



Degree Program in Economics & Business

Course of Accounting

Volumes Held, Margins Lost:
Firm-Level Financial Consequences of the 2022 EU and
G7 Oil Sanctions on Russian Energy Firms

Prof. Luo Jianchuan

Supervisor

Anastasiia Safonova (Mat.: 304131)

Candidate

Academic Year: 2025/26

Abstract

This study examines whether the 2022 EU embargo and G7 price cap on Russian oil exports imposed a measurable differential financial effect on targeted firms relative to domestic non-oil firms and international oil companies. Focusing on revenue and receivables scaled by total assets and on gross and net profit margin ratios, the analysis finds that Russian oil firms exhibited revenue growth, suggesting adaptation through trade rerouting rather than volume collapse, accumulated higher receivables, consistent with sanctions-induced disruption to payment infrastructure, and experienced a compression in gross and net profitability. These results are robust across five model specifications and alternative estimation techniques. The findings suggest that the sanctions operated primarily through a profitability channel rather than through a direct disruption of volumes.

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1. Introduction

The 2022 sanctions on Russian oil and gas exports represent unusually coordinated and technically specific economic statecraft in recent decades. Designed to constrain Russia's fiscal capacity amid geopolitical conflict, the measures—including the European Union's embargo on seaborne crude oil, the G7-led price cap mechanism, and restrictions on refined petroleum products—were implemented with the explicit aim of curtailing export revenues—contributing approximately 28–45% of federal budget revenues depending on the year and oil price level (International Energy Agency 2022)—while preserving global energy market stability.

The macro-level dynamics of this policy have been documented in a growing body of empirical work (Babina et al. (2023) on diverted trade flows; Kilian, Rapson, and Schipper (2025) on the Urals-Brent discount; and Spiro, Wachtmeister, and Gars (2025) on shadow fleet growth). Whether these shocks translated into measurable financial deterioration of the directly targeted firms, however, remains less well explored. This paper examines through which financial channels—volume or profitability—the sanctions affected Russian energy sector companies.

The paper compares the post-2022 financial trajectories of Russian oil and gas companies against two control groups: Russian non-oil domestic firms and international oil companies. Using statutory financial statement data from Russian RSBUs and Compustat Global spanning 2011–2025, it analyses four deflated performance indicators: revenue, receivables, and gross and net profit margins. Results indicate that Russian oil firms exhibited an increase in revenue, reflecting ruble depreciation and successful trade rerouting to Asian markets rather than a contraction in activity, alongside an increase in receivables, consistent with the price cap mechanism and sanctions-induced payment frictions, and a relative compression of gross profit margins by approximately 20 percentage points and of net profit margins by approximately 14 percentage points.

The remainder of this paper is structured as follows. Section 2 provides background, existing literature overview, and hypotheses development. Section 3 describes the data sources, sample construction, variable definitions, and identification strategy. Section 4 presents the main regression

results across four outcome variables and discusses the findings. Section 5 reports robustness checks: Section 5.1 presents univariate paired t-tests and first-difference regressions for the 2021–2022 transition window; Section 5.2 tests robustness to alternative fixed effects structures; and Section 5.3 reports weighted least squares estimation. Section 6 provides the conclusion.

2. Background and Literature

2.1 Background

This section provides the institutional context for the sanctions regime examined in this paper, tracing the political motivation for the measures and their key implementation milestones.

Russia's full-scale invasion of Ukraine in February 2022 prompted an immediate and far-reaching policy response from Western governments. For the European Union in particular, the invasion created a dual imperative: to punish Russia economically for the military aggression, and to accelerate long-standing ambitions to reduce strategic dependence on Russian energy.

The European Commission adopted the REPowerEU Plan on 18 May 2022. This communication outlined a comprehensive strategy to end the EU's dependence on Russian fossil fuels "well before 2030" through energy savings, supply diversification, and accelerated renewable deployment (EC 2022). While not a sanction per se, this plan signaled a decisive political commitment to sever energy ties with Russia and established the context for the immediate restrictive measures that followed.

The first concrete trade restriction was enacted on 3 June 2022, with the adoption of the EU's sixth sanctions package. Council Regulation (EU) 2022/879 formally prohibited "the purchase, import or transfer, directly or indirectly, of crude oil or petroleum products. . . if they originate in Russia or are exported from Russia" (Council of the European Union 2022c). To allow for market adjustment, the regulation included a wind-down period, permitting the execution of pre-existing contracts for crude oil until 5 December 2022 and for refined petroleum products until 5 February 2023.

The scope of the sanctions was fundamentally expanded on 2 September 2022, when the G7 Finance Ministers announced their joint political intention to implement a novel "price cap" mechanism for Russian oil (G7 Foreign Ministers 2022). This policy innovation aimed to curb Russia's export revenues while maintaining the flow of oil to global markets, thereby mitigating price volatility. In late September, this energy confrontation also acquired a critical infrastructure

dimension.

On 26 September 2022, a series of unexplained explosions and gas leaks damaged the Nord Stream 1 and Nord Stream 2 pipelines—an event that materially shaped the strategic and political environment in which the 2022 energy sanctions were designed and enforced. In its subsequent public statement, the EU described the incident as “deliberate” disruption of European energy infrastructure and emphasized that any intentional damage to critical energy networks was “utterly unacceptable” and would trigger a “robust and united response”, while underlining the need to strengthen the resilience and security of energy supply. For Russia, the destruction of the pipelines eliminated the ability to modulate gas supply volumes. The Nord Stream incident thus marks an escalation from market and regulatory instruments to heightened concerns about physical infrastructure risk, reinforcing the EU’s broader policy logic of reducing exposure to Russian energy and tightening coordination on energy security alongside the embargo and price-cap regime.

Against this backdrop, the legal groundwork for this cap within the EU framework was established on 6 October 2022 by Council Decision (CFSP) 2022/1909, which created an exemption from the EU’s ban on maritime services for cargoes sold at or below a pre-established price (Council of the European Union 2022a).

The sanctions framework reached its full operational form in early December 2022. On 2 December, the G7 and Australia formally agreed to set the price cap for seaborne Russian-origin crude oil at 60 USD per barrel (Federal Foreign Office 2022). This agreement was codified into EU law the following day by Council Regulation (EU) 2022/2367 (Council of the European Union 2022b). Consequently, on 5 December 2022, both the full EU embargo on seaborne Russian crude and the G7/EU price cap mechanism simultaneously entered into force. A similar cap on refined petroleum products followed on 5 February 2023.

A further consequence of the February 2022 sanctions wave was the rapid withdrawal of Russian firms from international capital markets. The suspension of IFRS reporting obligations and the delisting of Russian depositary receipts from Western exchanges meant that international financial databases lost coverage of Russian firms precisely at the moment of treatment, creating a systematic

data gap from fiscal year 2022 onwards.

This sequence creates two distinct phases for empirical analysis: a pre-treatment period covering fiscal years up to and including 2021, and a post-treatment period covering fiscal years from 2022 onwards. Russia's invasion of Ukraine in February 2022 triggered immediate anticipatory adjustments in export routes, counterparty relationships, and working capital positions well before the embargo's formal entry into force in December 2022, meaning the sanctions shock was already transmitting to annual financial statements throughout the year. Furthermore, for firms whose fiscal years do not end on 31 December, a fiscal year coded as 2022 may span up to March 2023, capturing the onset of the shock; assigning such observations to the baseline period would misclassify the most acute phase of the disruption.

With this institutional timeline established, the following section situates the 2022 measures within the broader sanctions literature and develops the empirical hypotheses.

2.2 Existing Literature and Hypotheses Development

Literature Review. The effectiveness of economic sanctions has long been debated in international relations and political economy. The foundational debate in that literature centres on whether sanctions achieve their stated political objectives: Hufbauer, Schott, and Elliott (1990) argue, across a comprehensive dataset of post-World War I cases, that sanctions succeed in roughly a third of episodes when carefully designed and targeted, while Pape (1997) challenges this conclusion, contending that the historical success rate is far lower once military pressure and other confounding factors are controlled for. Drezner (2003) reconciles these positions through a game-theory framework, arguing that successful coercion episodes are systematically undercounted because compliant targets tend to concede before formal sanctions are imposed.

Recent scholarship on the 2022 sanctions against Russian oil and gas exports has shifted focus from macro-level geopolitical outcomes toward more granular analyses of trade dynamics, market adaptation, and firm-level financial transmission. A substantial body of work has examined the immediate trade and price consequences of the 2022 sanctions. Babina et al. (2023) document that

Russia successfully redirected seaborne crude volumes from Europe to Asia, notably India and China, averting a collapse in export volumes. However, this rerouting triggered market fragmentation, with Urals crude from Baltic and Black Sea ports facing steep discounts relative to Brent, while ESPO crude from Pacific ports traded closer to global benchmarks. The authors attribute a 29% quarter-on-quarter decline in Russian oil revenues in early 2023 primarily to the EU embargo, which strengthened buyer monopsony power in new markets. This finding is echoed by Kilian, Rapson, and Schipper (2025), who estimate that the embargo accounted for roughly half of the observed Urals discount through elevated transport costs and enhanced buyer power in segmented markets. Similarly, Spiro, Wachtmeister, and Gars (2025) conclude that the embargo imposed sustained revenue losses via buyer discounts and rerouting costs, whereas the G7 price cap functioned more as a partial transport embargo than a binding price ceiling—a distinction that matters for interpreting firm-level margin outcomes.

Situating these trade-flow findings within a broader macroeconomic framework, Afontsev (2026) identifies three structural factors underpinning Russia’s resilience under the sanctions regime: the scale of the Russian economy, the flexibility of external economic linkages—manifested in the rapid geographical reorientation of trade flows—and the quality of domestic economic policy coordination. This framework provides important context for the firm-level evidence presented here: the same macro-level flexibility that prevented an aggregate trade collapse is precisely what sustained top-line revenues at the firm level, while the cost of executing that flexibility was borne in per-unit profitability—the channel this study identifies as the primary transmission mechanism.

This macro-level picture of redirected trade and discounted prices is directly reflected in the operational reality of Russian producers. Lukoil’s 2022 annual report acknowledges this dynamic explicitly, noting that despite a significant widening of the spread between Urals and Brent due to supply restrictions, the average Urals price still increased nominally year-on-year. However, the report adds a critical layer of fiscal nuance, stating that “the net price of Urals crude (after mineral extraction tax and export duty) fell by 8.1% versus 2021” (Lukoil 2022). This distinction between gross and net realizations underscores a channel of financial pressure that aggregate trade data do

not capture: the wedge created by sanctions is mediated not only by discounted export prices but also by Russia's domestic fiscal instruments, which can amplify or cushion the shock at the firm level. The perspective from the international side is equally instructive. ConocoPhillips, in its 2023 annual report, directly attributes the moderation of global oil prices to Russia's adaptation, noting that "prices were lower through 2023 as Russia's ability to redirect crude oil to destinations outside the EU more than offset OPEC Plus crude oil supply curbs" (ConocoPhillips 2023). This acknowledgement by a major international producer validates the view that while Russia avoided an export collapse, the financial terms of the redirected trade were less favourable—exactly the mechanism the present analysis seeks to trace to individual firms.

