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Environmental Commitments in the African Oil Sector: Sustainability or Greenwashing?

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📄 Robustness and Mechanism Tests

- ✅ No single year drives the effect (jackknife by year).
- ✅ No single country drives the effect (jackknife by country).
- 📈 Nigeria: stronger effect → consistent with Western firm pressure.
- 📉 Algeria: weaker effect → likely due to Sonatrach enforcement.
- 🐳 Not solely driven by high-flaring countries.
- ⚖️ Confirms operator-led mechanism (e.g., operator change without ownership change).

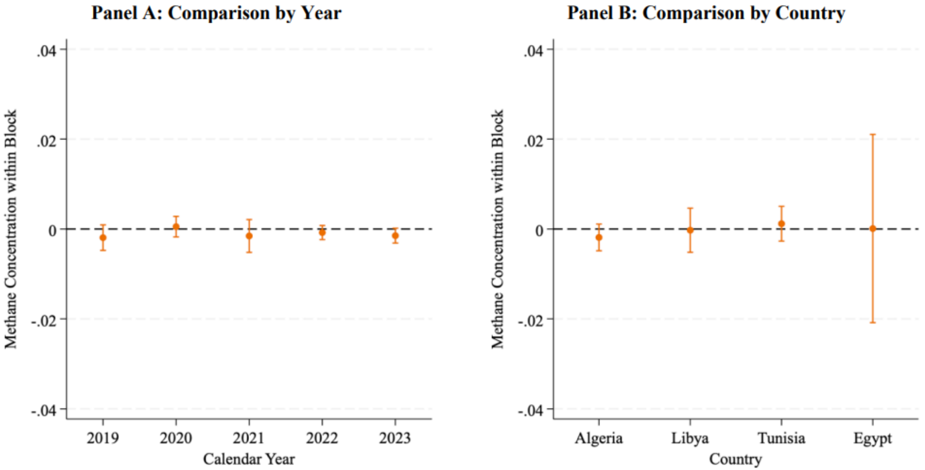
📊 Main Results (Superficially)

- ✅ ZRF commitments lead to global reductions in gas flaring.
- 💡 Reductions driven by operational improvements, not asset divestitures.
- ⚖️ Net annual cut of 58M metric tons CO_2-eq in Africa — equivalent to removing **12.6M cars** or **14% of global flaring from Africa**.

Main Results (Conceptually) 🍖

- 🧠 **Granular, Measurable Effects of Voluntary Disclosure**: Observing continuously operated blocks, newly awarded blocks, and divested blocks. Net welfare increases.
- 🧠 **Improvement Leapfrogs in low-regulatory environments**: Stronger incentives where regulatory baselines are low. Lower and cheaper baselines, plus becoming a low-cost place to show progress
- 🧠 **Firm-wide commitments prevent leakage**: Zero-sum game when it is a firm-wide commitment compared to carbon leakage to developing countries

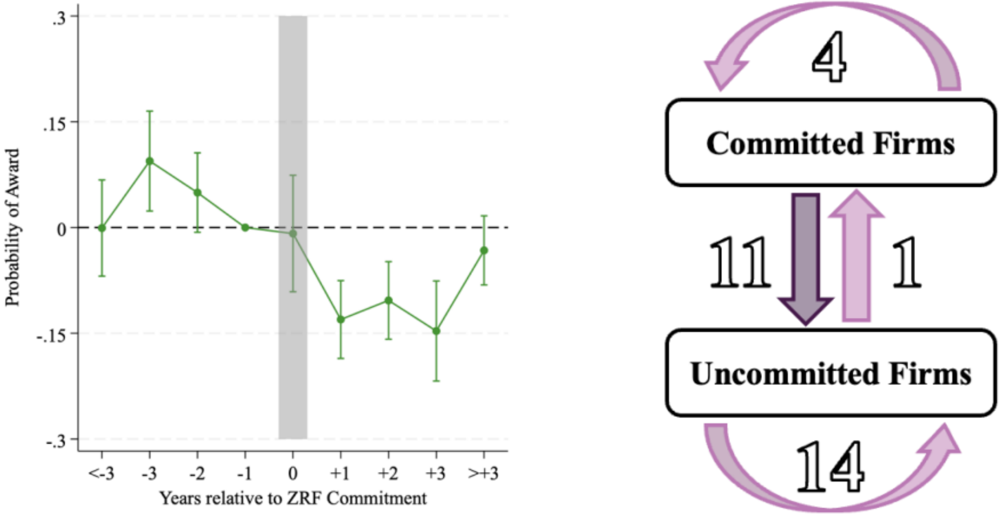
Figure 8. Methane Emissions for Continuous Operators



