A Review of Reviews of the Stern Review

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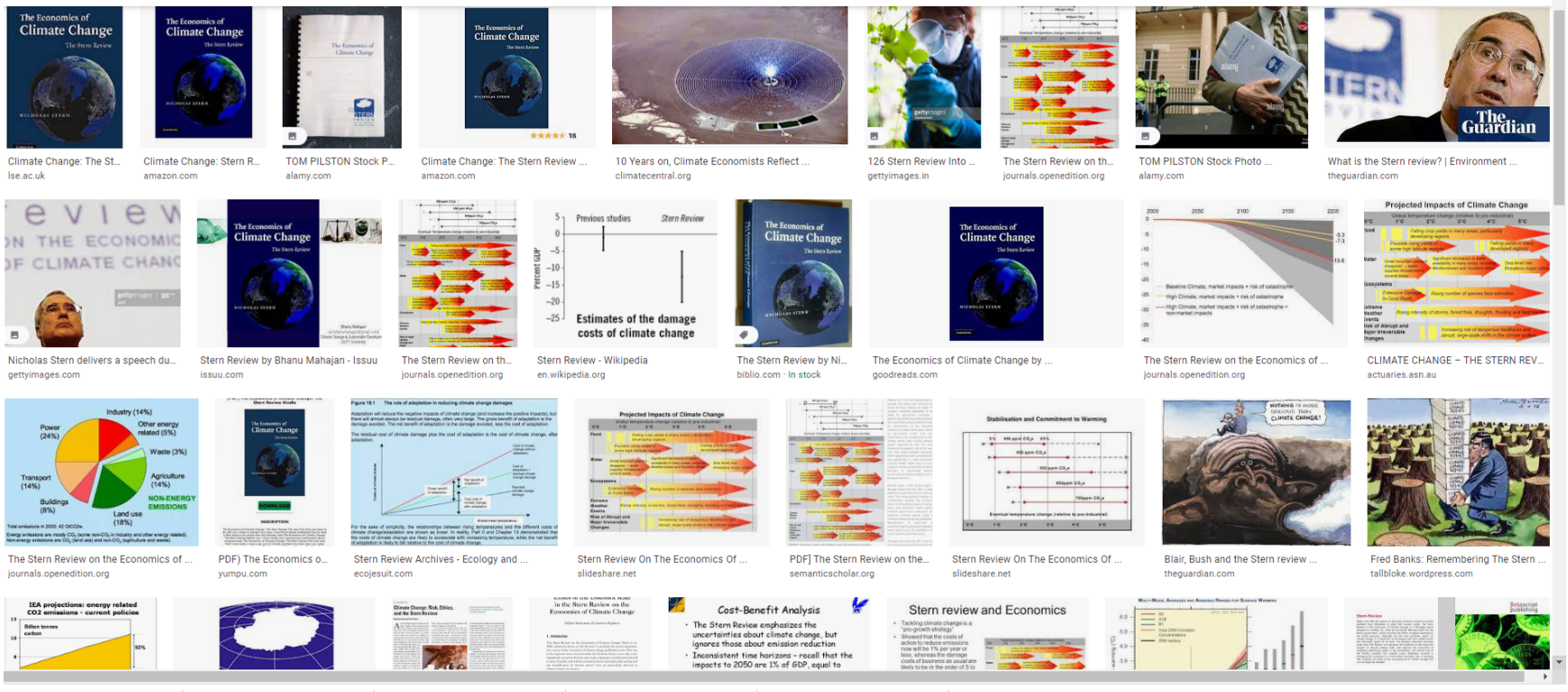
Googling...



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Setting the stage

$$C \uparrow \underbrace{\Longrightarrow}_{\textit{emissions}} \textit{Temp} \uparrow \underbrace{\Longrightarrow}_{\textit{damages}} C \downarrow$$

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Emissions mitigation costs vs. damage-reduction benefits: Optimal policy depends on costs vs. benefits
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Costs NOW; benefits LATER, with discount rate δ:
Optimal policy depends crucially on δ choice
SR choice ($\delta \approx 0$) criticized as much too low

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Assessing the SR δ Choice

Discounted CRRA Utility Maximization

$$max_{\{C_t\}} \sum_t \frac{1}{(1+\delta)^t} U(C_t)$$

$$U(C) = \frac{C^{1-\eta}}{1-\eta}$$

Subjective rate of time preference δ discounts *utility*
Coefficient of relative risk aversion η

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Ramsey Balanced Growth

$$r = \delta + \eta g$$

Real interest rate r discounts *consumption*
Per capita growth g

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Philosophical Approaches

Utilitarian (Bentham, 1807):
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Rawlsian (Rawls, 1971):
Weight different generations' utilities unequally
("Maximize the welfare of poorest generation")
But is the poorest generation really the present generation?

