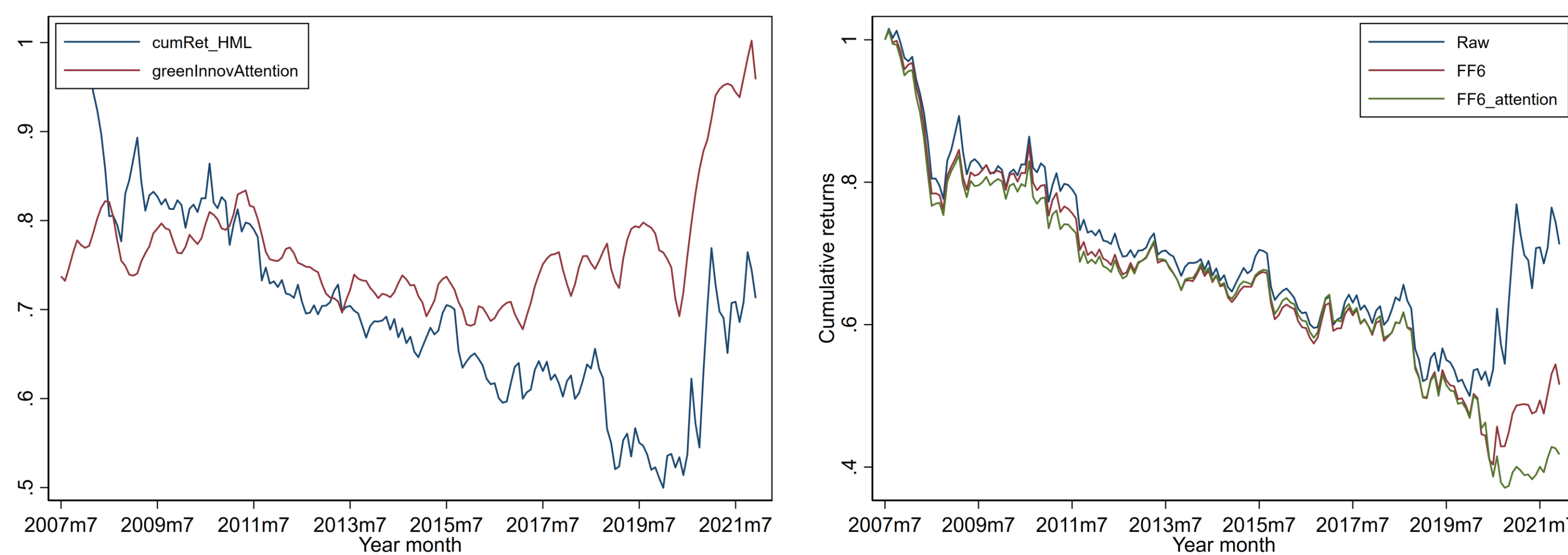


Firms inventing and adopting green technologies, including many from carbon-intensive sectors, exhibit lower expected returns than their industry peers.



Main contribution

(1) New measure:

Provide a **firm-level green innovation measure** by utilizing **ClimateBERT** and **GPT-3** models on earnings call transcripts.
 → categorize firms into **green inventors** and **green adopters**.
 → climate policies effectively incentivize green innovation but predominantly among financially unconstrained companies within the green inventors.

(2) Asset pricing implications:

Companies with increased green innovation experience:
 1. **lower expected returns**.
 2. **reduced carbon emissions** and **fewer climate incidents**.
 3. **value increase** during enforcement of **stringent climate regulations** and **recent heightened attention**.
 → Pricing effects are most pronounced for clean energy and electricity power.