A second stream of literature investigates Russia's capacity to circumvent sanctions, particularly through the development of a "shadow fleet" and reliance on non-coalition intermediaries. Babina et al. (2023) note weak initial enforcement of the price cap, especially for ESPO crude, where over 95% of transactions in the initial enforcement period exceeded the cap yet often still used Western-insured tankers. Cardoso, Salant, and Daubanes (2025) model the dynamic expansion of the shadow fleet and present a counterintuitive argument: tightening price caps or enhancing enforcement can paradoxically increase Russia's discounted profit stream by accelerating investment in evasion capacity. In a specific structural model, they find that the profit-minimizing cap may lie closer to \$69.35 rather than the implemented \$60, challenging the policy logic of continual cap reduction. This contrasts with Wolfram, Johnson, and Rachel (2022), who emphasize the structural leverage of Western maritime services and argue that evasion remains constrained by the essential role of coalition insurance and shipping. These divergent theoretical predictions underscore that the sanctions' financial effectiveness cannot be assessed from trade-flow data alone—the net cost that evasion ultimately imposed on Russian producers is an empirical question that requires firm-level financial evidence.

The complex, cross-border dimension of this risk is illustrated by firm-level disclosures from international companies with indirect exposure. ExxonMobil's 2022 SEC filings regarding its Kazakhstan operations via the Caspian Pipeline Consortium (CPC) describe a secondary sanction

risk where critical transport infrastructure traversing Russian territory could be disrupted, threatening “a loss of cash flows of uncertain duration“ for energy assets not located in Russia (ExxonMobil 2022). This demonstrates that international oil firms are not straightforward beneficiaries of the supply shift away from Russian producers—indirect exposure through shared infrastructure introduced compliance uncertainty and operational risk that could offset or even reverse any competitive gains from redirected demand.

Huynh, Hoang, and Ongena (2025) find, in a study covering sanctions on Russia over the period 2000–2019, that prior sanctions regimes left energy firm performance largely unaffected while undermining performance in non-energy sectors, with political connections and China reorientation serving as mitigating factors. Crucially, their sample predates the 2022 oil and gas measures by design, and the authors are explicit that their results may not generalise to the qualitatively different regime of sector-specific export restrictions combined with a seaborne crude embargo and price cap mechanism. Whether the 2022 sanctions break from this prior pattern is what remains to be tested empirically. Two further studies question the broader effectiveness of the sanctions regime: Mamonov and Pestova (2022) use high-frequency sovereign bond yields to identify macroeconomic effects, and Fouad (2024) synthesizes secondary data to argue that the sanctions may not have inflicted sufficient economic pain to alter Russian policy behaviour.

While macro-trade analyses are well developed, firm-level evidence remains sparse and methodologically varied. Several studies examine Russian corporate responses to sanctions but focus on specific dimensions rather than financial performance. For instance, Fedyunina et al. (2025), in their firm-level analysis of Russian manufacturing firms in 2022, found that import-reliant firms with access to Chinese suppliers exhibited higher revenue growth, suggesting that reorientation mitigated sanction shocks. Another study of Russian energy firms’ inventory behavior conducted by Duong, Huynh, and Nguyen (2025) shows that sanctioned firms held significantly higher inventory levels as a buffer against market disruptions. Nguyen, Ngo, and Nguyen (2024) examined stock returns of energy firms in sanctioning countries and reported short-term positive effects that fade after roughly 90 days.

A related body of work uses equity market event-study methods to measure the financial impact of sanctions announcements on targeted firms. Ahn and Ludema (2020) examine the effect of financial sanctions on publicly traded Iranian firms over 2011–2016 and find lasting negative effects on profitability ratios and decreased leverage among targeted firms—a pattern broadly consistent with the accounting-based results reported here, identified through a different methodology and institutional context.

The literature reveals several tensions. First, there is disagreement on the primary driver of Russian revenue losses: Babina et al. (2023) and Kilian, Rapson, and Schipper (2025) emphasize the embargo’s role, while Cardoso, Salant, and Daubanes (2025) highlight the complex, sometimes perverse, interactions between cap levels, enforcement, and shadow fleet expansion. Second, firm-level studies present mixed evidence on whether energy firms are more resilient or more vulnerable than non-energy firms, partly due to differing time frames and methodological approaches.

Collectively, these studies provide an understanding of the sanctions’ macro-trade effects and adaptive responses, yet leave relatively unexplored the question of whether the relative financial pain intended by the sanctions’ architects materializes. This study seeks to contribute to this discussion by quantifying selected series of financial metrics to test whether the sanctions created a measurable and statistically identifiable differential in financial performance.

Hypotheses. The central research question is whether the 2022 sanctions imposed a measurable differential financial effect on Russian oil firms relative to the control group. I formalise this as a set of one-sided tests derived from the sanctions transmission channels discussed above.

H_0 : The 2022 sanctions had no differential effect on the revenue, receivables, or profitability ratios of Russian oil firms relative to the control groups.

H_1 : The sanctions imposed a negative differential shock on Russian oil firm profitability and revenue, and a positive differential shock on receivables. Specifically, I expect revenue and gross and net profit margins to decline relatively more for Russian oil firms, reflecting restricted market access, forced trade rerouting, and rising operational costs. I expect receivables to increase

relatively more, consistent with an accumulation of uncollected trade receivables as payment infrastructure was disrupted by financial sanctions targeting Russian banks.

Failure to reject H_0 for a given outcome is interpreted as evidence that the sanctions did not differentially affect that dimension of performance, or that Russian firms successfully adapted within the observation window.

3. Data and Empirical Strategy

3.1 Sample Construction and Data Sources

Data Collection. Financial statement data for Russian firms are primarily from *audit-it.ru*, a Russian commercial database aggregating statutory annual accounts submitted to the Federal Tax Service (FNS) and the Federal State Statistics Service (Rosstat), supplemented where necessary by Compustat Global entries for the same firm-years. All financial information for Russian firms reflects filings prepared under Russian Accounting Standards (*Rossiyskiye standarty bukhgalterskogo ucheta*, RSBU), the mandatory statutory reporting framework applicable to virtually all registered Russian legal entities. Unlike IFRS, which Russian public companies may adopt voluntarily, RSBU filings are legally required and provide the most comprehensive and temporally consistent source of firm-level financial data for the domestic Russian corporate sector, including the post-treatment years that are critical for identification. As noted in Section 2.1, the sanctions wave resulted in near-complete loss of coverage for Russian firms in Compustat from fiscal year 2022 onwards, making *audit-it.ru* the necessary primary source. Compustat observations, identified by *gvkey*, are therefore used only to fill residual gaps in pre-treatment years, thereby maximising temporal coverage while preserving the primacy of statutory RSBU filings. To enable this combined approach, I manually constructed a firm-level mapping between company names as listed on *audit-it.ru* and their corresponding *gvkey* identifiers in Compustat. For each Russian firm, annual financial statement data were extracted on a firm-by-firm basis, matching variables from the RSBU balance sheet (*bukhgalterskiy balans*, Form No. 1) and the income statement (*otchet o finansovykh rezul'tatakh*, Form No. 2) to the analytical constructs used in the regressions.

Financial data for the international oil and gas firms are sourced from Compustat Global. I extracted all firm-year observations for non-Russian firms incorporated under oil-related SIC codes over the 2011–2025 period, covering upstream exploration, drilling, field services, petroleum refining, and downstream wholesale. The international control group is restricted to oil and gas firms and does not include international non-oil companies as they would introduce compositional noise

into the control group—the global oil industry is highly concentrated in a relatively small number of large integrated majors. Currency conversion to Russian rubles uses GBP as the vehicle currency, following a two-step triangulation applied at the firm-year level using daily exchange rates prevailing on the fiscal year-end date (`datadate`) from Compustat. Because the ruble experienced substantial depreciation over the sample period, converting all values to a common currency at year-end rates ensures that each observation is converted at the rate contemporaneous with the reporting period. The use of deflated variables further mitigates the currency effect, as both numerator and denominator are reported in the same currency. RSBU monetary values, originally reported in thousands of rubles, are rescaled to millions at this stage to match the WRDS reporting format.

Initial extraction of international firm data was performed in the WRDS SAS environment; all subsequent data cleaning, variable construction, and regression analysis were conducted in Python using the `pandas` and `statsmodels` libraries.

Sample Construction. The merged sample is subject to four sequential screens. First, to align the international sample with the scale of the Russian treatment group and eliminate micro-cap entities whose financial dynamics are unlikely to be comparable, I apply a minimum revenue threshold of RUB 1 billion—approximately corresponding to the smallest Russian oil firm in the sample—retaining only firms whose minimum annual revenue across the sample period exceeds this floor. Second, I require non-missing values for all variables entering the regression analysis to achieve the same number of observations for each model. Third, I retain only firms with non-missing observations in each year from 2021 to 2023, ensuring that the window immediately surrounding the treatment event is complete for every firm in the sample. Fourth, to mitigate spillover bias, Russian non-oil firms that were themselves directly targeted by Western sanctions in 2022 are excluded from the control group, as their inclusion would conflate the treatment effect of sanctions on the energy sector with independent sanction exposure affecting the control units.

After applying these screens, the final sample comprises 524 firms and 6,725 firm-year observations spanning 2011–2025. Panel coverage is unbalanced in the earlier and last years of the

sample, as filing completeness on *audit-it.ru* and Compustat coverage varies across firms, but is fully balanced over the 2021–2023 core estimation window by construction.

Sample Composition. Panel A of Table 1 reports the distribution of firm-year observations by group and sector across the full sample period. The treatment group comprises 14 Russian oil and gas firms totalling 197 firm-year observations—Panel B of Table 1 includes a full list of selected companies. It spans the full spectrum of the Russian oil and gas value chain, drawn from three SIC categories: upstream exploration and production companies classified under SIC 1311, which account for the majority of treatment-group observations; integrated refining majors under SIC 2911, including Gazprom, Lukoil, Gazprom Neft, and Tatneft; and one oilfield services firm under SIC 1389, Integra Group.

The Russian non-oil control group consists of 130 firms contributing 1,735 firm-year observations across six broad sectors: utilities (the largest component), retail and food, construction and real estate, telecom and IT, chemicals, and automotive and machinery. This group is intended to capture the general macroeconomic environment facing Russian firms while remaining unexposed to the energy-specific sanctions channel. As noted above, firms from this group that were directly targeted by Western sanctions in 2022 have been excluded to preserve the integrity of the counterfactual.

The international oil and gas control group comprises 380 firms and 4,793 firm-year observations, covering the same SIC codes as the Russian treatment group as well as adjacent upstream, midstream, and downstream sectors: crude petroleum and natural gas (SIC 1311), drilling (SIC 1381), field exploration (SIC 1382), field services (SIC 1389), petroleum refining (SIC 2911), petroleum products (SIC 2990), and wholesale petroleum distribution (SIC 5171 and 5172). This group provides an international benchmark for the financial performance of oil firms operating outside the sanctions perimeter. Panel C of Table 1 reports the regional distribution—the group is geographically diverse, with Asia-Pacific firms accounting for the largest share (51.3%), followed by European firms (24.2%), and smaller representations from the Middle East, North America, Africa, and Latin America.

