

ESG and Downside Risks: Implications for Pension Funds

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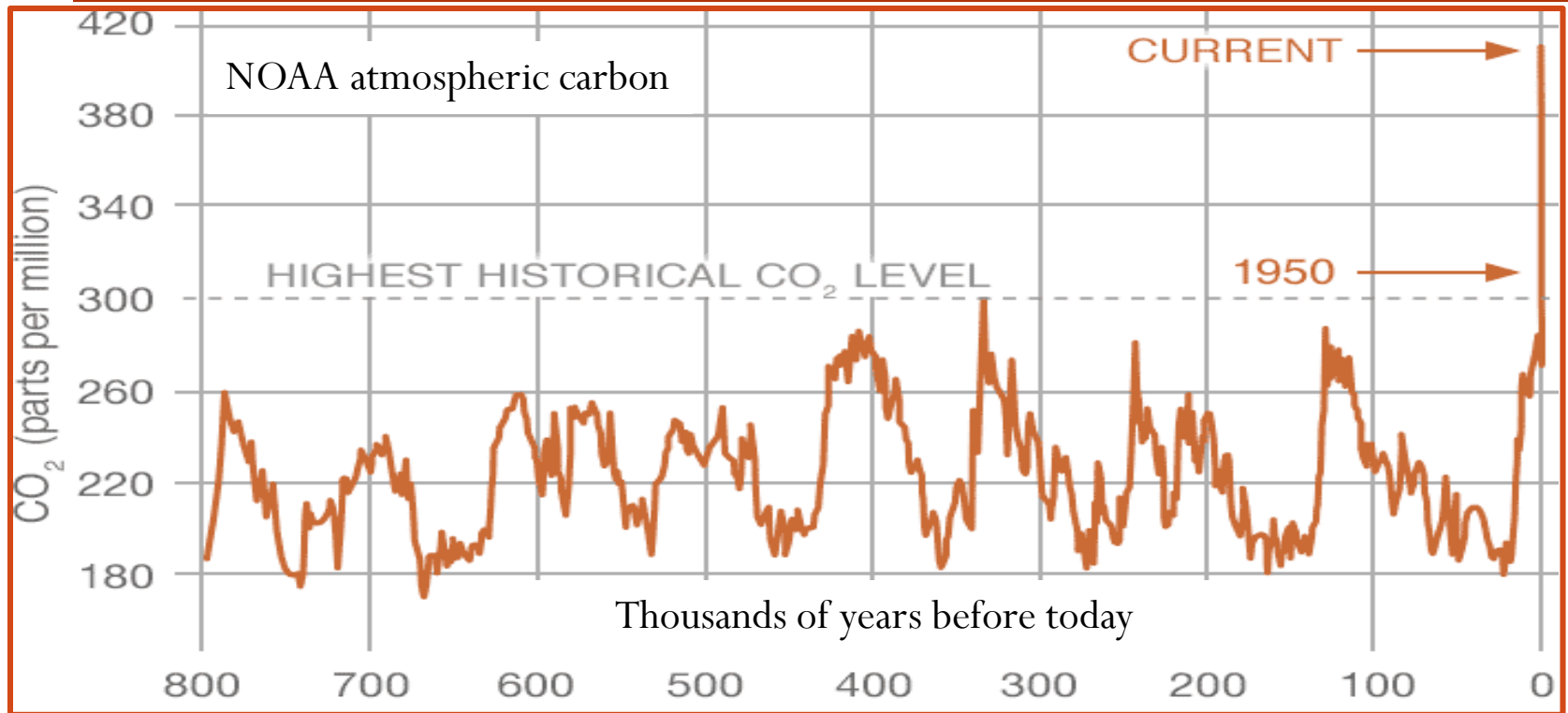
Risks seen more clearly through an ESG lens

- Reputation risk
- Litigation risk
- Supply chain risk
- Corruption risk
- Regulatory and political risk
- **Climate risk**
- Human capital management risk