The Green Innovation Premium
 Markus Leippold, Tingyu Yu
 University of Zurich tingyu.yu@uzh.ch

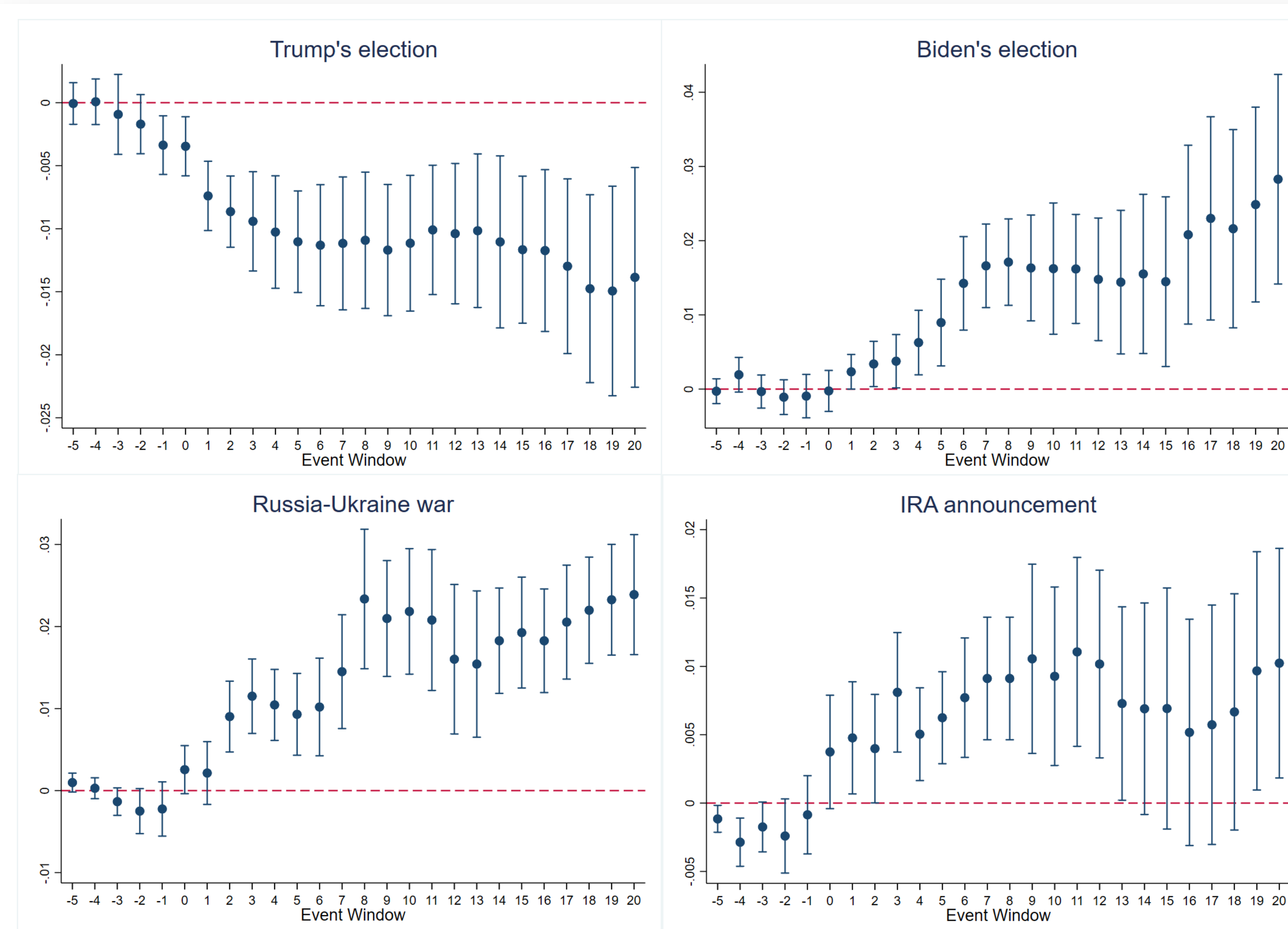
The negative premium

A portfolio that is long (short) on firms with low (high) green innovation activities generates an **average return of about 6% per year**.

The recent two-year surge in investor attention to green innovation results in **increased demand and prices** for green innovating firms.