Macro Approaches (Representative Agent)

Macro theoretical (Ramsey, 1928):

$$r = \delta + \eta g$$

$$\delta = r - \eta g$$

$$(r{=}2, \eta{=}1, g{=}2) \implies \delta{=}0$$

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Macro empirical (Ramsey-Bauer-Rudebusch, 2022):

$$\delta = r^* - \eta g$$

$$(r^*{=}0.5, \eta{=}1, g{=}2) \implies \delta{=}-1.5$$

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Micro Approaches (Heterogeneous Agents)

Micro theoretical (Feng-Ke, 2018):

The social welfare function is
(1) discounting exponentially
(2) Pareto
(3) non-dictatorial

if and only if

The social welfare function's δ is no greater than that of the most patient member of society. (That is, $\delta \approx 0$.)

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Micro empirical (Weitzman, 2001):

Heterogeneous agents discounting at widely-dispersed exponential rates implies that $\delta \to 0$ as $t \to \infty$.

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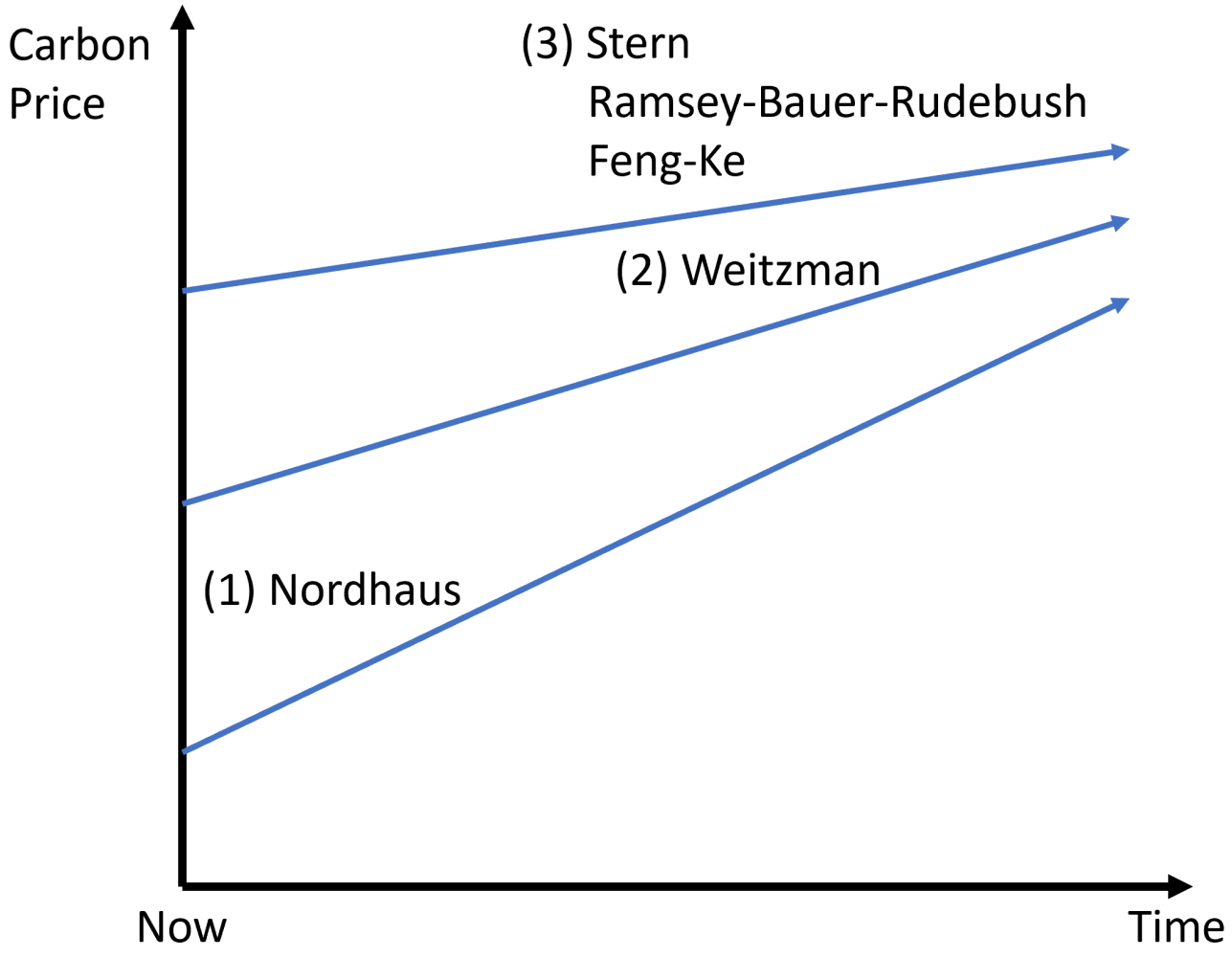
Flattening the Policy Ramp