Components of risk affected differentially by ESG issues

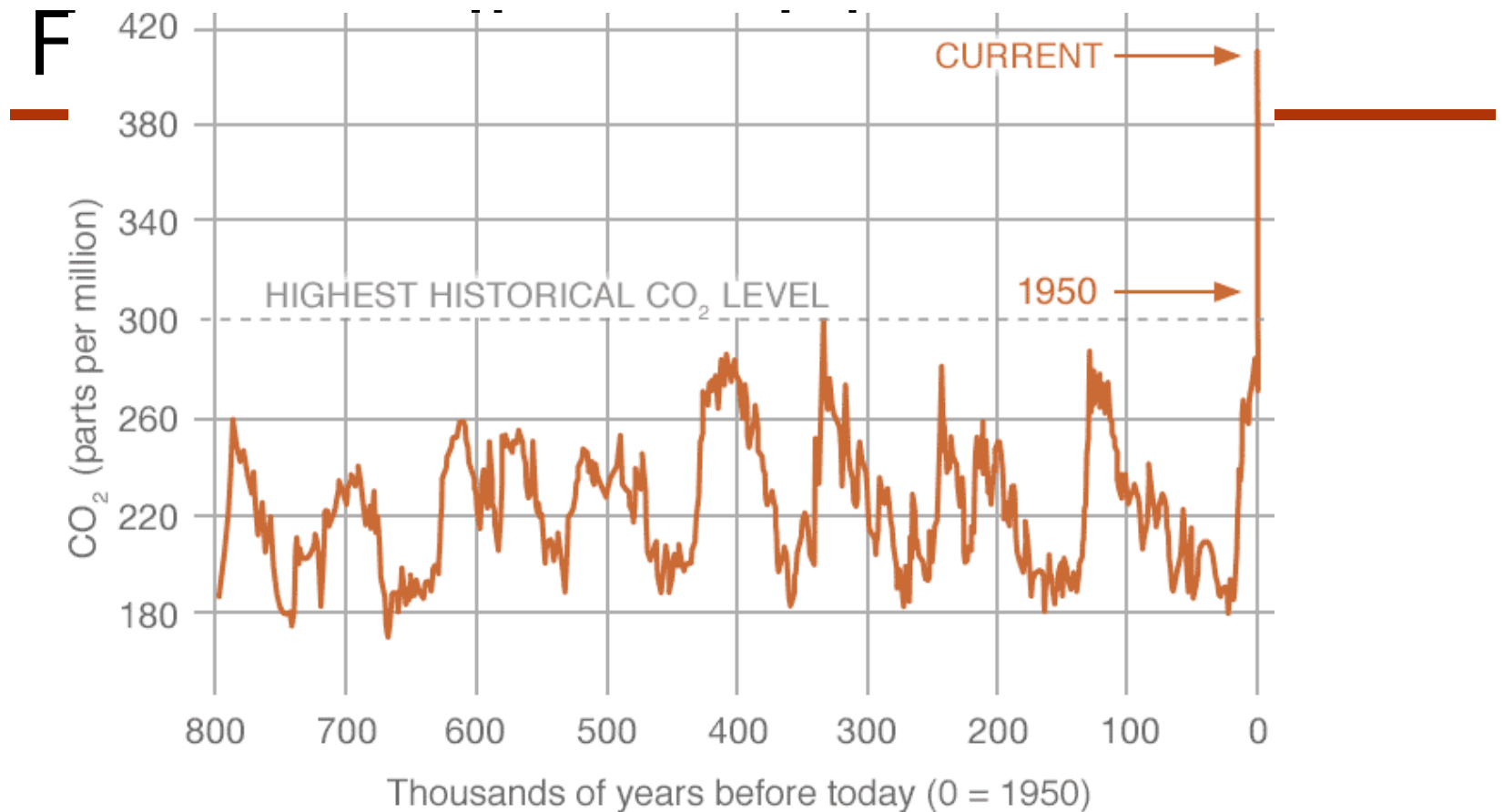
- Systematic risk
- Estimation risk
- Tracking error
- **Downside (tail) risk**

Focus on climate risks



Issues with Climate Risk

- Can adversely affect asset values, especially for long-term investors
- Is difficult to price and hedge
 - Systematic nature
 - Lack of disclosure by portfolio firms
 - Difficulty in finding suitable hedging instruments
- Has become a first order topic for policy makers