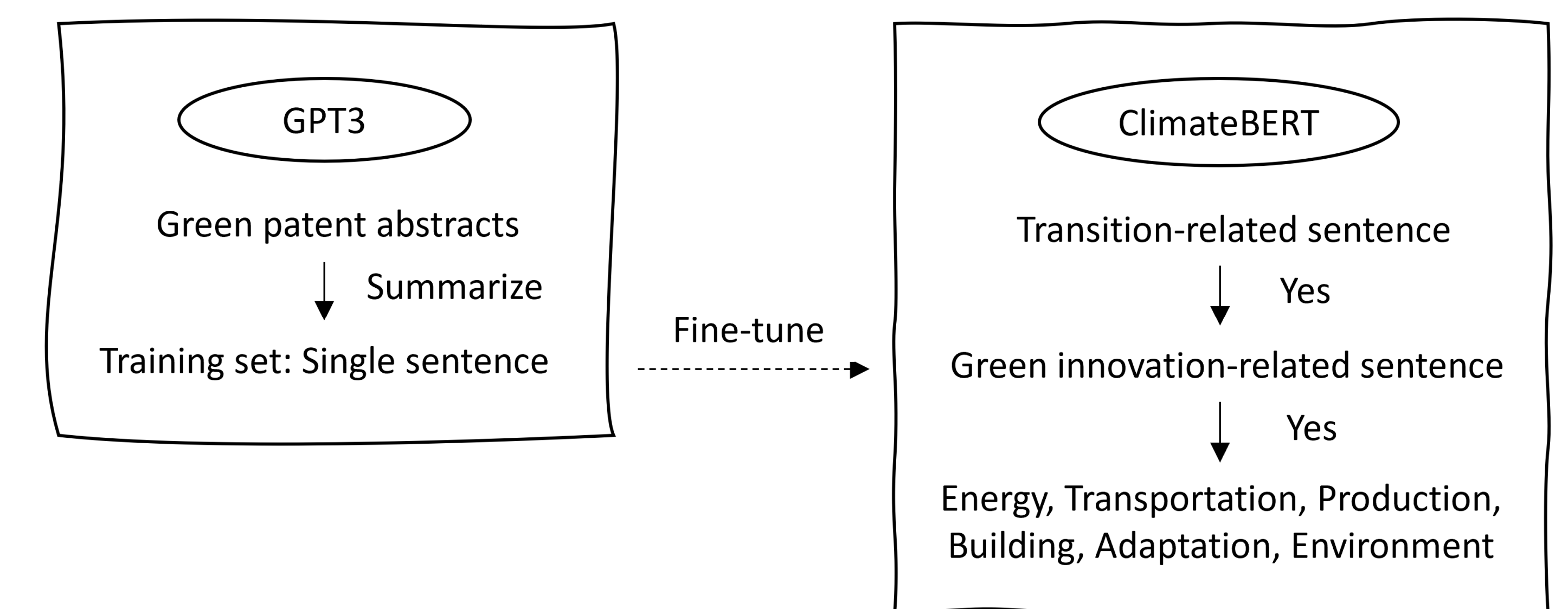
	Low	2	3	4	High	HML	FF3+Mom	FF5	HXZ q
vw	1.03**	0.90***	0.45	0.70*	0.57	-0.46***	-0.52***	-0.53**	-0.46**
	(2.38)	(2.63)	(0.94)	(1.74)	(1.15)	(-2.88)	(-2.67)	(-2.50)	(-2.32)
ew	0.85*	0.68	0.54	0.59	0.09	-0.77***	-0.77***	-0.67***	-0.73***
	(1.77)	(1.19)	(0.97)	(1.24)	(0.16)	(-5.51)	(-4.76)	(-3.81)	(-4.11)

Green innovating firms exhibit **greater resilience and adaptability** when facing potentially **stringent environmental policies**.