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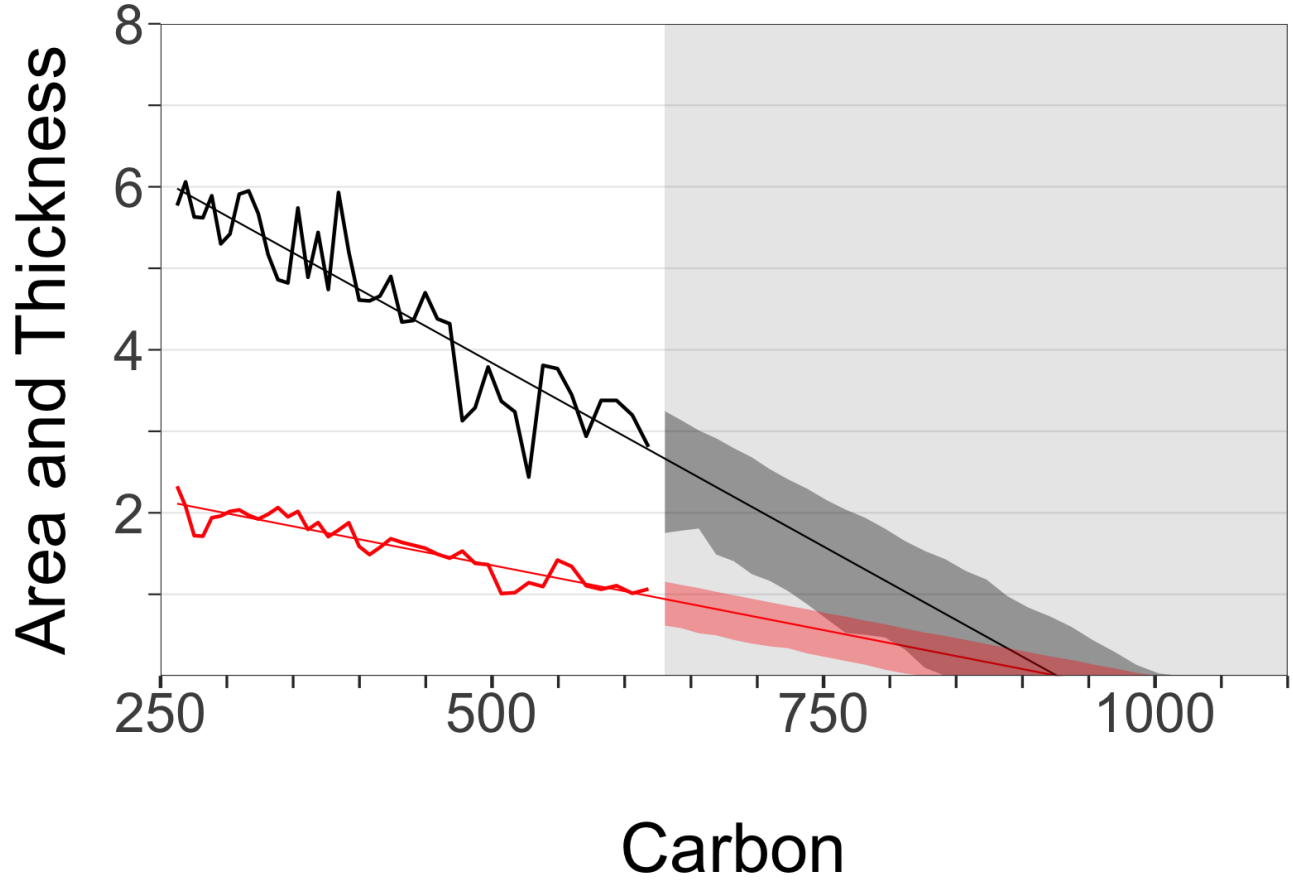
Arctic Sea Ice Area & Thickness Data, Constrained Linear Carbon Trends, and Projections in Ice-Carbon Space



