Supporting Information: Fossil Fuel Subsidy Reforms Have Become More Fragile

Paasha Mahdavi[1], Michael L. Ross[2], Evelyn Simoni[2]

[1*]Department of Political Science and Environmental Science & Management, University of California, Santa Barbara.
[2]Department of Political Science, University of California, Los Angeles.

Contributing authors: paasha@ucsb.edu; mlross@polisci.ucla.edu; evesimoni@ucla.edu;

S1 Visualizing Reforms

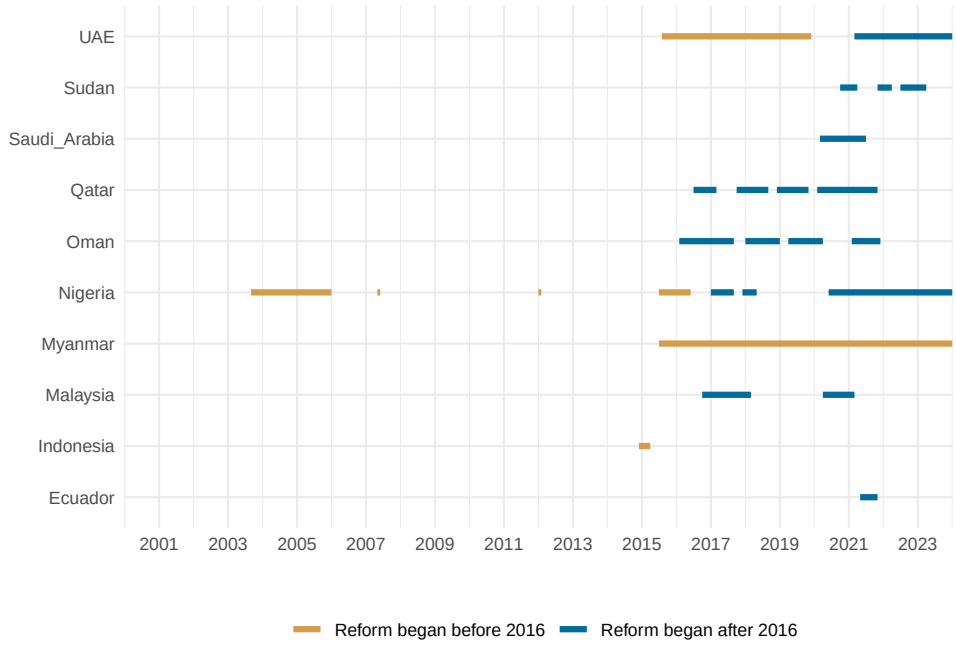


Fig. S1: Periods of Fixity Reform.