Notes: This figure shows coefficient estimates and 95% confidence intervals for OLS regressions estimating differences in methane concentrations between committed and uncommitted blocks in Northern Africa. Panel A estimates the model from Eq. (2), which compares methane concentrations separately for each year. Panel B estimates the model from Eq. (3), which compares methane concentrations separately for each country. The sample is a subset of the one described in Section IA2 of the Internet Appendix, including only blocks located in Algeria, Libya, Tunisia, and Egypt. The sample is a panel of oil blocks from 2012 to 2023. Standard errors are clustered at the operator level.

Figure 9. Commitments and Ownership Flows

Panel A: Probability of Awards **Panel B: Frequency of Divestitures**



Notes: This figure shows coefficient estimates and 95% confidence intervals for OLS regressions estimating the probability of awards around corpora
commitments and changes in natural gas flaring around awards in Africa. Panel A estimates the dyadic regression model from Eq. (4), which compares t

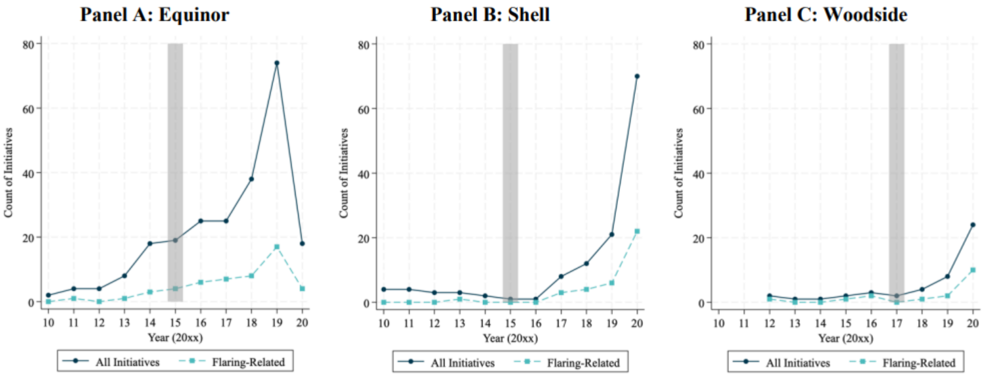
💡 Key Takeaways

- ⚖️ **Commitments:** Not causal, but real improvements follow
- 📊 **Literature contrast:** Divestitures here are rare but much more costly.
- 🐳 **Mechanism:** Illiquid African blocks + weak governance → firms improve rather than sell.
- 💡 **Surprise:** Global commitments incentivize cleanup in weak states, which is the opposite of carbon leakage under taxes.