Issues with
Climate Risk

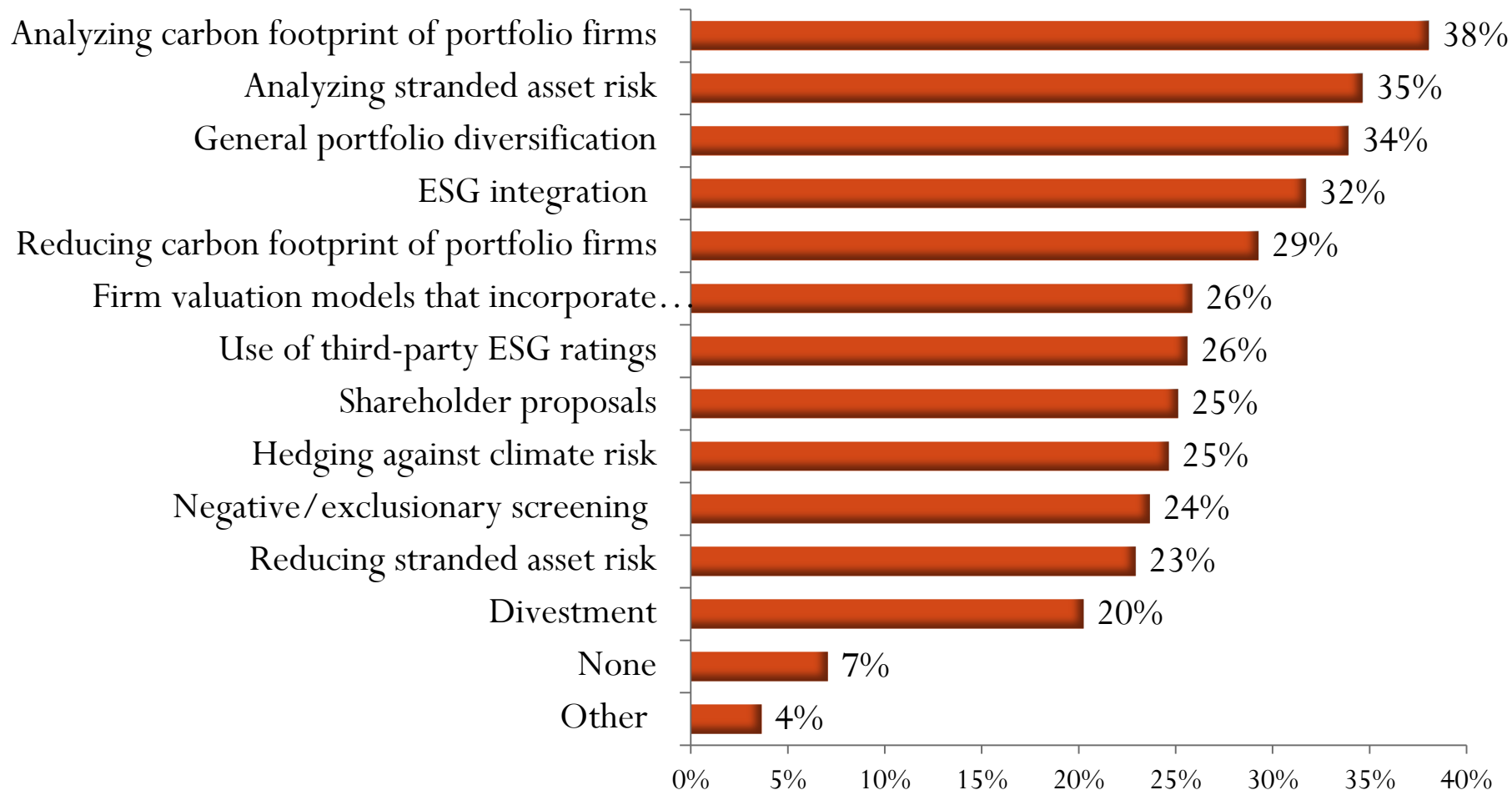
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Focus on downside risks: Important for pension funds