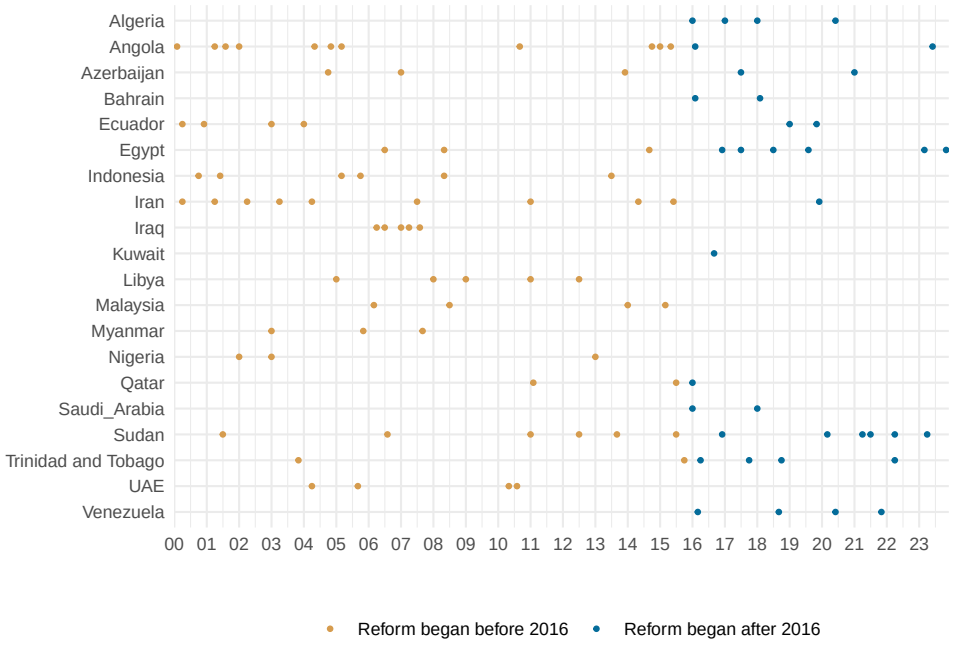


Fig. S2: Increases of Monthly Prices Above 10 percent.

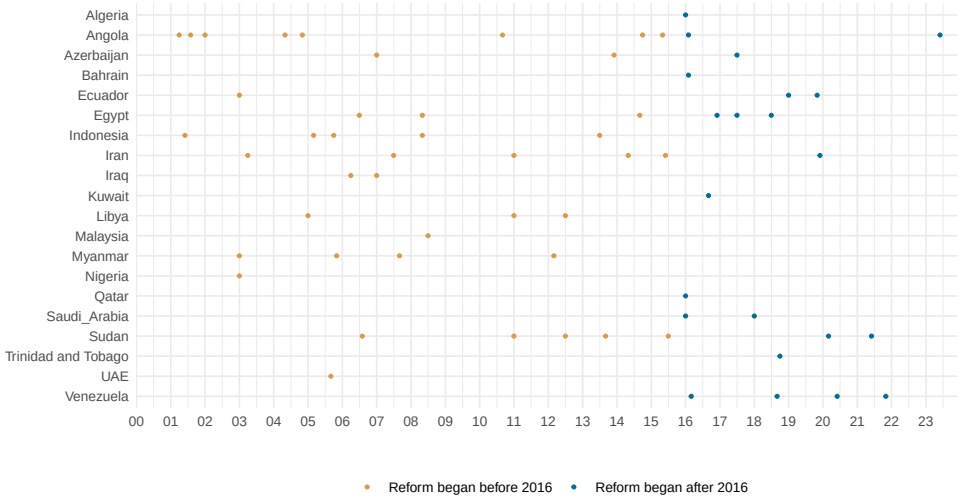


Fig. S3: Increases of Quarterly Prices Above 25 percent.

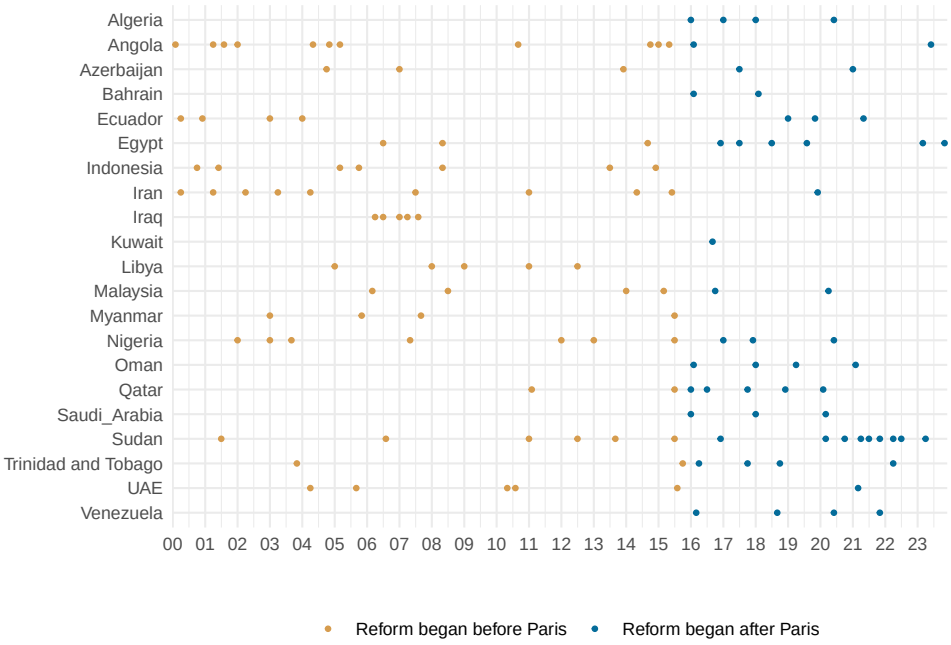


Fig. S4: Instances of Any Type of Reform.