Critique

- The absence of cost estimates limits the ability to evaluate whether ZRF compliance is economically efficient, whether it's sustainable across firms, or whether firms are strategically shifting costs elsewhere.
- Excessive flaring in weakly governed African states like Nigeria has historically led to severe community unrest, including violence and insurgency, due to environmental degradation and exclusion from oil benefits. While the paper shows reductions in flaring, it does not examine whether these operational improvements translate into local welfare gains that could prevent future instability. (Niger Delta Conflict)
- The observation that certain national oil companies (e.g., Sonatrach) exhibit flaring performance on par with or better than multinational firms challenges the interpretation that voluntary CSR commitments are the primary driver of environmental improvement. Instead, variation in flaring outcomes may be better explained by differences in ownership structure, domestic political control, and regulatory authority.
- Niger delta explains Figure 1 - perhaps a within conflict zone robustness test

Thank you



Notes: This figure shows the count of all and flaring-related internal corporate initiatives reported by Equinor, Shell, and Woodside to the Carbon Disclosure Project (CDP) over time. A flaring-related initiative is defined as one where flaring or methane is discussed in the textual description. The year of ZRF commitment is shaded in gray for each company.

Corporate Initiatives Reported to CDP

Figure 3. ZRF Commitments and Reported Gas Flaring

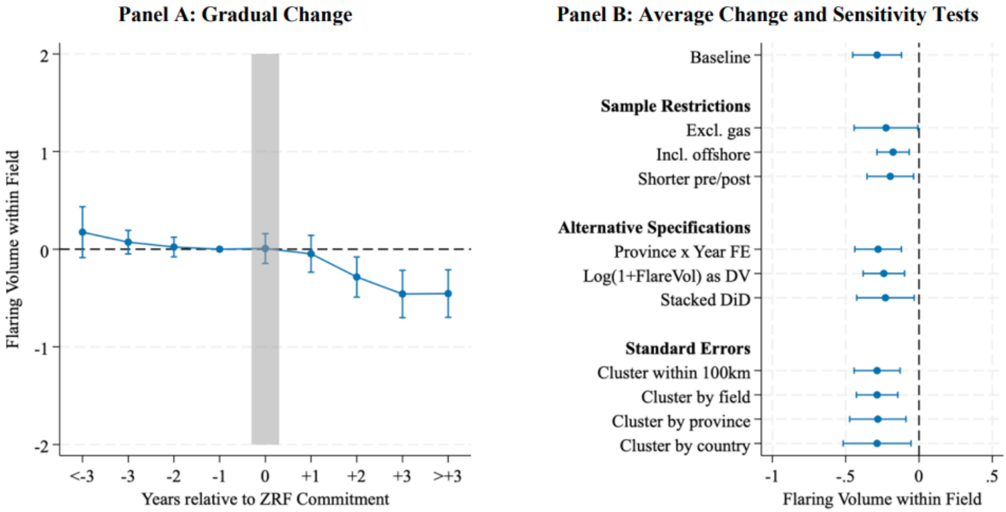
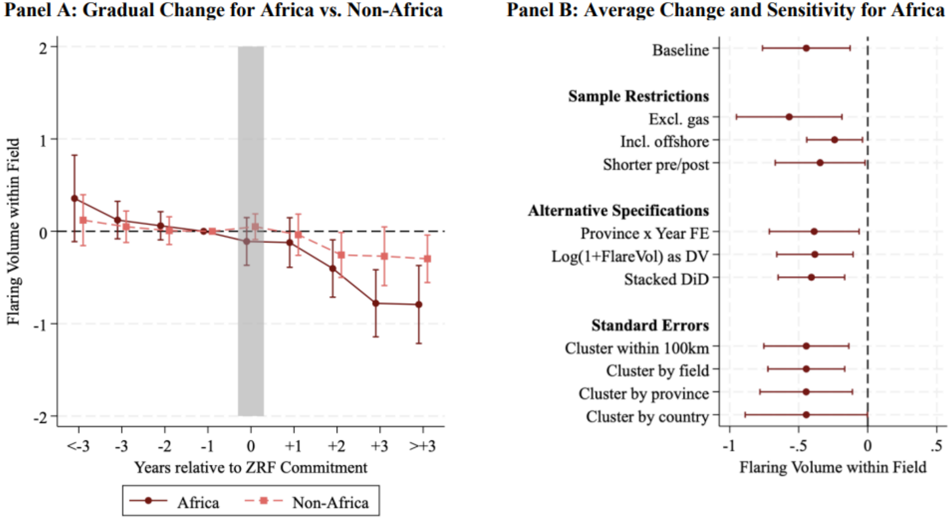