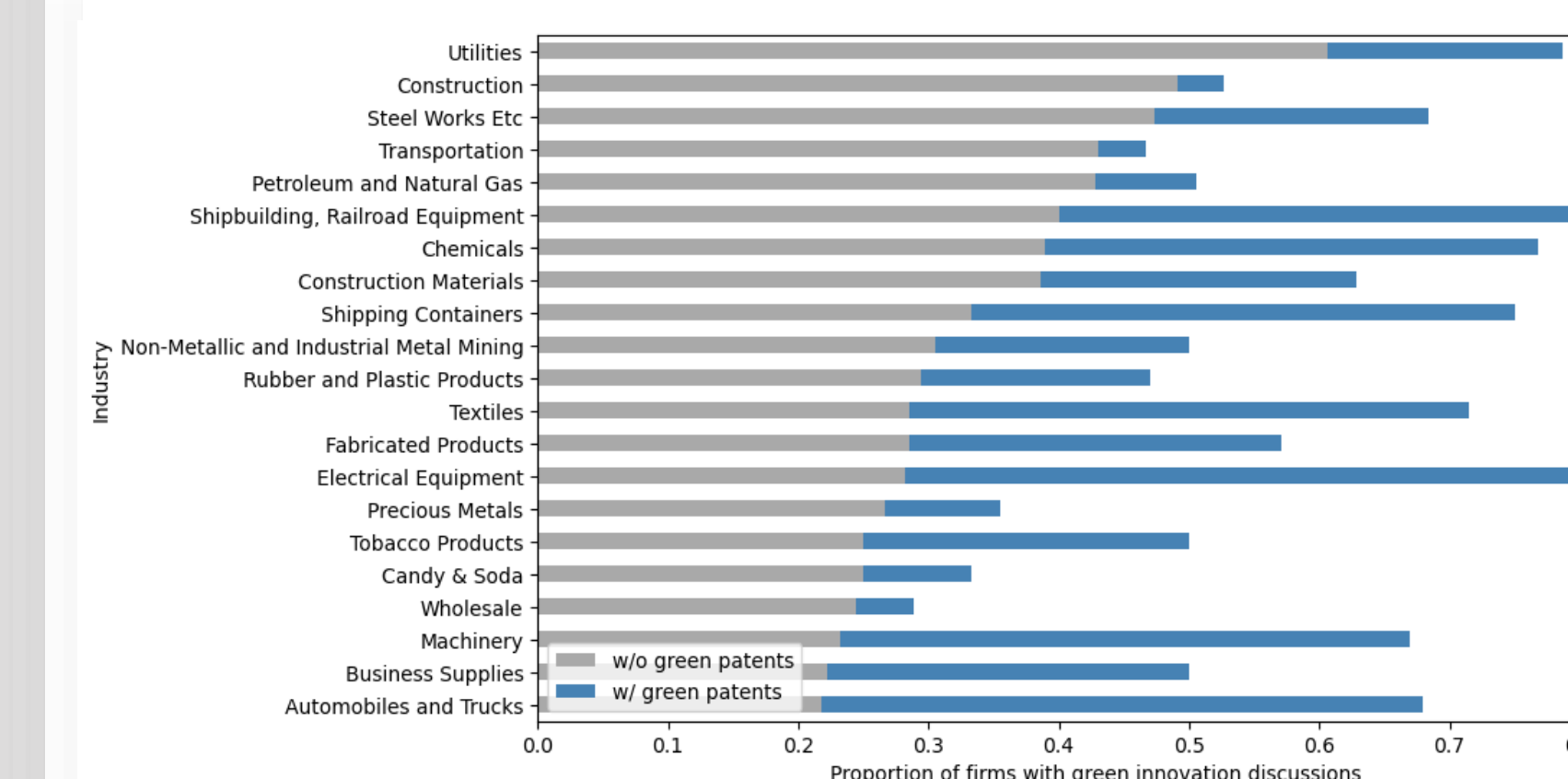
NLP method

Broader green innovation strategies that are unfeasible to patent.
Precisely focus on critical green innovation activities in real time due to the brief available time and investor attention during earnings calls.



$$GreenInnov_{i,t} = N_{i,t}^{greenInnov} / N_{i,t}$$

Green inventors vs. green adopters



Active inventors:
Electrical equipment, Automobiles.
 Prominent adopters:
Construction, Transportation.
 Combination of the two:
Utilities, Chemicals, Machinery.

Stock markets price green innovation activities **beyond the realm of patents**.

The adoption of both **in-house and external green technologies** improves the future environmental performance.