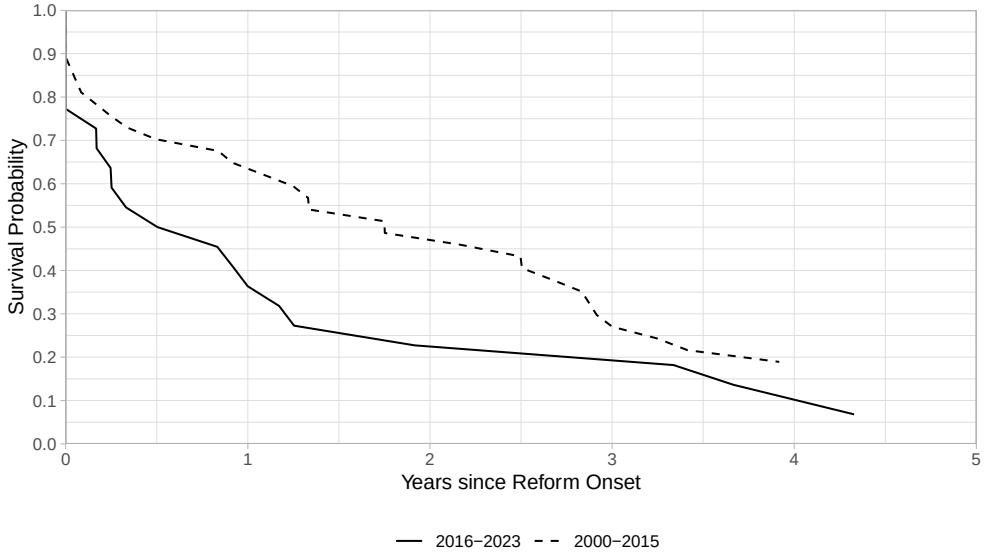


Fig. S5: Survival Estimates for Price Reform 25 percent, 2000–2015 vs 2016–2023.

S2 Sensitivity Analysis

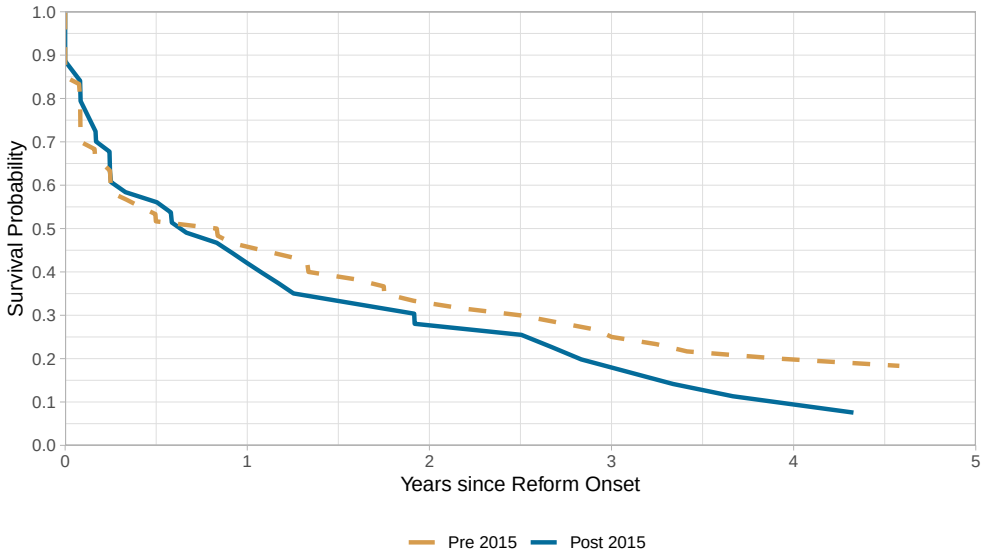
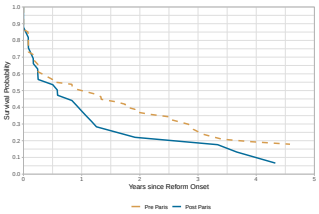
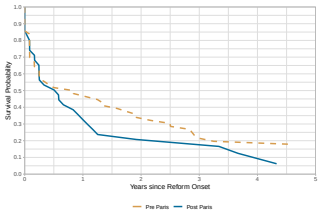