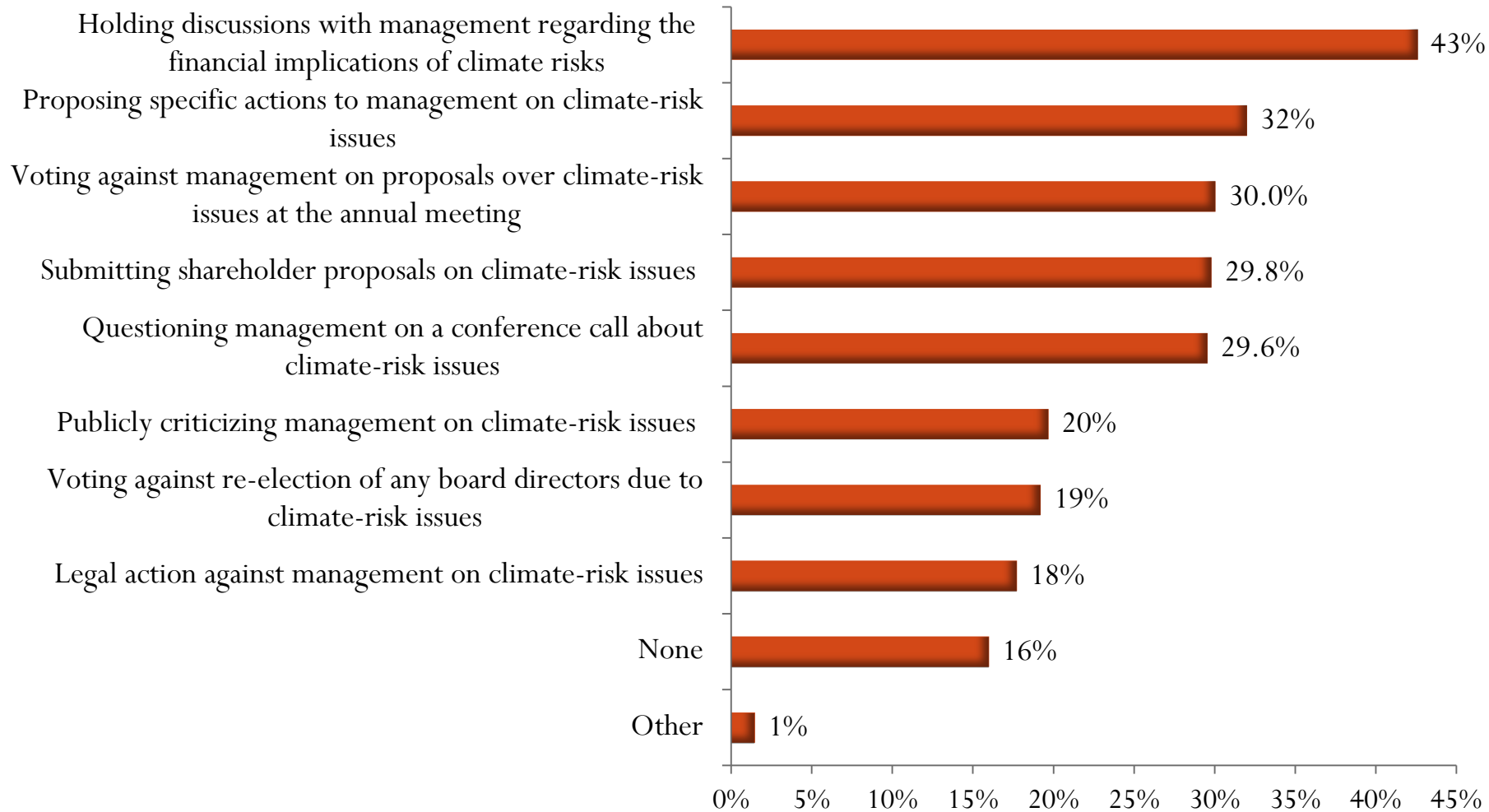
- Downside risk relevant for investors whose assets need to match liabilities and face downside risk constraints.
 - As wealth protection becomes important, pension funds have a preference to avoid downside risk.
 - Pension funds face large liabilities towards their beneficiaries and the failure to meet those liabilities carries significant penalties
- Downside risks relevant for institutional investors more broadly
 - For banks and insurance companies, regulatory capital requirements for equity positions are calculated based on downside risk measures.
 - Mean-variance framework assumes that either investors have asset returns are jointly normally distributed; two assumptions that are likely violated (e.g., returns are typically skewed).