Table 1: Sample Composition
Panel A: Firm-Year Observations by Industry and Year

	SIC	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
<i>Russian Oil</i>																	
Crude Petroleum & Natural Gas	(1311)	6	7	8	8	8	8	7	8	8	8	8	8	8	7	6	113
Oil & Gas Field Services	(1389)	–	1	1	1	1	1	1	1	1	1	1	1	1	1	–	13
Petroleum Refining	(2911)	5	5	5	4	4	4	5	5	5	5	5	5	5	5	4	71
<i>Russian Non-Oil Companies</i>																	
Utilities		52	59	60	61	61	61	61	61	61	59	61	61	61	61	47	887
Retail & Food		9	12	12	14	17	17	17	17	17	17	19	19	19	19	10	235
Construction & Real Estate		1	7	8	8	8	6	6	7	8	8	9	9	9	8	5	107
Telecom & IT		6	6	7	7	7	6	6	7	7	7	8	8	8	8	6	104
Chemicals		4	6	6	7	7	7	7	7	7	6	7	7	7	7	6	98
Automotive & Machinery		2	3	3	4	5	5	4	6	5	5	6	6	6	5	2	67
Other		10	12	12	14	15	16	15	16	18	19	20	20	20	20	10	237
<i>International Oil Companies</i>																	
Crude Petroleum & Natural Gas	(1311)	48	54	61	64	65	65	73	78	87	94	99	99	99	90	68	1,144
Drilling Oil	(1381)	11	14	15	15	17	16	16	18	18	19	20	20	20	18	14	251
Oil & Gas Field Exploration	(1382)	32	33	34	36	36	36	36	37	39	40	40	40	40	36	31	546
Oil & Gas Field Services	(1389)	16	15	18	18	19	19	19	19	19	25	26	26	26	25	19	309
Petroleum Refining	(2911)	71	72	72	72	76	76	79	81	82	83	84	84	84	79	62	1,157
Products of Petroleum	(2990)	17	17	19	20	21	23	23	25	27	30	33	33	33	30	19	370
Wholesale Petrol. Bulk Stations	(5171)	23	25	26	29	28	29	29	29	29	29	29	29	29	28	19	410
Wholesale Petrol. Products	(5172)	32	33	35	36	39	38	41	42	42	44	49	49	49	46	31	606
Total		345	381	402	418	434	433	445	464	480	499	524	524	524	493	359	6,725

Panel B: List of Russian Oil Firms

	Obs.	Assets	Leverage	Net Income
Surgutneftegaz PJSC	13	4,536.51	0.12	0.36
PAO Novatek	15	1,184.26	0.32	0.38
Kogalymneftegaz	14	858.66	0.21	0.11
Russneft PJSC	14	286.72	0.80	0.03
Ritek Rossijskaya Innovation	14	234.34	0.13	0.19
Slavneft-Megionneftegaz OAO	15	185.80	0.39	0.00
Udmurtneft	14	66.89	0.48	0.16
Gazprom Promgaz	14	2.85	0.48	0.02
<i>Crude Petroleum and Natural Gas (SIC 1311)</i>	113	883.35	0.37	0.15
Gazprom PJSC	15	17,233.42	0.29	0.15
PJSC Lukoil	15	2,135.39	0.43	0.62
Gazprom Neft PJSC	14	1,794.26	0.71	0.10
Tatneft PJSC	15	889.19	0.25	0.18
Gazprom Neftekhim Salavat JS	12	187.34	0.55	0.05
<i>Petroleum Refining (SIC 2911)</i>	71	4,665.32	0.44	0.23
Integra Group	13	7.22	0.63	−0.04
<i>Oil & Gas Field Services (SIC 1389)</i>	13	7.22	0.63	−0.04
Total — 14 firms	197			

Panel C: Geographical Distribution of International Oil Firms

	Obs.	Firms	Share (%)	Assets	Net Income
Asia-Pacific	2,501	195	51.3	570.56	0.02
Europe	1,142	92	24.2	1,087.06	−0.02
Middle East	376	30	7.9	1,120.70	0.09
North America	294	26	6.8	61.29	−0.20
Africa	267	19	5.0	41.54	0.04
Latin America	213	18	4.7	2,134.08	0.02
Total	4,793	380	100.0		

Panel A reports the number of firm-year observations by industry segment and calendar year over the period 2011–2025. Treatment firms (Russian oil companies) and the international oil control group are classified by official SIC industry titles as assigned by the U.S. Securities and Exchange Commission and retrieved via WRDS Compustat. The Russian non-oil control group is partitioned into broad industry sectors based on Compustat firm names and manual verification. Panel B lists all Russian oil companies in the sample divided into industry groups by according SIC codes. Obs. denotes the number of firm-year observations; Assets are total assets reported in billions of Russian rubles (RUB). Leverage is defined as lagged total liabilities divided by lagged total assets; Net Income is net profit margin ratio. Panel C reports the geographical distribution of the international oil companies included in the sample. Country of domicile is sourced from Compustat's `loc` field, with `fic` (country of incorporation) used where `loc` is unavailable. Firms are then aggregated into broad geographical regions.

3.2 Variable Definitions

Dependent Variables. The dependent variables capture the primary channels through which sanctions are expected to affect firm financial performance: revenue disruption from restricted market access, working capital strain from severed payment infrastructure, and compression of profit margins from rising costs and price volatility.

Raw ruble-denominated variables exhibit substantial right skew. To ensure comparability across firms of different scales and to produce economically interpretable measures of financial performance, I deflate all dependent variables used in the analysis:

- *Revenue*: annual ruble denominated revenue divided by lagged total assets;
- *Receivables*: annual ruble denominated receivables divided by lagged total assets;
- *Gross Profit*: gross profit margin ratio;
- *Net Income*: net profit margin ratio.

All dependent variables are winsorised at the 1st and 99th percentiles of the pooled sample distribution.

Control Variables. This study includes three time-varying firm-level controls:

- *Size*: natural logarithm of lagged total assets;
- *Leverage*: lagged total liabilities divided by lagged total assets;
- *Liquidity*: lagged current ratio.

All three controls are measured in the year prior to the observation year ($t - 1$) to avoid look-ahead bias. Controls are also winsorised at the 1st and 99th percentiles.

Treatment Indicators. The analysis uses three main treatment indicators:

- *Russian Oil_{*i*}*: equals one if firm i is a Russian oil and gas company and zero otherwise;
- *Post-2022_{*t*}*: the post-treatment indicator, equals one for fiscal years 2022 and later;
- *Russian_{*i*}*: equals one for Russian-domiciled firms, included in some specifications to absorb time-invariant differences between Russian and international firms.

Time Trend. To capture time trends in firm financial performance over the sample period, I construct a continuous time variable defined as $t = \text{Year} - 2021$, which equals zero in the last pre-treatment year and increases by one for each subsequent fiscal year.

A Note on Accounting Standards. Russian Accounting Standards (RSBU) differ from IFRS in several respects material to the variables constructed here. The discussion below draws on the relevant Russian accounting regulations (*Polozhenie po bukhgalterskomu uchetu*, PBU), the corresponding IFRS standards, and comparative analyses of the two frameworks (DVP Audit 2023; Parkkinen 2014; Kuzina and Rudenko 2019).

Revenue. Revenue (*vyruchka*, Form No. 2, line 2110) maps to Compustat `revt` or `sale` and is a standalone line item under both frameworks. A structural difference in recognition timing arises from the fact that RSBU (PBU 9/99) follows a conditions-based approach closer to the older risks-and-rewards model than to the five-step performance-obligation framework of IFRS 15 (Parkkinen 2014). In normal operating conditions this distinction is minor, but for energy exporters facing rerouted trade flows and correspondent banking restrictions after 2022, the RSBU model may delay revenue recognition relative to an IFRS-equivalent measure, compressing reported turnover in the treatment group during the post-sanction window.

Trade receivables. Trade receivables (*debitskaya zadolzhennost'*, Form No. 1, line 1230) map to Compustat `rect` and are a standalone line item under both frameworks. Beyond the loss recognition difference noted above, RSBU receivables may understate true credit exposure relative to an IFRS equivalent for post-2022 energy exporters: where payment from sanctioned or rerouted counterparties is delayed but not yet formally classified as doubtful under the discretionary RSBU standard, receivables remain on the balance sheet at face value (Kuzina and Rudenko 2019). This implies that the receivables-to-assets ratio for the treatment group may be upward-biased in 2022–2024, attenuating any sanctions-driven deterioration in this variable.

Gross profit. Gross profit (*valovaya pribyl'*, Form No. 2, line 2100) is a standalone line item for Russian firms. For firms in the international control group, Compustat Global does not report gross

profit for a substantial share of observations, so it is constructed as $\text{revt} - \text{cogs}$. This construction is conceptually equivalent to the RSBU line item, as both represent revenue less cost of goods sold.

Net income. Net income (*chistaya pribyl'*, Form No. 2, line 2400) maps directly to Compustat Global `nicon` or `ninc`; both represent the residual earnings attributable to equity holders after tax and are conceptually equivalent. Two structural differences in loss recognition, however, may cause RSBU net income to overstate economic performance relative to an IFRS equivalent. First, provisions for doubtful receivables under RSBU are governed by paragraph 70 of Order No. 34n (1998), which defines a doubtful debt as a receivable not paid and unsecured by guarantees, with the timing and amount left to management's discretion (Sigidov et al. 2016). This contrasts with the mandatory expected credit loss model of IFRS 9, which requires forward-looking provisioning from the date of initial recognition (PricewaterhouseCoopers 2020; Bank for International Settlements 2017). Second, inventory write-downs under RSBU (PBU 5/01, superseded by FSBU 5/2019 for periods from 2021) follow a lower-of-cost-or-market rule applied with greater managerial latitude than the net realisable value test prescribed by IAS 2. Both differences give Russian firms more scope to defer loss recognition, an effect that is likely amplified in periods of financial stress such as those following the 2022 sanctions.

Leverage. Total liabilities under RSBU encompass both current and non-current obligations as presented in Form No. 1 (lines 1400 and 1500), mapping to Compustat `lt`. Both PBU 15/2008 and IAS 23 require capitalisation of borrowing costs attributable to qualifying assets, but differences in the definition of qualifying assets may affect the amount capitalised in practice (IFRS Foundation 2008). For capital-intensive energy firms undertaking long-cycle infrastructure projects, a narrower RSBU definition of qualifying assets would reduce capitalised interest, lowering reported total assets and mechanically inflating the leverage ratio relative to an IFRS equivalent.

The differences documented above do not invalidate the DiD identification strategy, as the comparability risk introduced by the international oil control group—which reports under IFRS or US GAAP via Compustat—is mitigated by the exclusive use of scaled ratio variables, which are substantially less sensitive to absolute measurement differences than level variables. Crucially,

these classificatory differences between RSBU and IFRS are structural and time-invariant: they are present throughout the entire sample period and affect treated and control firms symmetrically across all years. All estimated coefficients should therefore be interpreted as effects on RSBU-measured financial performance rather than on economically equivalent IFRS constructs.

3.3 Identification Strategy

The causal effect of the 2022 sanctions on firm financial performance is estimated using a difference-in-differences (DiD) framework. The treatment group consists of Russian oil and gas firms; the control group comprises all remaining firms in the sample—Russian non-oil companies and international oil firms—which are assumed to be unaffected by the energy-specific sanctions channel. The least squares model to fit:

$$Y_{it} = \alpha + \beta_1 \text{Russian Oil}_i + \beta_2 \text{Post-2022}_t + \beta_3 \text{Russian Oil} \times \text{Post-2022}_{it} + \beta_4 \text{Russian}_i + \gamma' X_{i,t-1} + \varepsilon_{it}, \quad (1)$$

where Y_{it} is a dependent variable, Russian Oil_i equals one for Russian oil and gas firms, Post-2022_t equals one for fiscal years from 2022 onwards and zero otherwise, and $X_{i,t-1}$ is the one-period lagged firm-level controls (size, leverage, and liquidity). The key variable of interest is the interaction: $\text{Russian Oil} \times \text{Post-2022}_{it}$ whose coefficient β_3 identifies the average treatment effect on Russian oil firms relative to the control group after the sanctions shock.

In the regressions all binary indicators (Russian Oil_i , Post-2022_t , Russian_i) and their interaction are demeaned prior to estimation. Demeaning ensures numerical stability of the interaction term and facilitates interpretation of the constituent main effects in the presence of the interaction (Aiken, West, and Reno 1991). Descriptive statistics are conducted prior to demeaning.