Fig. S6: Sensitivity Analysis: Kaplan-Meier survival rate of all subsidy reforms before (dashed orange) and after (solid blue) December 2014.

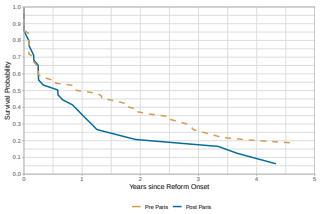
S3 Leave Out Analysis



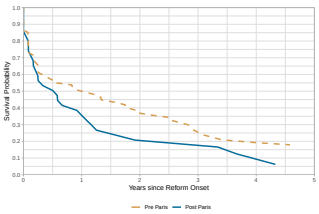
(a) Excluded: Algeria



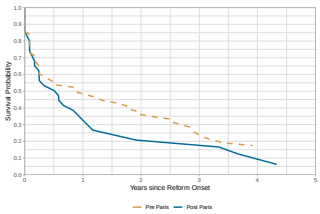
(b) Excluded: Angola



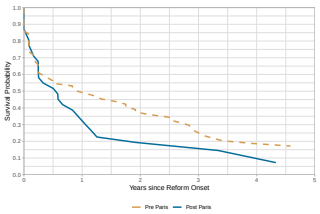
(c) Excluded: Azerbaijan



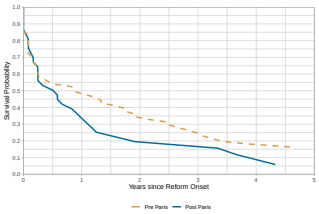
(d) Excluded: Bahrain



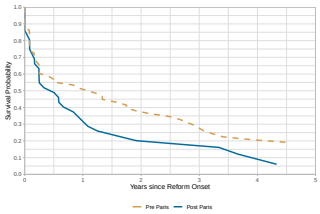
(e) Excluded: Ecuador



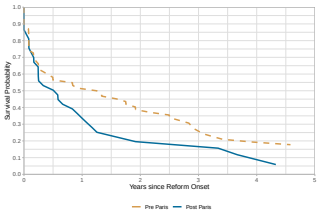
(f) Excluded: Egypt



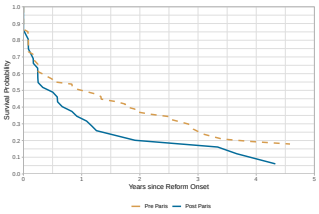
(g) Excluded: Indonesia



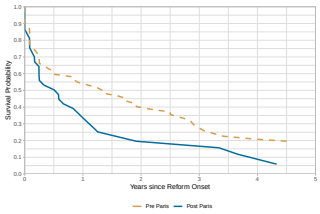
(h) Excluded: Iran



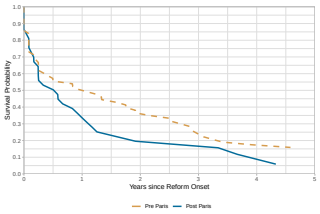
(i) Excluded: Iraq



(j) Excluded: Kuwait

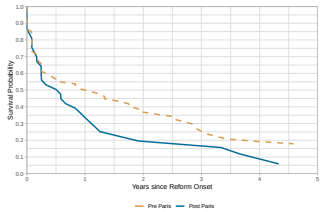