Figure 5. ZRF Commitments and Reported Gas Flaring by Region



Notes: This figure shows coefficient estimates and 95% confidence intervals for OLS regressions estimating changes in natural gas flaring around corporate commitments. Panel A separately estimates the model from Eq. (1) for African and non-African oil fields. Panel B replaces the *Year Relative to Commit* indicators with a single *PostCommit* indicator to estimate the average change at the year of commitment for African oil fields and several alternative specifications. The sample selection is described in Section IA2.1 of the Internet Appendix, and singletons are further dropped corresponding to the fixed-

Table 1. Comparison of Firms by Private Stakeholder Pressure

Indicator	Committed		Uncommitted	
	# Firms	%	# Firms	%
Publicly Traded Firm	24	66.67	13	13.27
Firm Releases ESG Report	28	77.78	16	16.33
Firm Responded to CDP	21	58.33	10	10.20
Firm Has ESG Score (Sustainalytics)	17	47.22	9	9.18
Total # Firms	36		98	

Notes: This table shows the number and percentage of committed and uncommitted firms that show various indicators of private stakeholder pressure.

Table 3. Committed Firms and Continuously Owned African Blocks by Commitment Year

Commit Year	Companies in Sample		Cont. Operated Blocks	
	# Firms	%	# Blocks	%
	(1)	(2)	(3)	(4)
2015	9	52.94	47	24.23
2016	5	29.41	17	8.76
2017	1	5.88	4	2.06
2018	1	5.88	125	64.43
2019	0	0.00	0	0.00
2020	0	0.00	0	0.00
2021	1	5.88	1	5.15
2022	0	0.00	0	0.00
Total	17	100.00	194	100.00

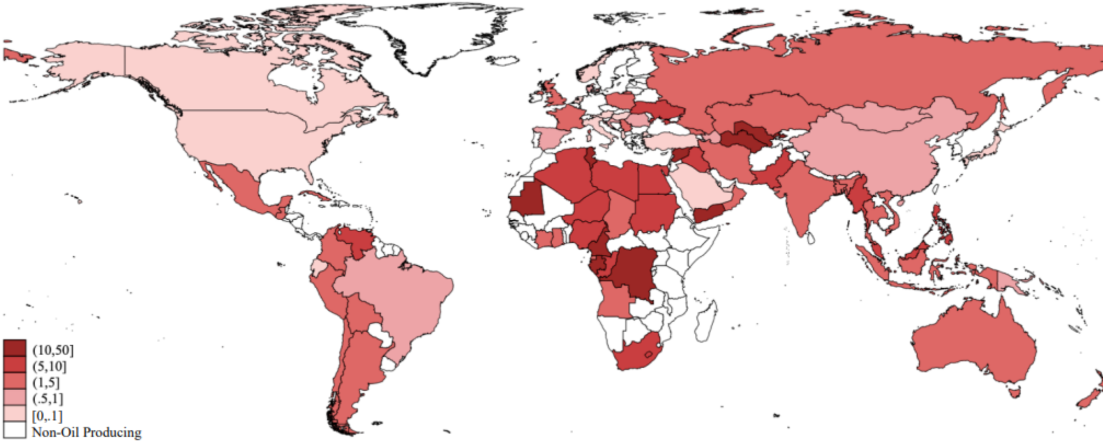
Notes: This table separates committed companies and continuously operated oil blocks in Africa by year and displays the temporal distribution of commitments for companies and blocks. Columns (1) and (2) describe companies within our *Enverus* sample. Columns (3) and (4) describe continuously operated oil blocks within our *Enverus* sample.

