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Climate Target Adoption and Emissions Dynamics in Oil & Gas

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ABSTRACT

Oil and gas companies are under growing pressure to set climate targets, but evidence linking these targets to near-term emission changes is limited. We analyze a balanced panel of 168 firm-years (2021–2024) across the oil and gas value chain, examining the relationship between greenhouse gas (GHG) changes and the adoption of short-term (ST) and long-term (LT) emissions targets, along with Sustainable Development Goal 13 (SDG13) commitments, while controlling for profitability, leverage, and firm size. Our methodology includes firm fixed effects and SECTOR×year fixed effects, with dynamics assessed through event studies.
Descriptive statistics show a sharp increase in LT target adoption, from 28.6% in 2021 to 90.5% by 2024, while ST target adoption remains low, between 9% and 26%. By 2023-2024, SDG13 commitments are nearly fully adopted at around 100%. In our fixed-effects models, higher ST target intensity significantly reduces GHG emissions, while LT target effects are delayed. Event studies indicate immediate reductions in emissions after ST adoption and delayed impacts from LT targets, with SDG13 commitments spiking at announcement, aligning more with disclosure timing than operational changes. Segment-level analysis shows significant variability: Midstream has the largest reductions, Crossstream has reductions linked to ST targets and declines related to SDG13, while other segments show weaker results. Non-parametric tests confirm year effects in GHG emissions and notable shifts in LT target intensity after 2022. In summary, ST targets may stimulate operational adjustments, whereas LT targets help establish trajectories that become evident over time. These findings provide valuable insights for designing and sequencing targets aimed at achieving credible decarbonization in challenging sectors.

Keywords: decarbonization; event study; fixed effects; panel data; value chain