(k) Excluded: Libya

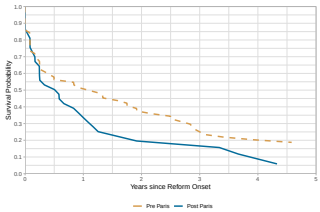


(l) Excluded: Malaysia

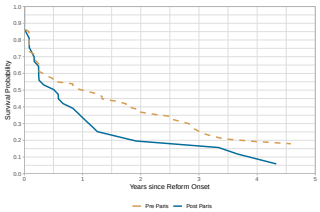
Fig. S7: Leave Out Analysis. Pre and Post 2016 (Part 1)



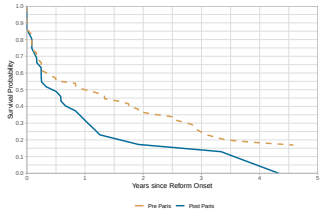
(m) Excluded: Myanmar



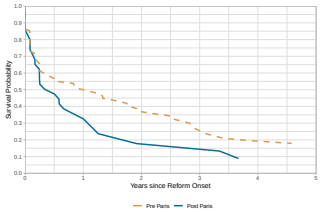
(n) Excluded: Nigeria



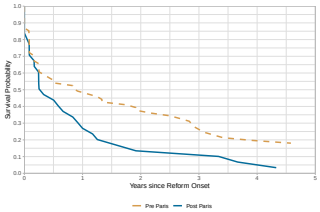
(o) Excluded: Oman



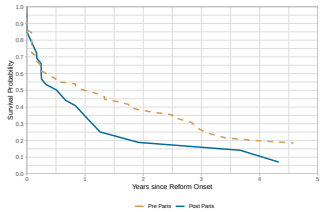
(p) Excluded: Qatar



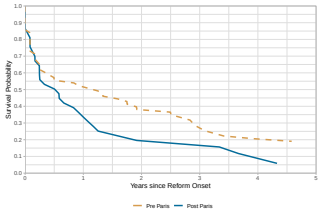
(q) Excluded: Saudi Arabia



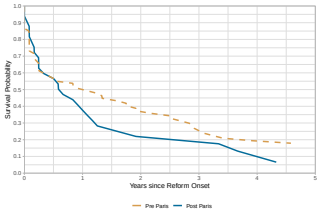
(r) Excluded: Sudan



(s) Excluded: Trinidad and Tobago

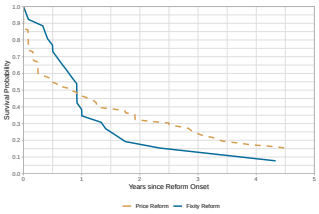


(t) Excluded: UAE

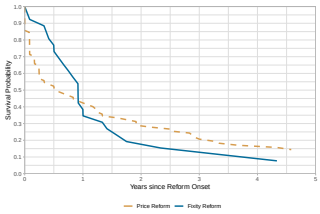


(u) Excluded: Venezuela

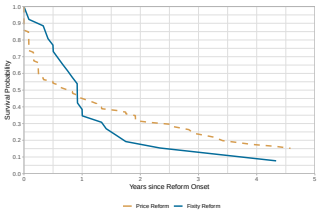
Fig. S7: Leave Out Analysis. Pre and Post 2016 (Part 2)