Investors' approaches to incorporating climate risk management into the investment process

From Global Survey of Large Institutional Investors: 439 Respondents

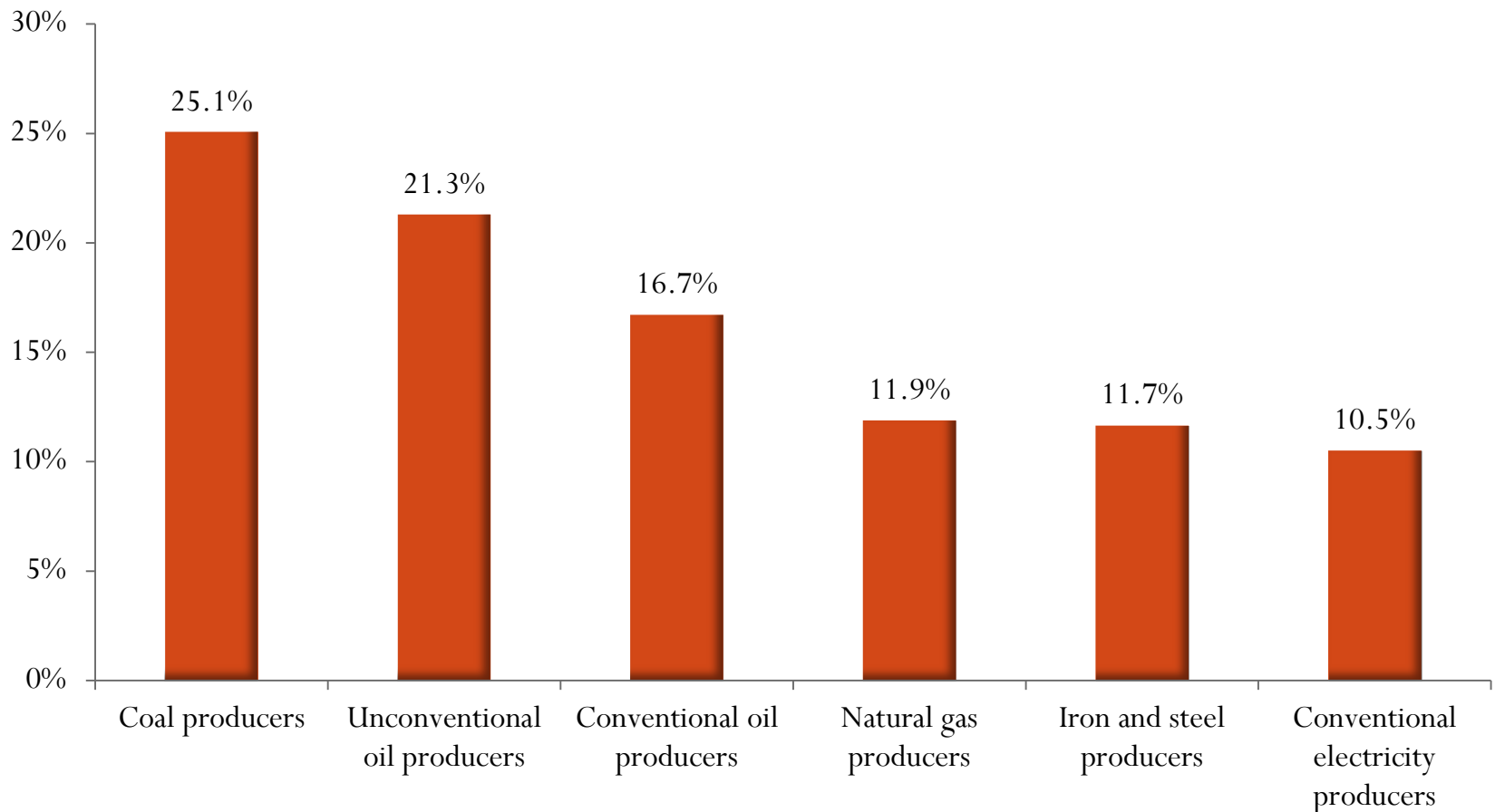


Investors' approaches to engaging firms on climate risk



Investors' perceptions of stranded asset risks

Percentage of respondents that believe that stranded asset risk is "very high" in the industry