Table 2. Committed Firms and Global Fields by Commitment Year

Commit Year	Companies in Sample		Reported Fields	
	# Firms	%	# Fields	%
	(1)	(2)	(3)	(4)
2015	15	41.67	198	37.79
2016	7	19.44	82	15.65
2017	2	5.56	17	3.24
2018	2	5.56	100	19.08
2019	1	2.78	41	7.82
2020	2	5.56	47	8.97
2021	6	16.67	31	5.92
2022	1	2.78	8	1.53
Total	36	100.00	524	100.00

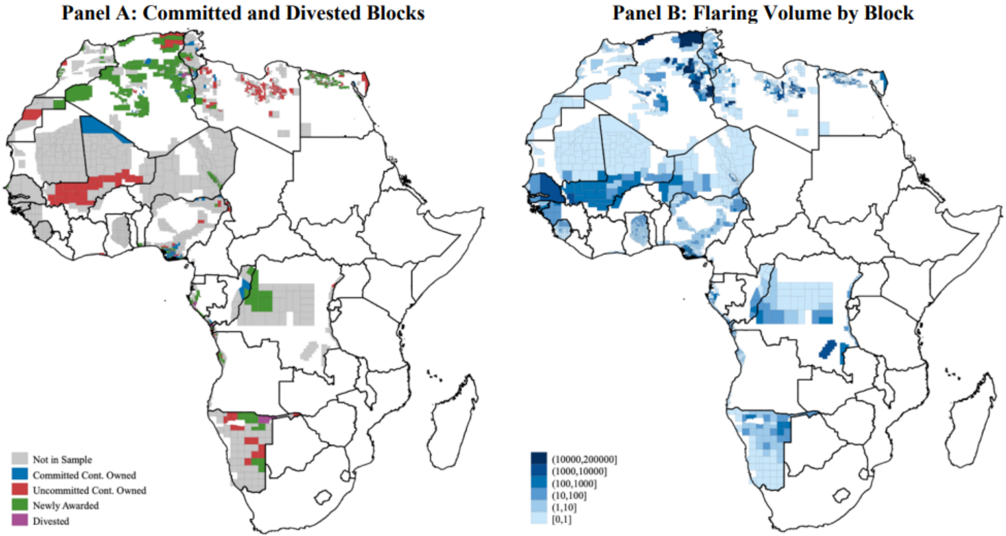
Notes: This table separates committed companies and oil fields across the world by year and displays the temporal distribution of commitments for companies and fields. Columns (1) and (2) describe companies within our World Bank sample. Columns (3) and (4) describe oil fields within our World Bank sample.

Figure 4. Flaring Scaled by Production Around the World in 2012-2014



Notes: This figure shows total flaring volumes divided by total oil production for oil-producing countries around the world between 2012 and 2014 (before ZRF commitments began). Country-level flaring volumes are collected from the World Bank *GFMR* dataset, and country-level oil production is collected from *Our World in Data* at https://ourworldindata.org/grapher/oil-production-by-country.

Figure 6. Blocks and Gas Flaring in Africa



Notes: This figure shows the geographical distribution of oil-producing blocks and gas flaring in Africa. Panel A separates blocks by ownership status, classifying blocks as continuously operated by a committed firm, continuously operated by an uncommitted firm, awarded, or divested during our sample period (2012–2023). Panel B is a heat map showing the total flaring volume in each block across our entire sample period (2012–2023).