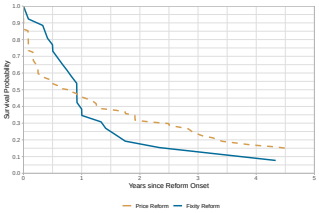
(a) Excluded: Algeria



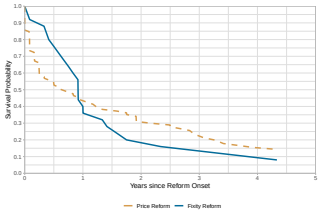
(b) Excluded: Angola



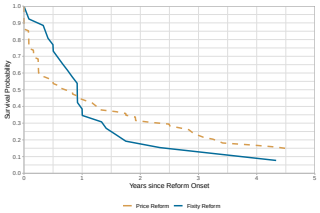
(c) Excluded: Azerbaijan



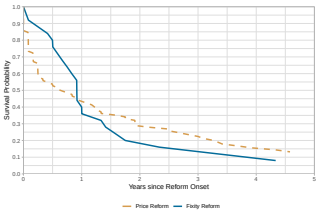
(d) Excluded: Bahrain



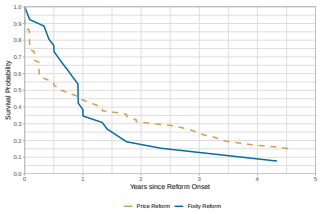
(e) Excluded: Ecuador



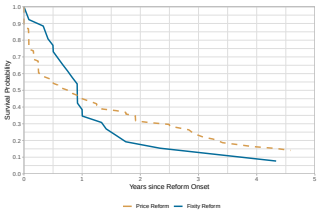
(f) Excluded: Egypt



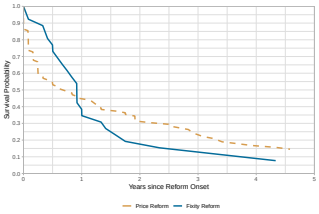
(g) Excluded: Indonesia



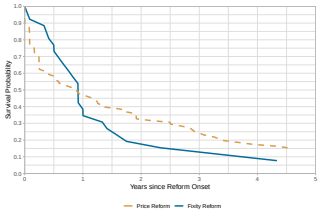
(h) Excluded: Iran



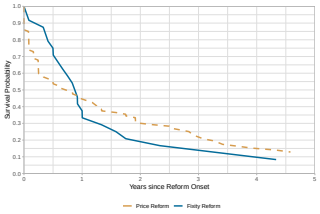
(i) Excluded: Iraq



(j) Excluded: Kuwait

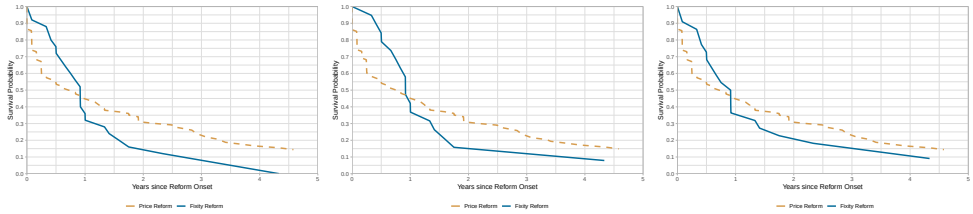


(k) Excluded: Libya

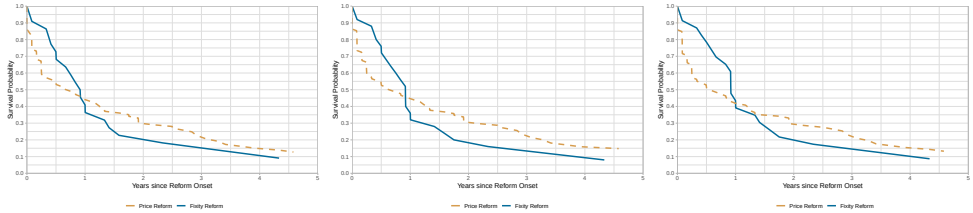


(l) Excluded: Malaysia

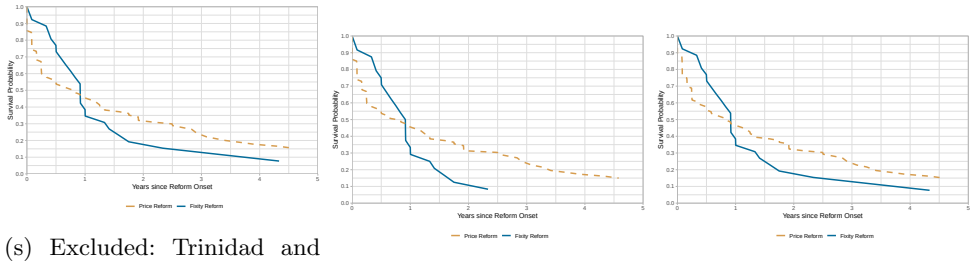
Fig. S8: Leave Out Analysis. Fixity versus Price Reforms (Part 1)