Model Specifications. For each Y_{it} variable this paper estimates five specifications, progressively including additional variables to control for alternative sources of variation:

Specification (1) is the bare DiD with no additional controls.

Specification (2) augments (1) with the set of controls $X_{i,t-1}$ and a country indicator $Russian_i$.

Specification (3) augments (2) with a linear time trend t_{it} .

Specification (4) replaces the $Russian_i$ indicator with country fixed effects, absorbing all time-invariant cross-country differences in financial performance. The linear time trend is retained as the sole time control.

Specification (5) adds year fixed effects to the country fixed effects of (4), yielding a two-way fixed-effects estimator. Year fixed effects absorb $Post-2022_t$ and t_{it} , which are therefore excluded from this specification. This specification identifies β_3 from within-country, within-year variation only, providing the most conservative estimate of the treatment effect.

Standard errors are clustered at the firm level in all specifications to account for within-firm serial correlation in outcomes (Bertrand, Duflo, and Mullainathan 2004).

3.4 Descriptive Statistics

Table 2 reports summary statistics for the full sample of 6,725 firm-year observations. The raw financial metrics prior to deflation are added for completeness and illustrate the substantial size heterogeneity that motivates the use of scaled variables throughout the analysis. Mean revenue across the pooled sample stands at RUB 469.6 billion, with a standard deviation of RUB 2,139.9 billion and a P_{99} of RUB 8,349.8 billion, indicating a heavily right-skewed distribution driven by the largest energy majors. Total assets exhibit a similar pattern, with a mean of RUB 624.8 billion and a P_{99} of RUB 14,092.3 billion. The deflated variables are considerably better behaved: revenue has a mean of 1.334 and a median of 0.798, and the margin ratios are bounded within economically plausible ranges after winsorisation at the 1st and 99th percentiles. Among the controls, leverage averages 0.549 with moderate dispersion, and liquidity averages 0.943, with the distribution skewed left of one, suggesting that a majority of firms carry current liabilities in excess of current assets. The indicator variables confirm the composition of the sample: 28.3% of observations fall in the post-2022 window, 28.7% are Russian firms, and 2.9% are Russian oil firms.

Panel B reports mean values by sector and industry group. Several patterns are notable. Within

the Russian oil treatment group, petroleum refiners (SIC 2911) are by far the largest firms, with a mean size of 14.114 compared to 12.214 for upstream extractors (SIC 1311), and carry the highest net profit margin (0.227) and gross profit margin (0.365) in the group. Upstream extractors exhibit lower leverage (0.368) and tighter liquidity (0.669), consistent with the capital-intensive but cash-generative nature of extraction operations. The single oilfield services firm (SIC 1389, Integra Group) stands apart with a negative mean net profit margin (−0.043) and the highest receivables ratio in the treatment group (0.405), reflecting the more competitive and operationally leveraged nature of services businesses.

Among the Russian non-oil control firms, utilities dominate in terms of revenue (mean of 2.233) owing to the high asset base typical of capital-heavy infrastructure businesses, while chemicals and construction firms record the highest net profit margins (0.248 and 0.270, respectively).

The international oil control group is internally heterogeneous: wholesale petroleum distributors (SIC 5171 and 5172) report the highest revenue means (2.149 and 2.649, respectively), consistent with the thin-margin, high-turnover nature of distribution businesses, while upstream exploration and drilling firms (SIC 1381 and 1382) record negative mean net profit margins (−0.162 and −0.049), reflecting the capital intensity and exploration risk of those subsectors. Notably, international petroleum refiners (SIC 2911) exhibit substantially lower gross profit margins (0.155) than their Russian counterparts (0.365), a structural difference likely reflecting the regulated and vertically integrated nature of Russian refining operations.

Table 2: Descriptive Statistics
Panel A: Full Sample

	Mean	Std. Dev.	P_1	Median	P_{99}
<i>Raw Variables</i>					
Revenue	469.597	2,139.942	1.167	30.449	8,349.769
Receivables	61.909	271.036	0.080	5.325	1,184.206
Gross Profit	136.992	873.490	-1.816	6.081	2,546.905
Net Income	34.930	590.047	-78.228	0.824	616.557
Total Assets	624.794	2,870.696	0.903	41.623	14,092.320
<i>Deflated Variables</i>					
Revenue	1.334	1.456	0.051	0.798	7.000
Receivables	0.193	0.170	0.008	0.139	0.819
Gross Profit	0.320	0.276	-0.085	0.246	0.998
Net Income	0.031	0.579	-1.558	0.029	1.038
<i>Control Variables</i>					
Size	10.697	2.113	6.580	10.541	15.888
Leverage	0.549	0.321	0.066	0.538	1.400
Liquidity	0.943	1.161	0.080	0.765	4.713
<i>Indicator Variables</i>					
Russian Oil	0.029				
Post-2022	0.283				
Russian	0.287				

Table 2: Descriptive Statistics (Continued)
Panel B: Mean Values by Industry Group

	SIC	Revenue	Receivables	Gross Profit	Net Income	Size	Leverage	Liquidity
<i>Russian Oil Companies</i>								
Crude Petroleum & Natural Gas	(1311)	0.880	0.225	0.352	0.155	12.214	0.368	0.669
Oil & Gas Field Services	(1389)	0.706	0.405	0.085	−0.043	8.868	0.627	1.007
Petroleum Refining	(2911)	0.802	0.195	0.365	0.227	14.114	0.438	0.728
<i>Russian Non-Oil Companies</i>								
Utilities		2.233	0.310	0.243	0.055	9.847	0.602	1.132
Retail & Food		1.637	0.221	0.377	0.144	9.616	0.593	0.914
Construction & Real Estate		0.434	0.124	0.590	0.270	10.052	0.378	0.637
Telecom & IT		0.540	0.101	0.346	0.158	10.593	0.463	1.325
Chemicals		0.885	0.099	0.423	0.248	10.394	0.485	1.079
Automotive & Machinery		0.845	0.237	0.290	0.063	9.308	0.504	0.625
Other		0.929	0.189	0.354	0.003	10.683	0.579	1.067
<i>International Oil Companies</i>								
Crude Petroleum & Natural Gas	(1311)	0.451	0.105	0.552	0.016	11.190	0.520	0.930
Drilling Oil	(1381)	0.528	0.159	0.548	−0.162	10.267	0.583	1.202
Oil & Gas Field Exploration	(1382)	0.576	0.226	0.369	−0.049	10.340	0.514	0.929
Oil & Gas Field Services	(1389)	0.618	0.235	0.382	−0.062	10.563	0.543	0.929
Petroleum Refining	(2911)	1.580	0.154	0.155	0.016	12.102	0.624	0.927
Products of Petroleum	(2990)	1.363	0.184	0.223	0.056	9.424	0.446	0.725
Wholesale Petrol. Bulk Stations	(5171)	2.149	0.194	0.205	0.024	10.066	0.502	0.819
Wholesale Petrol. Products	(5172)	2.649	0.251	0.175	0.059	10.221	0.577	0.888

Panel A reports descriptive statistics for the full sample of 6,725 firm-year observations. Columns report the mean, standard deviation, 1st percentile, median, and 99th percentile of each variable across the full sample. Panel B reports group means of deflated variables by industry segment between the groups. Raw financial variables are denominated in Russian rubles and expressed in billions (RUB bn). Deflated variables: Revenue is revenue divided by lagged total assets; Receivables are trade receivables divided by lagged total assets; Gross Profit is the gross profit margin ratio; Net Income is the net profit margin ratio. Size is the natural logarithm of lagged total assets; Leverage is lagged total liabilities divided by lagged total assets; Liquidity is lagged current ratio. All variables are winsorised at the 1st and 99th percentiles of the pooled distribution. Indicator variables take the value of one as follows: Russian Oil for Russian-domiciled oil sector firms, Post-2022 for fiscal years 2022 and later, and Russian for Russian-domiciled firms.

Pre- and Post-Treatment Comparison. Table 3 reports the raw DiD comparison, dividing the sample into pre-2022 and post-2022 periods for the treatment and control groups separately and computing mean outcomes between periods. In raw levels, both groups experienced growth in revenue and total assets over the post-2022 period. However, the treatment group's deflated revenue increased by 0.103 in the post-2022 period, while the control group's fell by 0.063, yielding a raw DiD estimate of +0.166 (significant at the 1% level). This is a preliminary result of the sanction revenue channel failure, consistent with Russian oil firms rerouted exports at elevated ruble prices, rather than experiencing the market contraction initially anticipated.

The most striking result in the pre-post comparison concerns gross profit margins. The treatment group's mean gross profit margin ratio fell sharply from 0.386 to 0.205 post-2022, a decline of 0.182, while the control group's margin was essentially unchanged (+0.020). The resulting raw DiD of -0.202 is significant at the 1% level and constitutes the strongest preliminary evidence that the sanctions compressed the profitability of Russian oil operations, consistent with the price cap mechanism reducing per-unit realisation even as volumes were rerouted. Deflated receivables also increased differentially for the treatment group (raw DiD of +0.045, significant at the 1% level), consistent with payment delays from correspondent banking restrictions.

The net profit margin raw DiD of -0.151 is in the expected direction but does not reach conventional significance levels, suggesting that bottom-line profitability was partially buffered—plausibly through windfall ruble revenues from depreciation, fiscal transfers, or deferred loss recognition under RSBUS, as discussed in the Note on Accounting Standards. These raw comparisons are purely descriptive and do not control for compositional differences or common time trends; the regression analysis in Section 4 provides the formal estimates.

Table 3: Univariate Comparison: Treatment vs. Control Group

Treatment Group: Russian Oil Companies ($N = 197$) Control Group: Russian Non-Oil and International Oil ($N = 6,528$)							
	Treatment Group		Control Group		Changes		
	Pre-2022	Post-2022	Pre-2022	Post-2022	Δ Treat	Δ Control	Raw DiD
<i>Raw Variables</i>							
Revenue	767.271	1,397.654	355.881	708.259	630.383	352.378	278.005**
Receivables	257.928	370.969	43.666	84.073	113.040	40.407	72.634***
Gross Profit	347.012	406.471	94.375	220.820	59.458	126.445	-66.987**
Net Income	161.428	181.330	12.142	78.570	19.902	66.428	-46.526*
Total Assets	1,847.999	3,163.566	460.851	873.051	1,315.566	412.200	903.366**
<i>Deflated Variables</i>							
Revenue	0.814	0.916	1.367	1.304	0.103	-0.063	0.166***
Receivables	0.218	0.247	0.197	0.181	0.029	-0.016	0.045***
Gross Profit	0.386	0.205	0.314	0.334	-0.182	0.020	-0.202***
Net Income	0.190	0.105	0.008	0.074	-0.085	0.066	-0.151
<i>Control Variables</i>							
Size	12.599	12.903	10.494	11.001	0.304	0.508	-0.204***
Leverage	0.412	0.407	0.548	0.567	-0.005	0.019	-0.024***
Liquidity	0.670	0.836	0.943	0.968	0.167	0.025	0.141

Pre-2022 and Post-2022 columns report group means. Δ Treat = $\bar{x}_{\text{treat,post}} - \bar{x}_{\text{treat,pre}}$; Δ Ctrl = $\bar{x}_{\text{ctrl,post}} - \bar{x}_{\text{ctrl,pre}}$. Stars on Raw DiD: Welch t -test on the $\Delta\Delta Y$ estimate, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Raw financial variables are denominated in Russian Rubles and expressed in billions (RUB bn). Deflated variables: Revenue is revenue divided by lagged total assets; Receivables are trade receivables divided by lagged total assets; Gross Profit is the gross profit margin ratio; Net Income is the net profit margin ratio. Size is the natural logarithm of lagged total assets; Leverage is lagged total liabilities divided by lagged total assets; Liquidity is lagged current ratio. All variables are winsorised at the 1st and 99th percentiles of the pooled distribution.