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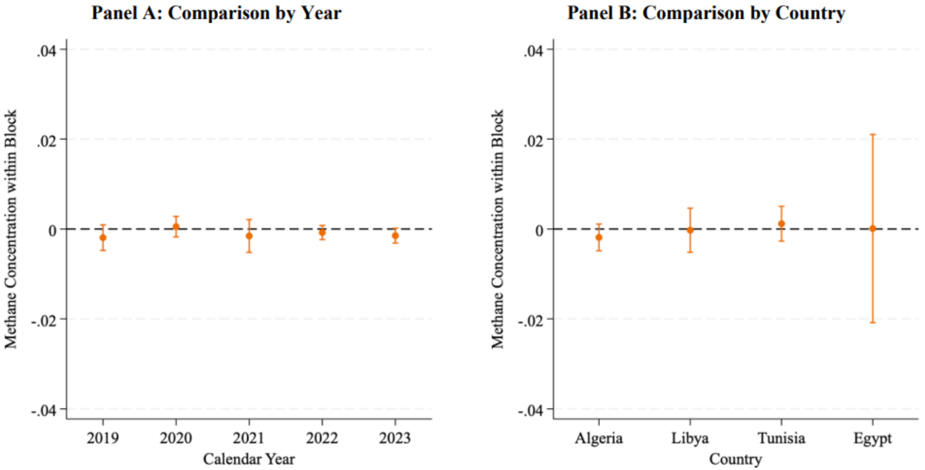

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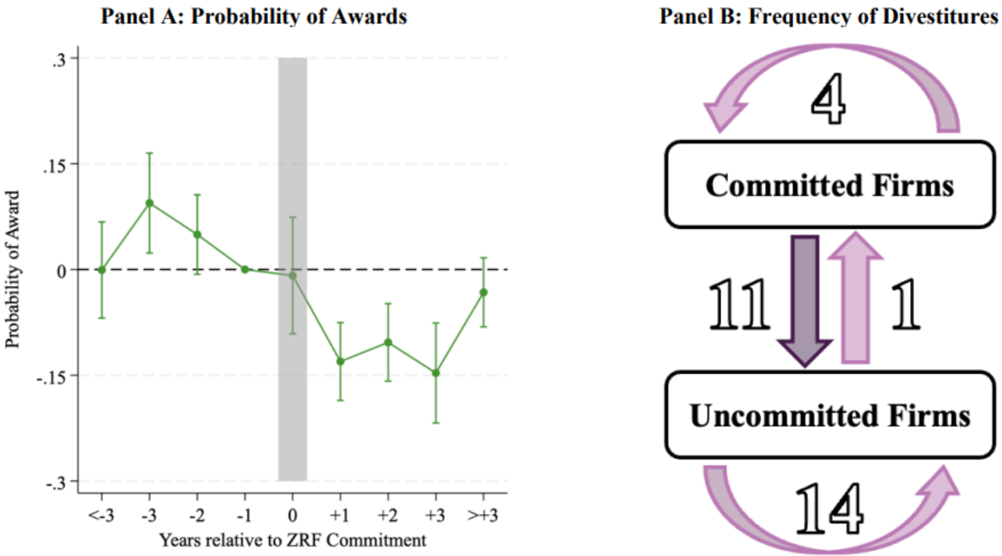

