. Thailand and Vietnam illustrate possible fiscal and domestic-value-retention channels but are neither additional cases nor established findings. Testing this proposition requires a separate design tracing external costs through domestic prices, institutional incidence, investment, and subsequent productive capability.

6.4 Theoretical Implications

The findings contribute in four respects. First, they distinguish the **unit subjected to coercion** from the **function whose interruption constitutes the systemic outcome**. Control over a vessel, bank, insurer, or other node produces functional control only when its service cannot be transferred to another executable configuration.

Second, sanctions may catalyse **transactional reconfiguration** by increasing the value of alternative vessels, guarantees, currencies, jurisdictions, counterparties, and settlement channels. This is a potential endogenous limit of weaponised interdependence, but only when the alternative configuration is operationally sufficient, externally accepted, and repeatable.

Third, the analysis introduces time into restriction and substitution. Sustained interruption becomes likely when effective capacity is removed faster than replacement becomes operational and the deficit persists beyond available buffers and the function's viable interval. Later recovery cannot erase an interruption already incurred.

Fourth, sanctions operate across a **relational distributional field**. Exporters, coalition members, importers, intermediaries, firms, governments, and consumers possess unequal capacities to absorb, transfer, or defer costs. Continuity in one part of the circuit may therefore depend on risks or resource losses absorbed elsewhere.

Energy sanctions consequently initiate a contest over who can reconstruct the transaction protocol, whose recognition makes it operational, whether it becomes repeatable in time, and where its costs ultimately fall. This framework replaces a binary judgment of success with analysis of component restriction, functional interruption, timely reproduction, and the unequal incidence of continuity.

7. Conclusion

Evidence from December 2022 to 20 September 2026 supports a finding of **reproduced material-commercial continuity under operational pressure and variable value compression**. Sanctions constrained vessels, insurers, financial channels, counterparties, and destination markets; increased transport and transaction costs; and interrupted particular transactions and corridors. They did not, however, produce sustained interruption of Russia's aggregate petroleum-export function during the observed period.

Russia preserved this function by reconstructing the institutional conditions of transport, delivery, monetisation, and subsequent operation. Reproduction did not require restoration of the original network or Russian ownership of every participating asset. It required timely access to usable vessels, accepted liability arrangements, willing buyers, ports, executable contracts, and settlement channels. Aggregate trade and fiscal evidence corroborates continuing monetisation of substantial exported volumes, although it does not establish settlement of every cargo.

Russian state capability operated through regulation, guarantees, diplomatic coordination, export and currency rules, infrastructure, and risk absorption. Yet state action was insufficient by itself. Foreign shipowners, ports, insurers, traders, banks, refiners, registries, and public authorities supplied the external acceptance required to make reconstructed transactions executable. Continuity was therefore state-enabled but relationally co-produced.

The resulting structure was neither an unchanged continuation of pre-sanctions trade nor an autonomous Russian alternative. It was a **partially parallel and hybrid export operating**

structure that reduced reliance on particular coalition-controlled services while retaining dependence on foreign demand, third-country jurisdictions, internationally circulating vessels, and world petroleum markets.

The article makes three contributions. First, it distinguishes the component targeted by sanctions from the function expected to disappear. Restricting a vessel, insurer, bank, or buyer produces systemic interruption only when the associated function cannot be transferred to another operational configuration.

Second, it conceptualises **transactional reconfiguration** as the time-bounded recombination of effective rights, accessible assets, guarantees, counterparties, jurisdictions, and settlement arrangements. Sustained interruption becomes likely when enforcement removes effective capacity faster than replacement becomes operational and the resulting deficit persists beyond available buffers and the function's viable interval.

Third, it shows that continuity is relational and distributionally unequal. Replacement capacity depends on external acceptance, while its costs and risks are distributed among exporters, governments, intermediaries, importing states, firms, and consumers. Aggregate continuity therefore does not imply unchanged welfare or uninterrupted operation at every component or corridor.

The Russian case demonstrates operational pressure, variable value compression, and interruption at particular scales, but not sustained aggregate interruption. Nor does continued export establish permanent resilience. Concentrated buyers, politically contingent intermediaries,

constrained insurance and settlement, and future coordinated restrictions could alter the balance between capacity removal and replacement.

The study remains limited by its focus on petroleum exports, opacity surrounding ownership and settlement, and an observation period ending on 20 September 2026. Within these limits, its central conclusion is that continuity under sanctions is an institutionally produced outcome: it depends on whether effective operational rights and complementary transaction arrangements can be reconstructed, externally accepted, and repeated before the available adjustment interval expires—and on which actors absorb the costs of doing so.

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