Correlation Structure and Multicollinearity Diagnostics. Table 4 reports Pearson and Spearman rank correlations for all variables used in the analysis. The two sets of correlations are broadly consistent with each other, suggesting that the bivariate relationships are not driven by outliers or non-linearities. Overall, the correlations raise no multicollinearity concerns.

Among the outcome variables, revenue and receivables are positively correlated under both measures (Pearson: 0.52; Spearman: 0.54), reflecting the common asset-denominated scaling; both are negatively correlated with size (-0.33 and -0.35 under Pearson, -0.27 and -0.31 under Spearman), consistent with larger firms operating with lower asset turnover. Gross and net profit margin are more strongly associated under Spearman (0.40) than Pearson (0.10), suggesting a monotone but non-linear relationship between the two profitability ratios. Notably, the Spearman correlation between revenue and net income (-0.22) is meaningfully larger in magnitude than the corresponding Pearson coefficient (-0.01), indicating that the rank-based relationship between asset turnover and profitability is obscured in levels by outliers or skewness in the distributions. Across both measures, the four dependent variables capture distinct dimensions of financial performance rather than collinear proxies for the same underlying construct.

Among the regressors, the most notable correlation is between leverage and liquidity (Pearson: 0.51; Spearman: 0.62), which is expected given that both are functions of the liability side of the balance sheet—more leveraged firms tend to carry higher current liabilities, compressing the current ratio. The treatment indicators *Russian Oil* and *Russian* are moderately correlated (0.27 under both measures), reflecting the mechanical relationship that all Russian oil firms are also Russian firms. *Post-2022* and the linear time trend are highly correlated by construction (Pearson: 0.76; Spearman: 0.78), as the post-treatment dummy and the centred time trend share variation in the post-period; this expected collinearity motivates their separate treatment across specifications rather than simultaneous inclusion. Variance inflation factors (VIF) computed for each specification confirm the absence of problematic multicollinearity, with all VIFs falling below 5 across Specifications (1)–(5).

Table 4: Correlations Coefficients

		1	2	3	4	5	6	7	8	9	10	11
1	Revenue		0.52	-0.34	-0.01	-0.33	0.15	-0.05	-0.02	-0.06	0.09	-0.07
2	Receivables	0.54		-0.18	0.03	-0.35	0.23	-0.06	-0.04	0.03	0.18	-0.06
3	Gross Profit	-0.55	-0.29		0.10	0.06	-0.06	0.03	0.02	0.01	0.00	0.05
4	Net Income	-0.22	-0.16	0.40		0.02	-0.07	-0.13	0.05	0.04	0.07	0.02
5	Size	-0.27	-0.31	0.07	0.12		0.06	0.02	0.11	0.16	-0.13	0.14
6	Leverage	0.20	0.21	-0.10	-0.29	0.11		0.51	0.03	-0.08	0.00	0.03
7	Liquidity	0.08	0.01	-0.15	-0.25	0.11	0.62		0.01	-0.03	0.04	0.04
8	Post-2022	0.00	-0.03	0.02	0.06	0.10	0.00	0.00		-0.01	-0.02	0.76
9	Russian Oil	-0.02	0.06	0.03	0.10	0.15	-0.09	-0.05	-0.01		0.27	-0.01
10	Russian	0.08	0.10	0.01	0.09	-0.12	0.00	0.10	-0.02	0.27		-0.02
11	Time trend t	-0.06	-0.07	0.04	0.04	0.14	0.01	0.02	0.78	-0.01	-0.02	

This table reports correlation coefficients. $N = 6,725$. Pearson correlation coefficients are reported in the upper-right corner, and Spearman correlation coefficients are reported in the lower-left corner. Deflated variables: Revenue is revenue divided by lagged total assets; Receivables are trade receivables divided by lagged total assets; Gross Profit is the gross profit margin ratio; Net Income is the net profit margin ratio. Size is the natural logarithm of lagged total assets; Leverage is lagged total liabilities divided by lagged total assets; Liquidity is lagged current ratio. All variables are winsorised at the 1st and 99th percentiles of the pooled distribution. Indicator variables take the value of one as follows: Russian Oil for Russian-domiciled oil sector firms, Post-2022 for fiscal years 2022 and later, and Russian for Russian-domiciled firms. Bold entries are significant at $p < 0.10$.

Graphical Evidence. Figure 1 plots annual group means for the deflated outcome variables and control variables over the 2011–2025 period. Several economically meaningful patterns emerge across the two figures.

The revenue and receivables panels are broadly reassuring for identification. Revenue moves in parallel across groups throughout the pre-period, with no pre-treatment divergence specific to Russian oil firms. The post-2022 receivables dynamics for the treatment group—an irregular pattern of increases and partial reversals absent in both control groups—are consistent with payment disruptions from correspondent banking restrictions, and provide supplementary evidence of operational friction beyond what margin ratios alone capture.

The gross profit margin warrants a separate note of caution. While both control groups co-move closely throughout the entire sample period and show no meaningful post-2022 deterioration, the Russian oil treatment group has been on a declining trajectory the whole sample period—well before the sanctions event. The post-2022 acceleration of this decline is visually apparent, but the pre-existing trend complicates clean attribution to the sanctions shock alone.

The most economically informative outcome is the net profit margin, which is also the noisiest series in the sample. Two global shocks are immediately visible: the 2014–2016 oil price collapse and the 2020 pandemic demand shock, both of which hit international oil firms hardest while Russian non-oil firms remained comparatively stable. Importantly, the 2022 sanctions do not produce a clean visual break in net margins—all three groups decline modestly and in parallel in 2022, consistent with the initial shock being partially absorbed by elevated ruble oil prices. The divergence materialises later: by 2025, Russian oil margins are declining while both control groups are stable or recovering, suggesting a delayed and cumulative sanctions effect as the ruble tailwind faded. This pattern motivates the use of the full post-2022 window rather than a narrow event study.

The control variable plots confirm that the structural differences between groups—Russian oil firms being persistently larger and less leveraged—are persistent rather than trend-driven, supporting their inclusion as regression controls to partial out cross-group heterogeneity unrelated to the sanctions shock. The one exception worth noting is the sharp post-2022 rise in the current ratio for

Russian firms, which diverges from the international control group and likely reflects disrupted trade credit cycles rather than improved liquidity. Since liquidity is included as an explicit regression control, this divergence is partialled out of the treatment effect estimate rather than confounding it.

A formal parallel trends test rejects strict pre-treatment trend equality for all the outcome variables, a result driven primarily by the 2014–2016 oil price collapse and the 2020 COVID-19 demand shock, both of which disproportionately affected oil-sector firms relative to domestic non-oil companies. The sensitivity of the main estimates to alternative sample window, fixed effect structures, and WLS weighing is examined in Section 5.

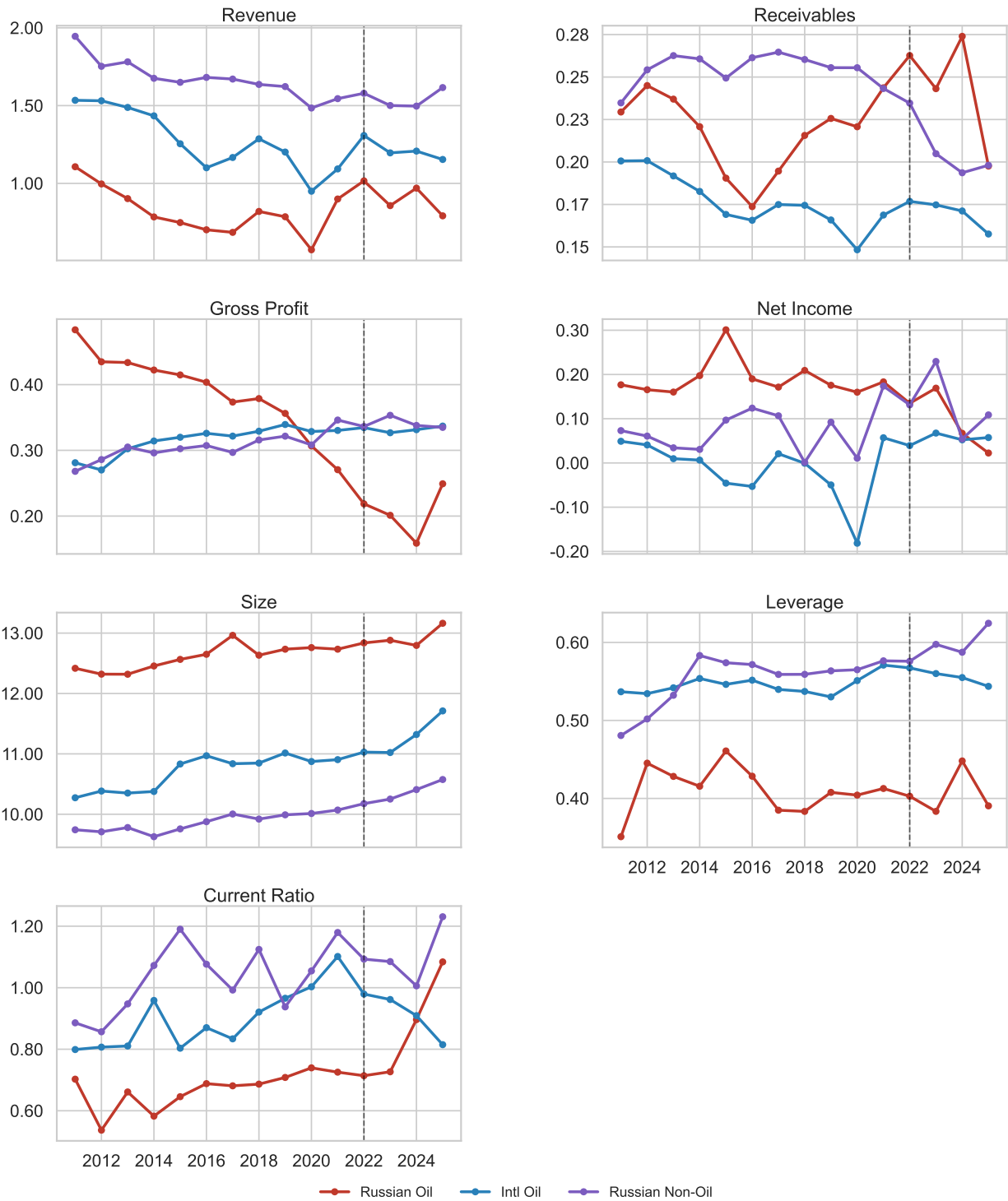


Figure 1: Annual group means of deflated outcome and control variables, 2011–2025.

4. Regression Results

Table 5 reports OLS estimates for each of the four scaled outcome variables across the five specifications introduced in Section 3.3. The coefficient of interest throughout is the DiD estimator on *Russian Oil* $\times$ *Post-2022*. Each outcome is discussed in turn below, followed by a unified interpretation of the transmission mechanism.

4.1 Revenue

Panel A of Table 5 reports a positive and significant DiD estimator across all five specifications, with the full specification estimate of +0.161 after controlling for country and time fixed effects. This result runs counter to the intended sanctions channel: one would expect restricted market access to compress revenue generation for targeted firms. The positive sign, however, does not indicate sanctions failure broadly—it indicates that the volume and revenue channel specifically was offset by other mechanisms.