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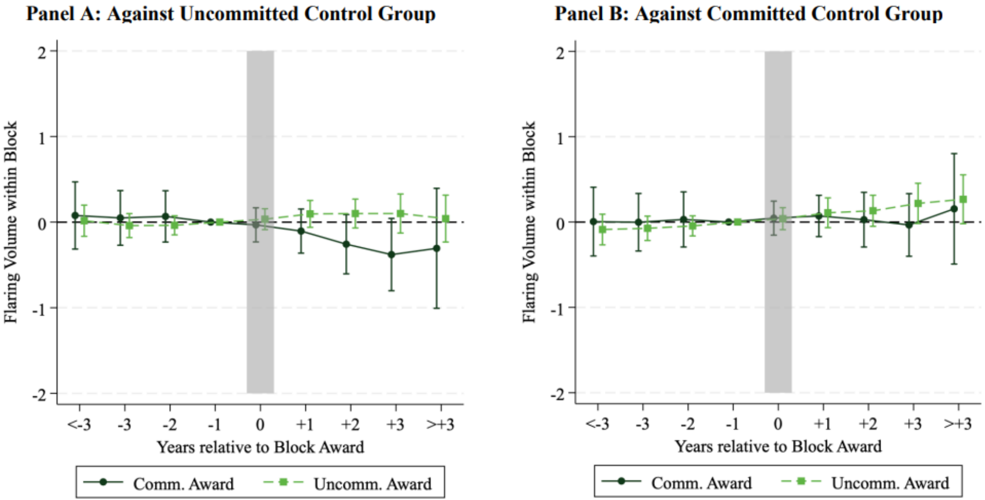
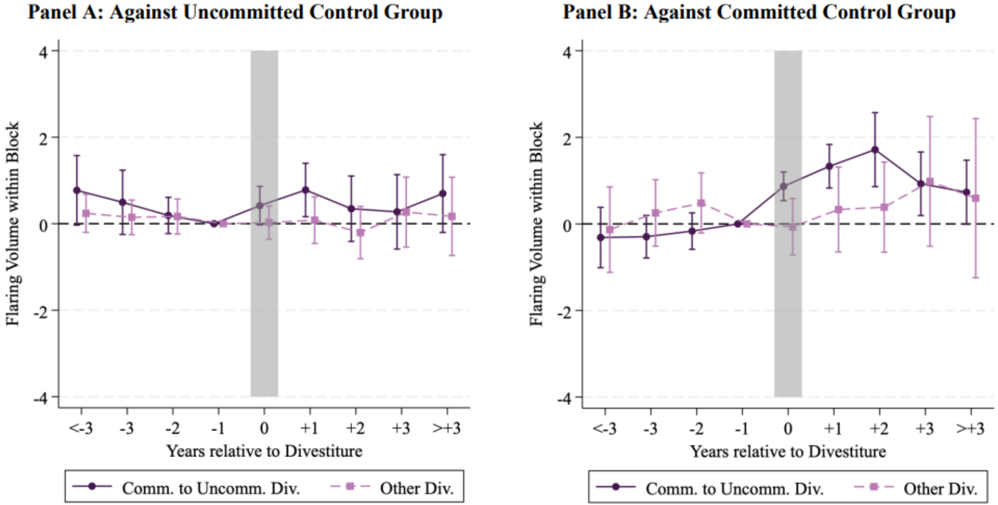
Figure 10. Awards and Gas Flaring



Notes: This figure shows coefficient estimates and 95% confidence intervals for OLS regressions estimating changes in natural gas flaring around awards in Africa. Panel A (B) estimates the model from Eq. (5), which separately compares flaring volumes in oil blocks awarded to committed and uncommitted firms against a control group of blocks continuously operated by uncommitted (committed) firms. The sample selection is described in Section IA2.3 of the Internet Appendix, and singletons are further dropped corresponding to the fixed-effect structure if necessary. The sample in Panel A for committed (uncommitted) awards is a balanced panel of oil blocks from 2012 to 2023. The sample in Panel B for committed (uncommitted) awards is a balanced panel of oil blocks from 2012 to 2023. Standard errors are clustered at the block level.

Figure 11. Divestitures and Gas Flaring



Notes: This figure shows coefficient estimates and 95% confidence intervals for OLS regressions estimating changes in natural gas flaring for divested blocks in Africa. Panel A (B) estimates the model from Eq. (6), which separately compares flaring volumes in oil blocks divested from committed to uncommitted firms and between other combinations of firms against a control group of blocks continuously operated by uncommitted (committed) firms. The sample selection is described in Section IA2.3 of the Internet Appendix, and singletons are further dropped corresponding to the fixed-effect structure if necessary. The sample in Panel A for committed-to-uncommitted (other) divestitures is a balanced panel of oil blocks from 2012 to 2023. The sample in Panel B for committed-to-uncommitted (other) divestitures is a balanced panel of oil blocks from 2012 to 2023. Standard errors are clustered at the block level.