Pricing of climate risk: Evidence from option markets

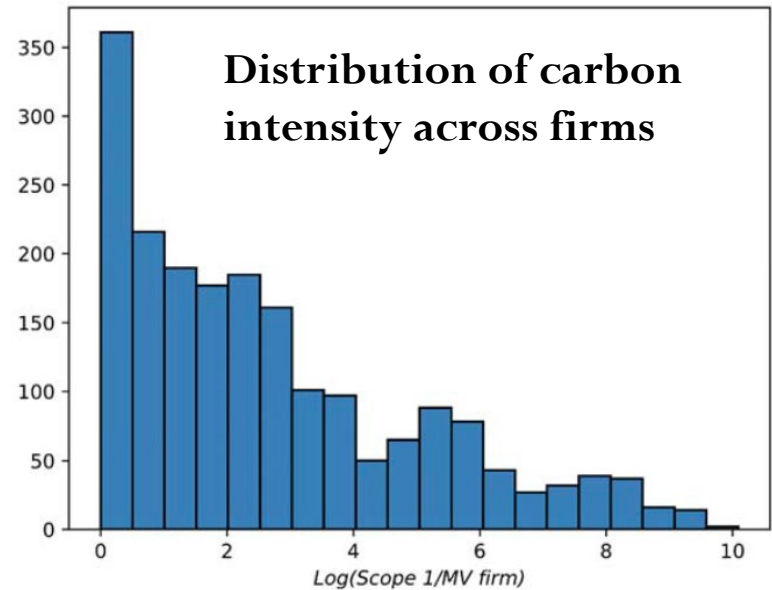
- Increased regulation needed to meet the Paris Agreement
- Regulatory climate risks likely most severe for firms with large carbon emissions: “carbon risks“
- Political uncertainty about regulation affects asset prices
- Is the cost of option protection against the tail risk associated with climate policy larger for more carbon-intense firms?
 - Option markets provide forward looking information on various risks
 - Formally: *SlopeD* reflects the steepness of the implied volatility slope
 - Intuition: how expensive is it for investors to use options to get insurance against downside tail events?

Carbon risks are very concentrated

100 firms account for 71% of global industrial GHG emissions!



National Iranian Oil Company



Pricing of protection against downside tail climate risk

Dependent variable:	<i>SlopeD</i>	<i>SlopeD</i>	<i>SlopeD</i>
	(1)	(2)	(3)
<i>log(Scope 1/MV firm)</i>	0.006*** (3.39)		
<i>Residual log(Scope 1/MV firm)</i>		0.003 (0.81)	0.005 (1.06)
<i>log(Scope 1/MV industry)</i>			0.006*** (3.76)
Model	Heckman	Heckman	Heckman
Controls	Yes	Yes	Yes
Year-by-quarter fixed effects	Yes	Yes	Yes
Level	Firm	Firm	Firm
Frequency	Monthly	Monthly	Monthly
Obs.	18,664	18,664	18,664
Adj. R^2	n/a	n/a	n/a

Change in pricing of tail risk protection with change in regulatory uncertainty

Dependent variable:	<i>SlopeD</i>	<i>SlopeD</i>	<i>SlopeD</i>	<i>SlopeD</i>	<i>SlopeD</i>	<i>SlopeD</i>
Event window:	[-250; +250]	[-250; +250]	[-250; +250]	[-250; +250]	[-250; +250], excl. [-50; +50]	[-250; +250], excl. [-50; +50], excl. Healthcare
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Post-Trump election x Scope 1/MV industry high</i>	-0.025** (-2.18)	-0.029** (-2.43)	-0.025*** (-2.88)	-0.020** (-2.20)	-0.037*** (-2.63)	-0.035** (-2.45)
<i>Scope 1/MV industry high</i>	0.041* (1.67)	0.043* (1.77)			0.046* (1.88)	0.043* (1.72)
<i>Post-Trump election</i>	-0.025*** (-4.63)			-0.022*** (-4.33)	-0.036*** (-5.97)	-0.041*** (-6.13)
Model	DiD	DiD	DiD	DiD	DiD	DiD
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Day fixed effects	No	Yes	Yes	No	No	No
Firm fixed effects	No	No	Yes	No	No	No
Industry fixed effects	No	No	No	Yes	No	Yes
Level	Firm	Firm	Firm	Firm	Firm	Firm
Frequency	Daily	Daily	Daily	Daily	Daily	Daily
Obs.	200,897	200,897	200,897	200,897	159,041	139,635
Adj. R^2	.062	.091	.294	.184	.061	.060

Conclusions

- Pension funds should care about downside risks
- ESG lens of downside risks
 - allows for a better understanding of the sources of the downside risks
 - and how they can be addressed through risk management or engagement
- Downside risks related to climate change should be a key focus for pension funds