First, the macro-trade literature documents that Russia successfully rerouted seaborne crude exports from Europe to Asia—notably India and China—averting a collapse in export volumes (Babina et al. 2023). If Russian oil firms sustained or increased their physical sales volumes through this geographical pivot, revenue would be maintained or increase even under sanctions. A further anticipatory dynamic may also be at play: facing the prospect of imminent volume restrictions as the December 2022 embargo approached, producers had an incentive to accelerate sales in the earlier part of the year, front-loading revenue before the restrictions entered into force.

Second, the sharp ruble depreciation in 2022 mechanically inflated the ruble value of dollar-linked oil export proceeds, while the asset base—predominantly physical capital carried at historical cost under RSBUs, as discussed in Section 3.2—revalued far more slowly, raising revenue even if real activity were unchanged (Forbes 2002). The FX effect for fiscal year 2022 reflects a more modest annual average than peak depreciation implies, given the ruble’s partial recovery under capital controls by mid-year; the more consequential cumulative weakening materialised through

2023–2024 (BOFIT 2022).

That the effect persists after controlling for firm size, leverage, and liquidity, and after absorbing country-level heterogeneity, suggests it reflects a genuine differential in revenue rather than a spurious pattern driven by sample composition. However, whether the result reflects successful adaptation, FX effects, or anticipatory front-loading, cannot be determined from scaled accounting data alone: these channels operate in the same direction and cannot be separately identified without volume data or constant-currency revenue figures.

Two additional features of the table deserve attention. First, the *Russian Oil* level indicator is large and significant in Specification (1) (−0.553) but collapses to insignificance once controls are added in Specification (2). This implies that the raw unconditional difference in revenue intensity between Russian oil firms and the rest of the sample is almost entirely explained by the structural characteristics of these firms rather than any inherent sectoral difference in revenue generation. Second, the *Post-2022* coefficient is negative and marginally significant in the baseline but turns positive and grows substantially once the time trend is included in Specification (3), suggesting a negative secular trend in revenue that, once removed, reveals a positive aggregate post-2022 level shift common to all firms. This secular decline is consistent with the long-run asset accumulation visible in the size trends documented in Figure 1.

4.2 *Receivables*

Panel B of Table 5 reports a positive and significant DiD estimator across all five models, stable at +0.046 in the fixed effects specifications. Russian oil firms carried approximately 4.6 percentage points more of their asset base in outstanding receivables in the post-2022 period relative to the control group.

This finding has a natural two-part interpretation. First, the same anticipatory logic that may have boosted pre-embargo revenues applies here: firms accelerating sales volumes ahead of the December 2022 cut-off and accepting less favourable payment terms to move product quickly, would accumulate receivables precisely as revenue rose. Second, and more persistently, restricted access

to SWIFT, the exclusion of major Russian banks from correspondent banking networks, and the reluctance of foreign counterparties to process oil-related payments all generate delays in cash collection that accumulate on the balance sheet as receivables (Wolfram, Johnson, and Rachel 2022). The same infrastructure that enabled trade also provided the payment rails; disrupting one inevitably disrupted the other. The irregular non-monotonic pattern visible in Figure 1—receivables rising post-2022 with periodic partial reversals—is consistent with periodic settlement events as new payment channels through Chinese and Indian intermediaries were gradually established, punctuated by renewed disruptions as enforcement tightened.

The behaviour of the *Russian Oil* level indicator here is notably different from the revenue outcome. Rather than collapsing upon the addition of controls, it turns positive and becomes significant in Specifications (2) through (5), suggesting that once firm size, leverage, and liquidity are held constant, Russian oil firms carry structurally higher receivables intensity than comparable firms even in the pre-treatment period. This is consistent with the concentrated, relationship-based nature of crude oil trade, where payment terms are often extended and counterparty networks are narrow. The *Post-2022* dummy, by contrast, is negative in the baseline but becomes statistically indistinguishable from zero once controls are added and remains so throughout—indicating no aggregate post-2022 increase in receivables intensity for the broader sample, which isolates the effect squarely on the treatment group. The adjusted R^2 of 0.334 in fixed effects specifications is the highest across all four outcome variables, reflecting the importance of country-level variation in payment norms and creditor rights.

4.3 *Gross Profit*

Panel C of Table 5 reports the largest and most precisely estimated DiD effect in the analysis. The estimate of -0.204 after controlling for country and time fixed effects implies a gross margin compression of approximately 20 percentage points relative to the control group—statistically significant at the 1% level and economically substantial given the treatment group’s pre-2022 mean gross margin of 0.386. The DiD estimator is the most stable of all four outcomes, varying by less

than half a percentage point across all five specifications, indicating that identification relies cleanly on the within-group pre/post contrast rather than on any particular set of controls.

The mechanism is straightforward. The price cap constrains per-barrel realisation on seaborne crude exports while operating costs—shipping to alternative markets, shadow fleet formation, compliance overhead from operating through non-coalition intermediaries, and the cost of replacing SWIFT-dependent payment infrastructure—either remain fixed or increase. The result is a squeeze on gross margins even if nominal revenues hold up, which is precisely the pattern observed jointly across Panels A and C of Table 5: revenue rises while gross profit margins fall. This combination rules out a simple volume contraction story and points specifically to a deterioration in per-unit profitability. Kilian, Rapson, and Schipper (2025) attribute roughly half of the observed Urals-Brent discount to enhanced buyer monopsony power in segmented Asian markets—buyers in India and China absorbed higher transport costs while simultaneously squeezing Russian producers on per-unit price, compressing margins at precisely the point where the price cap imposed a ceiling on realisation.

The adjusted R^2 rises sharply with country fixed effects, mirroring the revenue outcome and reflecting the importance of absorbing country-level differences in industry structure and cost conditions.

4.4 *Net Income*

Panel D of Table 5 reports a negative and significant DiD estimator of -0.143 after controlling for country and time fixed effects, significant at the 1% level and stable across all five specifications. The bottom-line result therefore confirms the gross margin finding: Russian oil firms experienced a meaningful compression in net profitability in the post-2022 period.

That the net margin effect (-0.143) is smaller in absolute terms than the gross margin effect (-0.204) is itself informative. The approximately 6 percentage point gap points to a partial below-the-line buffer operating through several channels. First, the Russian fiscal response included significant mineral extraction tax (MET) deductions for specific large fields—including Samotlor (Rosneft),

Vankor, and Priobskoye—with cumulative deductions projected at RUB 436 billion for 2024 alone (Interfax 2023); oil and gas companies were simultaneously excluded from the general windfall profit tax introduced in 2023, as their tax treatment was managed through separate instruments. Second, RSBU’s more permissive provisions for loss deferral mean that some of the economic pain visible at the gross margin level may not have fully migrated to the net income line within the observation window. Third, foreign exchange translation gains on dollar-denominated asset positions during ruble depreciation may have partially offset operating losses in 2022 and 2023.

The net margin outcome is, however, the noisiest of the four—reflected in the lowest adjusted R^2 across all specifications—as net income is sensitive to non-operating items, one-off provisions, deferred tax movements, and intra-group transfers that are largely idiosyncratic at the firm level and poorly explained by the regressors in any cross-country panel.

The *Russian* nationality dummy is positive and significant in Specifications (2) and (3), consistent with lower effective tax rates or differences in below-the-line income recognition under RSBU relative to IFRS. The *Post-2022* dummy remains positive and significant even after controls and the time trend are added—an aggregate post-2022 improvement in net margins across the broader sample that stands in stark contrast to the treatment group’s relative deterioration, further sharpening the DiD identification.

Table 5: The Effect of Sanctions on Scaled Variables

Panel A: Revenue

	(1)	(2)	(3)	(4)	(5)
Russian Oil $\times$ Post-2022	0.166** (2.129)	0.175** (2.430)	0.182** (2.490)	0.161** (2.273)	0.161** (2.308)
Russian Oil	-0.553*** (3.946)	-0.126 (0.671)	-0.139 (0.742)	-0.195 (1.082)	-0.196 (1.084)
Post-2022	-0.063* (1.877)	0.039 (1.109)	0.236*** (6.841)	0.228*** (7.059)	
Russian		0.201 (1.447)	0.201 (1.447)		
Size		-0.226*** (8.358)	-0.223*** (8.184)	-0.202*** (7.063)	-0.203*** (7.042)
Leverage		1.146*** (4.739)	1.143*** (4.729)	1.044*** (4.445)	1.048*** (4.459)
Liquidity		-0.218*** (5.890)	-0.214*** (5.811)	-0.188*** (5.159)	-0.188*** (5.154)
Time trend			-0.028*** (5.039)	-0.026*** (4.718)	
Intercept	1.334*** (21.553)	3.331*** (10.517)	3.293*** (10.352)	2.969*** (5.466)	3.138*** (5.845)
Country Fixed Effects				✓	✓
Time Fixed Effects					✓
Model DF	3	7	8	73	85
Adjusted R^2	0.003	0.158	0.160	0.293	0.294

Table 5: The Effect of Sanctions on Scaled Variables (Continued)

Panel B: Receivables

	(1)	(2)	(3)	(4)	(5)
Russian Oil $\times$ Post-2022	0.045** (2.018)	0.049** (2.091)	0.049** (2.099)	0.046** (1.969)	0.046** (1.971)
Russian Oil	0.021 (0.637)	0.067*** (2.593)	0.067*** (2.579)	0.065** (2.489)	0.065** (2.476)
Post-2022	-0.016*** (3.103)	-0.003 (0.724)	0.003 (0.525)	0.003 (0.653)	
Russian		0.045*** (3.030)	0.045*** (3.029)		
Size		-0.029*** (12.184)	-0.029*** (12.065)	-0.028*** (10.355)	-0.028*** (10.291)
Leverage		0.204*** (7.265)	0.204*** (7.263)	0.202*** (7.243)	0.202*** (7.254)
Liquidity		-0.037*** (6.980)	-0.037*** (6.960)	-0.037*** (6.566)	-0.037*** (6.567)
Time trend			-0.001 (1.244)	-0.001 (0.829)	
Intercept	0.193*** (28.190)	0.427*** (16.073)	0.426*** (15.899)	0.418*** (7.255)	0.419*** (7.360)
Country Fixed Effects				✓	✓
Time Fixed Effects					✓
Model DF	3	7	8	73	85
Adjusted R^2	0.003	0.253	0.253	0.334	0.334

Table 5: The Effect of Sanctions on Scaled Variables (Continued)
Panel C: Gross Profit

	(1)	(2)	(3)	(4)	(5)
Russian Oil $\times$ Post-2022	-0.202*** (3.708)	-0.205*** (3.802)	-0.206*** (3.820)	-0.204*** (3.764)	-0.204*** (3.753)
Russian Oil	0.072 (1.125)	0.047 (0.747)	0.049 (0.771)	0.060 (0.924)	0.060 (0.928)
Post-2022	0.020*** (2.992)	0.017** (2.439)	-0.009 (1.221)	-0.006 (0.892)	
Russian		0.001 (0.043)	0.001 (0.042)		
Size		0.008* (1.823)	0.008* (1.709)	0.003 (0.523)	0.003 (0.505)
Leverage		-0.086** (2.536)	-0.086** (2.528)	-0.107*** (3.118)	-0.108*** (3.119)
Liquidity		0.018** (2.391)	0.018** (2.326)	0.020*** (2.640)	0.020*** (2.631)
Time trend			0.004*** (2.858)	0.003*** (2.648)	
Intercept	0.320*** (28.815)	0.261*** (5.088)	0.266*** (5.135)	0.371*** (4.129)	0.342*** (3.876)
Country Fixed Effects				✓	✓
Time Fixed Effects					✓
Model DF	3	7	8	73	85
Adjusted R^2	0.003	0.014	0.015	0.237	0.236

