How Much Oil Trade Can We Really Track? Reconciling Customs and Shipping Records

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Many organizations, including governments, central banks, international organizations, and firms, rely on international trade statistics. However, these statistics do not always provide an accurate picture of trade flows. One example is the flow of oil from Russia, one of the world's largest crude exporters. Two months after invading Ukraine in 2022, Russia restricted access to all its foreign trade statistics, including exports and imports (Carnegie Endowment, 2022). As a result, policymakers face uncertainty about the movement of one of the world's most strategically important commodities.

The proposed paper has three objectives aimed at understanding the state of data on oil flows, which will inform our fourth objective, to provide a policy discussion around data gaps:

Objective 1: We will document the reported oil trade in UN Comtrade and World Bank's World Integrated Trade Solution (WITS), two commonly used sources of data on bilateral trade. Following Fisman and Wei (2004), we will compare reported exports to what a partner country reports for imports. We will measure discrepancies in crude oil and changes around 2022.

Objective 2: We will describe methods that use vessel tracking data from the Automatic Identification System (AIS) to fill the gaps in the customs data. For example, the KSE Institute publishes a monthly Russian Shadow Fleet Tracker that combines Kpler tanker-tracking data to estimate Russian seaborne oil exports (Dodonov et al, 2026). AIS messages report position, speed, and heading, along with draft and destination entered manually by the crew. We will summarize the different methods used to infer oil quantities from these data (e.g., Fernández-Villaverde et al., 2025, assume each tanker is loaded to capacity, and commercial providers infer volumes from changes in reported draft after departure, with historical averages for each terminal, Kpler, 2022).

Objective 3: Because AIS-based estimates depend on signal accuracy, we will describe existing methods to detect falsified signals. Vessels may disable their transponders ("go dark") or

broadcast false positions or identities ("spoof"). Researchers have used various methods to detect these behaviors, which we will test on a dataset on AIS positions, with more than 82 million observations on 27,103 vessels in the Arctic from August 2021 to July 2026. We will then extend the methods to the Baltic, Black Sea, and Pacific terminals that handle most Russian seaborne crude exports.

Objective 4: After describing the current state of data on oil flows, we will describe the state of regulations around reporting seaborne transport of oil. The International Convention for the Safety of Life at Sea requires tankers on international voyages to operate AIS, but enforcement rests primarily with flag states, which for many shadow fleet tankers are flags of convenience or fraudulent registries. We will describe the consequences when ships are found falsifying AIS signals. We will describe current sanctions on individual ships. And then we will discuss policy options that could help remedy the missing data, for both oil flows and ship locations.

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Acknowledgement: We have funding from Canada's Social Sciences and Humanities Research Council.