(m) Excluded: Myanmar (n) Excluded: Nigeria (o) Excluded: Oman



(p) Excluded: Qatar (q) Excluded: Saudi Arabia (r) Excluded: Sudan



(s) Excluded: Trinidad and Tobago (t) Excluded: UAE (u) Excluded: Venezuela

Fig. S8: Leave Out Analysis. Fixity versus Price Reforms (Part 2)

S4 Oil price volatility Analysis

We assess whether the differences in subsidy reform failure rate before and after December 2015 coincide with differences in the volatility of oil markets. Here we conduct a separate analysis using daily Brent prices from the EIA, using two measures of volatility: (1) standard deviation and (2) dispersion, which is the product of standard deviation and the square root of the number of time periods. The latter is a commonly used metric in the finance literature to evaluate the volatility of stock prices.

Across both metrics, volatility in oil prices is lower in the 2016-2023 period than the 2000-2015 period.

This is also generally the case for an annualized measure of dispersion, which shows that the two most volatile years in the pre-2016 period (the Financial Crisis of 2008 and the oil crash of 2014) had higher dispersion than the two most volatile years in the 2016-2023 period (the Covid-19 Pandemic in 2020 and the Ukraine invasion in

Table S1: Comparison of Oil Volatility in 2000-2015 versus 2016-2023.

Period	Days (t)	Standard deviation	Dispersion ($SD * \sqrt{t}$)
2000-2015	4061	32.8	2088
2016-2023	2031	20.4	919

2022). If we consider only the period after the 2008 Financial Crisis, then volatility is roughly the same in the 2016-2023 period as in the 2009-2015 period. In either case, there is little evidence that an increase in volatility accounts for the rise in reform attempts or reform failures in the post-2015 period.

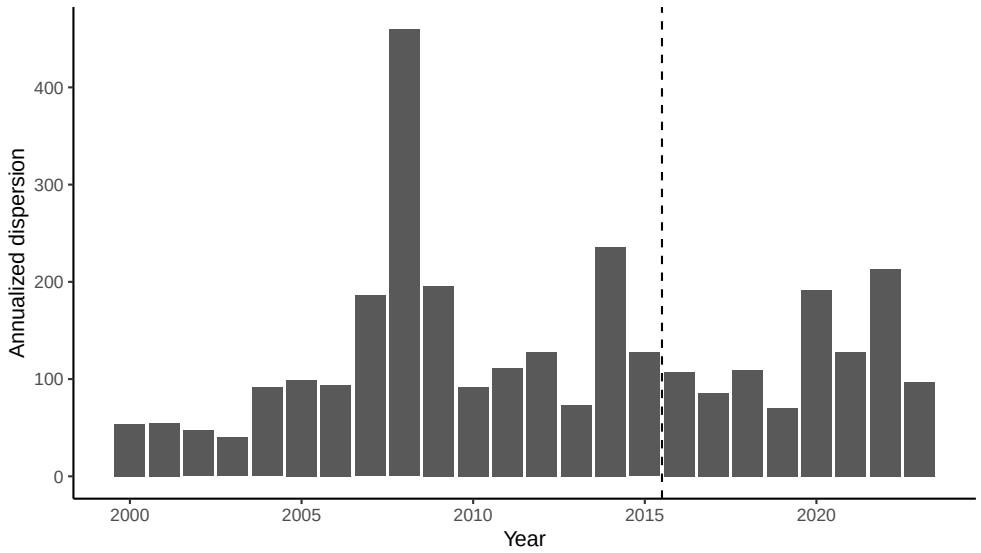


Fig. S9: Daily oil price volatility, 2000-2023. Data from the U.S. Energy Information Administration: "Europe Brent Spot Price FOB."