Table 5: The Effect of Sanctions on Scaled Variables (Continued)

Panel D: Net Income

	(1)	(2)	(3)	(4)	(5)
Russian Oil $\times$ Post-2022	-0.151*** (3.238)	-0.143*** (3.133)	-0.142*** (3.120)	-0.143*** (3.154)	-0.143*** (3.160)
Russian Oil	0.182*** (3.217)	0.068 (1.092)	0.067 (1.072)	0.064 (1.021)	0.063 (1.010)
Post-2022	0.066*** (4.760)	0.065*** (4.586)	0.094*** (3.542)	0.095*** (3.611)	
Russian		0.104*** (3.802)	0.104*** (3.804)		
Size		0.009** (2.409)	0.009*** (2.640)	0.010** (2.357)	0.010** (2.451)
Leverage		-0.019 (0.272)	-0.020 (0.278)	-0.044 (0.558)	-0.044 (0.558)
Liquidity		-0.062* (1.900)	-0.061* (1.890)	-0.054 (1.623)	-0.054* (1.646)
Time trend			-0.004 (1.583)	-0.004* (1.704)	
Intercept	0.031*** (2.787)	0.009 (0.211)	0.003 (0.077)	-0.003 (0.028)	0.013 (0.127)
Country Fixed Effects				✓	✓
Time Fixed Effects					✓
Model DF	3	7	8	73	85
Adjusted R^2	0.004	0.025	0.025	0.047	0.052

The table reports OLS estimates for the full sample of Russian oil firms acting as the treatment group and Russian non-oil firms and international oil firms as control groups over 2011–2025. Each panel uses a different dependent variable: Panel A, revenue deflated by total assets; Panel B, receivables deflated by total assets; Panel C, gross profit margin ratio; Panel D, net profit margin ratio. Columns correspond to five nested model specifications. Model (1) includes only the treatment dummy *Russian Oil* (= 1 if the firm is a Russian oil company), the post-treatment dummy *Post-2022* (= 1 for fiscal years 2022 and later), and their interaction *Russian Oil* $\times$ *Post-2022*, which is the DiD estimator of interest; all three are demeaned at the full-sample mean. Model (2) adds firm-level controls—Size (log of lagged total assets), Leverage (lagged ratio of total liabilities to total assets), and Liquidity (lagged current ratio)—together with a dummy *Russian* (= 1 for all Russian firms) to control for time-invariant differences between Russian and international firms. Model (3) further adds a linear time trend $t = \text{Year} - 2021$. Model (4) replaces the *Russian* dummy with country fixed effects. Model (5) additionally replaces the linear time trend with year fixed effects (the *Post-2022* dummy is omitted to avoid collinearity). All models are estimated by OLS with heteroskedasticity-robust standard errors (HC3), and t-statistics are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

4.5 *Interpretation of the Results*

Taken together, the four outcomes narrate a coherent account of how the 2022 sanctions transmitted to the financial statements of Russian oil firms. The pattern is not a straightforward revenue collapse—it is, more precisely, a story of short-run operational adaptation combined with sustained profitability compression.

Facing the imminent prospect of losing access to European markets, Russian oil firms appear to have front-loaded sales volumes ahead of the December 2022 embargo, accepting deferred payment terms to move product quickly. This explains the joint post-2022 increase in both revenue intensity and receivables: revenue rose as firms pushed volumes, and receivables accumulated as payment was deferred or delayed by financial sanctions disrupting settlement infrastructure. Once the embargo and price cap were fully operational, the revenue channel was sustained through successful trade rerouting to Asia and amplified by ruble depreciation—but at the cost of deeply compressed per-unit margins. The price cap achieved precisely its stated design objective at the firm level: oil continued to flow, but the profit realised on each barrel fell sharply. Operating costs rose in parallel through higher shipping distances, shadow fleet overhead, and compliance costs, further squeezing gross margins. The net margin deterioration was somewhat cushioned by targeted fiscal relief and below-the-line accounting treatments, but the bottom-line compression remained large and statistically unambiguous.

Hypothesis Assessment. The analysis allows for a structured assessment of the hypotheses formalised in Section 2.2.

The null hypothesis of no differential effect is rejected for all four outcome variables at the 1% significance level, and the results survive across all five specifications including the most demanding fixed effects models.

For three of the four outcomes, the evidence is consistent with the directional predictions in H_1 : gross and net profit margins declined significantly for Russian oil firms relative to the control groups, and receivables increased significantly, confirming that the sanctions transmitted through

both the profitability and payment friction channels as hypothesised. For revenue, H_0 is likewise rejected, but in the direction opposite to H_1 : Russian oil firms recorded an increase in revenue rather than the predicted contraction, attributable to successful trade rerouting, anticipatory front-loading of sales ahead of the embargo, and mechanical ruble depreciation effects.

5. Robustness Checks

5.1 Univariate and First-Difference Tests

Table 6 provides a focused event-window test of the sanctions shock by restricting attention to the 2021–2022 transition. For each firm present in both fiscal years, the within-firm first difference $\Delta Y_i = Y_{i,2022} - Y_{i,2021}$ is computed for each deflated variable. The upper part of the table reports univariate paired t -tests applied separately to the treatment and control groups, testing whether the mean within-firm change over this transition is statistically different from zero. The raw DiD in means is then tested via a two-sample t -test, implemented as a bivariate OLS regression of ΔY_i on the treatment indicator *Russian Oil* alone with HC3 standard errors. The lower part of the table reports the full first-difference regression:

$$\Delta Y_i = \alpha + \beta \text{Russian Oil}_i + \gamma X_{i,2021} + \lambda_{c(i)} + \varepsilon_i,$$

where $X_{i,2021}$ denotes pre-treatment firm size, leverage, and liquidity, and $\lambda_{c(i)}$ denotes country fixed effects. The two panels are complementary: the upper establishes the raw statistical significance of the transition-year shift, while the lower provides the conditionally adjusted estimate.

Univariate Results. The paired t -tests reveal an informative asymmetry across outcomes. For revenue, both groups record a significant increase in 2022—Russian oil firms by +0.116 (significant at 5%) and the control group by +0.169 (significant at 1%)—yielding an insignificant raw DiD of -0.052 . This confirms that the 2022 revenue increase was broad-based, driven by ruble depreciation and post-pandemic normalisation rather than a treatment-specific effect. The positive DiD estimator in the main regressions therefore reflects a cumulative post-2022 divergence that builds gradually rather than concentrating in the immediate sanction year.

The gross profit margin yields the sharpest result. Russian oil firms record a significant decline of -0.052 between 2021 and 2022 (significant at 5%), while the control group is essentially unchanged (+0.001, insignificant), producing a raw DiD of -0.053 significant at the 5% level. This is the cleanest evidence in the table: margin compression is already visible in the first sanction year, before

cumulative rerouting and cost-adaptation dynamics take hold. Receivables and net income move in the expected direction for Russian oil firms but do not reach significance in the univariate tests, suggesting these channels were still accumulating in 2022 and become apparent only over the full post-period.

First-Difference Regression. Conditioning on pre-treatment firm characteristics and country fixed effects, the *Russian Oil* coefficient is positive for revenue and receivables and negative for both profitability outcomes, consistent with the direction of all main panel estimates. The gross profit margin coefficient of -0.045 (significant at 10%) and the receivables coefficient of $+0.029$ (significant at 10%) survive conditioning; revenue and net income do not reach conventional significance in this restricted window.

The attenuation of the treatment effect relative to the main panel estimates is not concerning and arises from two compounding factors. First, the sample collapses to matched 2021–2022 pairs, substantially reducing statistical power relative to the full panel. Second, and more importantly, the 2021–2022 window predates the December 2022 implementation of the G7 price cap, meaning the treatment had not yet fully materialised for many firms by fiscal year-end; the cumulative effects of export rerouting, shadow fleet expansion, and tightening enforcement built through 2023–2024 and are captured only in the full panel. The first-difference estimates should therefore be read as a directional consistency check rather than standalone causal estimates.

Table 6: Univariate Paired t-test, First-Difference Regression Estimates

	Δ Revenue	Δ Receivables	Δ Gross Profit	Δ Net Income
<i>Univariate Paired t-Tests</i>				
Russian Oil Firms	0.116** (2.291)	0.019 (1.487)	-0.052** (2.325)	-0.048 (0.950)
Control Firms	0.169*** (6.247)	0.004 (1.226)	0.001 (0.131)	-0.024 (0.796)
$\Delta Y = \bar{\Delta Y}_{\text{RusOil}} - \bar{\Delta Y}_{\text{Control}}$	-0.052 (0.882)	0.015 (1.117)	-0.053** (2.216)	-0.024 (0.400)
<i>First-Difference Regression</i>				
Russian Oil	0.023 (0.226)	0.029* (1.904)	-0.045* (1.760)	-0.017 (0.172)
Size ₂₀₂₁	0.024 (1.243)	0.000 (0.081)	0.002 (0.603)	0.002 (0.198)
Leverage ₂₀₂₁	-0.061 (0.385)	0.010 (0.542)	0.021 (0.804)	0.096 (0.382)
Liquidity ₂₀₂₁	0.031 (1.047)	0.001 (0.246)	-0.004 (0.742)	-0.045 (0.804)
Model DF	70	70	70	70
Adjusted R^2	0.046	-0.033	-0.019	0.013

The table reports mean first differences $\Delta Y_i = Y_{i,2022} - Y_{i,2021}$ for Russian oil firms ($N = 14$) and control firms ($N = 510$) separately, with paired t -statistics in parentheses testing $H_0: \bar{\Delta Y} = 0$ within each group for the deflated variables: Revenue is revenue divided by lagged total assets; Receivables are trade receivables divided by lagged total assets; Gross Profit is the gross profit margin ratio; Net Income is the net profit margin ratio. The third row reports the DiD estimate $\Delta \Delta Y = \bar{\Delta Y}_{\text{RusOil}} - \bar{\Delta Y}_{\text{Control}}$, obtained by regressing ΔY_i on a *Russian Oil* indicator only (no controls), with the t -statistic on that coefficient in parentheses. The second part reports OLS estimates of the cross-sectional first-difference regression $\Delta Y_i = \alpha + \beta \text{Russian Oil}_i + \gamma X_{i,2021} + \lambda_{c(i)} + \varepsilon_i$, where Russian Oil is an indicator equal to one for Russian oil and gas firms, $X_{i,2021}$ denotes the pre-treatment firm-level controls (size, leverage, and liquidity), and $\lambda_{c(i)}$ are country fixed effects. t -statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 Alternative Fixed Effects

To assess the sensitivity of the main results to the choice of fixed effect structure, Table 7 reports the DiD estimator across six alternative fixed effect structures. Specifications (1)–(2) include industry fixed effects at the SIC level; Specifications (3)–(4) are the preferred country fixed effect estimates from the main analysis, which additionally absorb the Russian firm indicator as a time-invariant group-level characteristic; and Specifications (5)–(6) include entity fixed effects, the most demanding structure, which absorb both the *Russian Oil* and *Russian* firm indicators. Within each pair, the even-numbered specification additionally includes year fixed effects, which absorb the *Post-2022* indicator and the linear time trend t . All models include firm-level controls for size, leverage, and liquidity measured at the firm level, and are estimated by OLS with standard errors clustered at the firm level.

Country fixed effects are constructed from the Compustat `loc` and `fic` fields, with `fic` (country of incorporation) taking precedence where available. Industry fixed effects are assigned at the four-digit SIC level: international and Russian oil companies are classified directly from their reported SIC codes, while Russian non-oil companies—for which some SIC classifications are not available in the source data—are assigned to industry groups manually based on primary business activity as disclosed in company filings, then encoded as a categorical fixed effect on the same scale. Entity fixed effects are defined at the firm level using the Compustat `gvkey` identifier, which provides a unique and time-stable firm key across the full panel.

The central finding is one of robustness. For receivables and gross and net profit margins the DiD estimators are statistically significant at conventional levels across all six specifications, and the magnitude is stable to a degree that is unusual in cross-country panel regressions. The gross profit margin estimate, for instance, ranges narrowly between -0.167 and -0.204 , and the net margin estimate between -0.142 and -0.154 , regardless of whether identification comes from within-industry, within-country, or within-firm variation. This stability is substantively meaningful: it implies that the estimated profitability compression does not reflect cross-country heterogeneity in accounting standards or industry composition, nor firm-level time-invariant characteristics such as

size, ownership structure, or historical profitability levels.

Revenue is the notable exception: the coefficient is positive and significant only under country fixed effects, while industry and entity fixed effects reduce both the magnitude and precision to insignificance. This pattern suggests that the positive revenue effect identified in the main analysis reflects variation that is better absorbed by country-level controls than by within-firm comparisons over time. Under entity fixed effects, identification relies purely on within-firm deviations from firm-specific means, and the revenue signal is too diffuse—likely because nominal ruble revenue inflation affected all Russian firms broadly—to be cleanly attributed to the treatment group. This pattern is consistent with the interpretation developed in Section 4.1: the revenue effect reflects broad macroeconomic forces common to Russian firms rather than a treatment-specific channel, and should be read accordingly.

The addition of time fixed effects in Specifications (2), (4), and (6) leaves every coefficient virtually unchanged relative to its counterpart without time effects. This is reassuring on two fronts: it confirms that no common time shock is driving the treatment estimates, and it demonstrates that the post-2022 dummy in the main specifications is not proxying for an omitted global time trend.

Table 7: Robustness Check: Alternative Fixed Effects Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Revenue	0.107 (1.355)	0.107 (1.382)	0.161** (2.273)	0.161** (2.308)	0.098 (1.337)	0.101 (1.383)
Receivables	0.047** (2.037)	0.047** (2.039)	0.046** (1.969)	0.046** (1.971)	0.041* (1.768)	0.041* (1.790)
Gross Profit	-0.189*** (3.972)	-0.189*** (3.964)	-0.204*** (3.764)	-0.204*** (3.753)	-0.167*** (3.397)	-0.167*** (3.391)
Net Income	-0.142*** (3.092)	-0.142*** (3.099)	-0.143*** (3.154)	-0.143*** (3.160)	-0.153** (2.568)	-0.154** (2.575)
Entity Fixed Effects					✓	✓
Country Fixed Effects			✓	✓		
Industry Fixed Effects	✓	✓				
Time Fixed Effects		✓		✓		✓

Models (1)–(2) include industry fixed effects (SIC); models (3)–(4) include country fixed effects; models (5)–(6) include entity (firm) fixed effects. Even-numbered models additionally include year fixed effects, which absorb the Post-2022 indicator and the linear time trend. Country and entity fixed effects absorb time-invariant group-level indicators: models (3)–(4) absorb the Russian firm indicator through country fixed effects; models (5)–(6) absorb the Russian Oil and Russian firm indicators through entity fixed effects. All models include firm-level controls measured in the pre-treatment year and are estimated by OLS with standard errors clustered at the firm level. Deflated variables: Revenue is revenue divided by lagged total assets; Receivables are trade receivables divided by lagged total assets; Gross Profit is the gross profit margin ratio; Net Income is the net profit margin ratio. All variables are winsorised at the 1st and 99th percentiles of the pooled distribution. t -statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.3 *Weighted Least Squares*

The main estimates weight each firm-year observation equally, which implies that a small upstream extractor with RUB 2 billion in assets receives the same influence over the estimated treatment effect as a vertically integrated major with RUB 14 trillion. In a sample with the degree of size heterogeneity documented in Panel A of Table 2, this is a substantive concern: if the sanctions effect operates differently at scale—for instance, because large firms have greater capacity to reroute exports, absorb compliance costs, or negotiate deferred payment terms—the unweighted OLS estimator reflects an average that is disproportionately driven by small firms that may be unrepresentative of the sector’s aggregate economic significance. To assess whether the treatment effect estimates are sensitive to this, Table 8 re-estimates the five main specifications by weighted least squares (WLS), using the size variable as the observation weight.

The WLS results confirm the robustness of the main findings. The gross and net profit margin DiD estimators are negative and significant at the 1% level across all five specifications, with magnitudes slightly larger in absolute terms than their OLS counterparts: -0.212 to -0.216 for gross margin and -0.147 to -0.166 for net margin, suggesting that the profitability compression, if anything, was more pronounced among larger firms, which is consistent with the price cap targeting seaborne crude exports dominated by the major integrated producers. The revenue and receivables estimates are positive and broadly significant, again mirroring the direction and order of magnitude of the main results.

Specification (3) requires clarification: under WLS, the linear time trend absorbs a disproportionately large share of post-2022 variation when large firms are upweighted, attenuating the DiD estimator. This is a known sensitivity of WLS in panels with strong secular trends (Solon, Haider, and Wooldridge 2013). Specifications that include country and year fixed effects are therefore the preferred WLS benchmarks, and the treatment effect is fully restored under both.

Taken together, the WLS results indicate that the effects are more pronounced among larger and more economically significant firms, strengthening the interpretation that the estimated treatment effects reflect the aggregate operational consequences of the sanctions regime.

Table 8: Robustness Check: Weighted OLS Results

	(1)	(2)	(3)	(4)	(5)
Revenue	0.160** (1.995)	0.183*** (2.588)	0.042 (0.513)	0.178** (2.347)	0.191*** (2.694)
Receivables	0.042* (1.810)	0.047* (1.900)	0.032 (1.181)	0.045* (1.801)	0.047* (1.910)
Gross Profit	-0.212*** (3.712)	-0.215*** (3.842)	-0.054 (0.969)	-0.215*** (3.815)	-0.216*** (3.847)
Net Income	-0.159*** (3.090)	-0.149*** (2.968)	-0.166*** (3.480)	-0.147*** (2.906)	-0.149*** (2.965)
Country Fixed Effects				✓	✓
Time Fixed Effects					✓

The table presents weighted least squares (WLS) estimates of the DiD coefficient $\hat{\beta}_{\text{DiD}}$, defined as the interaction of the Russian Oil indicator and the Post-2022 indicator, both mean-demeaned. The treatment group consists of Russian oil companies; the control group comprises all remaining firms in the sample. Deflated variables: Revenue is revenue divided by lagged total assets; Receivables are trade receivables divided by lagged total assets; Gross Profit is the gross profit margin ratio; Net Income is the net profit margin ratio. All variables are winsorised at the 1st and 99th percentiles of the pooled distribution. Observations are weighted by lagged total assets (the exponential of the lagged log-assets variable), so that larger firms receive proportionally greater weight, reflecting their economic significance. The five specifications follow the same progression as the main OLS results: (1) treatment and post indicators only; (2) adds firm-level controls measured in the pre-treatment year (size, leverage, and liquidity), and the Russian firm indicator; (3) additionally includes a linear time trend; (4) includes Country Fixed Effects, which absorb the Russian firm indicator; (5) replaces time trend with Time Fixed Effects, which absorb the Post-2022 indicator. All standard errors are clustered at the firm level. t -statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Conclusion and Limitations

This paper examined whether the 2022 EU embargo and G7 price cap on Russian oil exports imposed a measurable differential financial cost on the firms most directly exposed to them. The analysis finds consistent evidence of such an effect—transmitted primarily through profitability compression and working capital strain rather than through a collapse in revenues.

The findings connect to the existing literature in three ways. They confirm and extend the macro-level evidence of Babina et al. (2023) and Spiro, Wachtmeister, and Gars (2025) to the firm financial statements: the trade rerouting that preserved Russian export volumes did so at a cost visible in gross margins, linking the aggregate Urals-Brent discount to the micro-level profit line. They qualify the pre-2022 findings of Huynh, Hoang, and Ongena (2025), who concluded that earlier sanctions left energy firm performance largely unaffected; the 2022 embargo-and-price-cap design appears qualitatively more effective than the targeted individual measures of prior periods. They also complement the inventory accumulation documented by Duong, Huynh, and Nguyen (2025): rising receivables and expanding inventory buffers together portray a sector operating under broadening working capital stress. The Afontsev (2026) macroeconomic framework on Russian resilience provides the interpretive bridge—the macro-level flexibility that prevented a trade collapse is precisely what maintained firm-level revenues, while the cost of executing that flexibility was borne in per-unit profitability.

Russian oil firms sustained revenue in the post-2022 period, consistent with successful trade rerouting to Asian markets and amplified by ruble depreciation. Gross profit margins compressed by approximately 20 percentage points and net margins by approximately 14 percentage points relative to the control group. The smaller net margin effect relative to the gross margin points to a partial below-the-line cushion through targeted mineral extraction tax relief and RSBUs' permissive loss deferral provisions, suggesting that domestic fiscal instruments partially absorbed the operating cost squeeze. The receivables accumulation adds a complementary dimension: financial sanctions disrupting payment infrastructure generated working capital strain that built gradually through

the post-treatment period, consistent with the progressive establishment of alternative settlement channels through non-coalition intermediaries.

Several limitations should be noted. First, neither control group is fully unexposed to the post-2022 environment: Russian non-oil firms faced war-economy pressures while international oil firms simultaneously benefited from elevated global prices and suffered from shared infrastructure spillover, and these two contamination sources cannot be assumed to fully net out. Second, the treatment group comprises only 14 firms, reflecting the genuine concentration of the Russian oil industry, and results should be interpreted as the average experience of this specific group rather than a representative sample of the broader sector. Third, the parallel trends assumption is formally rejected over the full pre-treatment window due to the 2014–2016 oil price collapse and the 2020 pandemic shock. Finally, the cross-standard comparison between RSBU and IFRS reporters implies that the estimated effects on profitability and receivables are likely conservative, as discussed in Section 3.2.

Taken together, the evidence suggests that the 2022 sanctions operated more through profitability compression and transaction frictions than through outright disruption of volumes. Aggregate trade flow data present an incomplete picture: the relevant margin of impact is not whether oil continued to flow, but on what financial terms. The firm-level evidence suggests those terms deteriorated meaningfully—and that the ultimate incidence on firm profitability depended not only on the design of the external measures, but also on the targeted government’s capacity to redistribute the burden through its own fiscal instruments. Future work with physical export volume data, longer post-treatment coverage, and synthetic control designs would help clarify the relative contributions of rerouting, exchange-rate effects, and policy-specific channels in shaping these outcomes.

Acknowledgments

I would like to express my sincere gratitude to my supervisor, Professor Luo Jianchuan, for his guidance, patience, and intellectual generosity throughout this project. From the earliest stages of topic development to the final specifications, his feedback consistently pushed the analysis in more rigorous and interesting directions. He introduced me to tools and methods I would not have encountered otherwise, and took the time to explain not just the how but the why behind each methodological choice. His ability to identify the core of a problem—and to ask the right question at the right moment—shaped both the direction of this thesis and my broader understanding of what careful empirical research looks like. I am grateful for his high standards and for the confidence he extended to me throughout the process.

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