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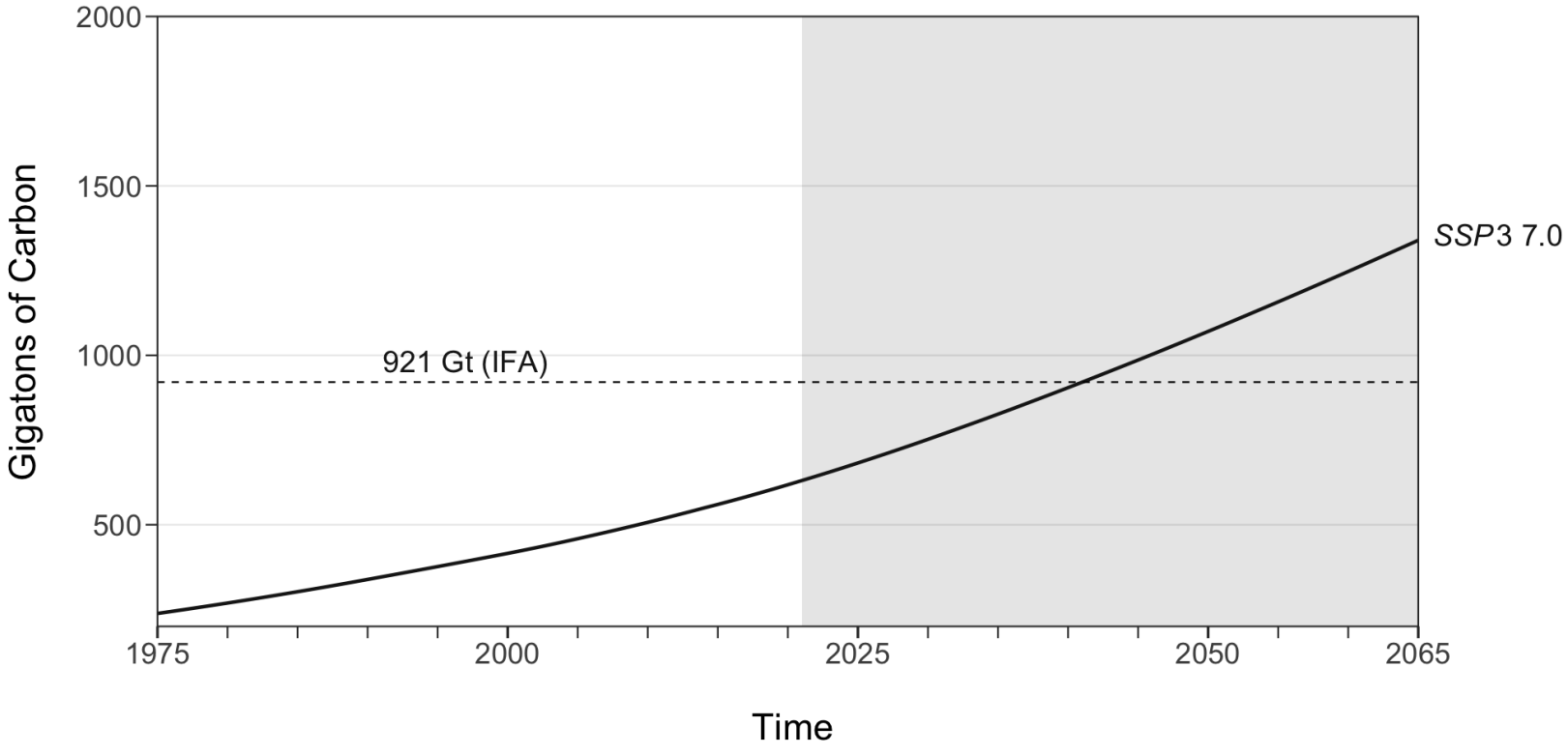
"Medium" Carbon Emissions Scenario



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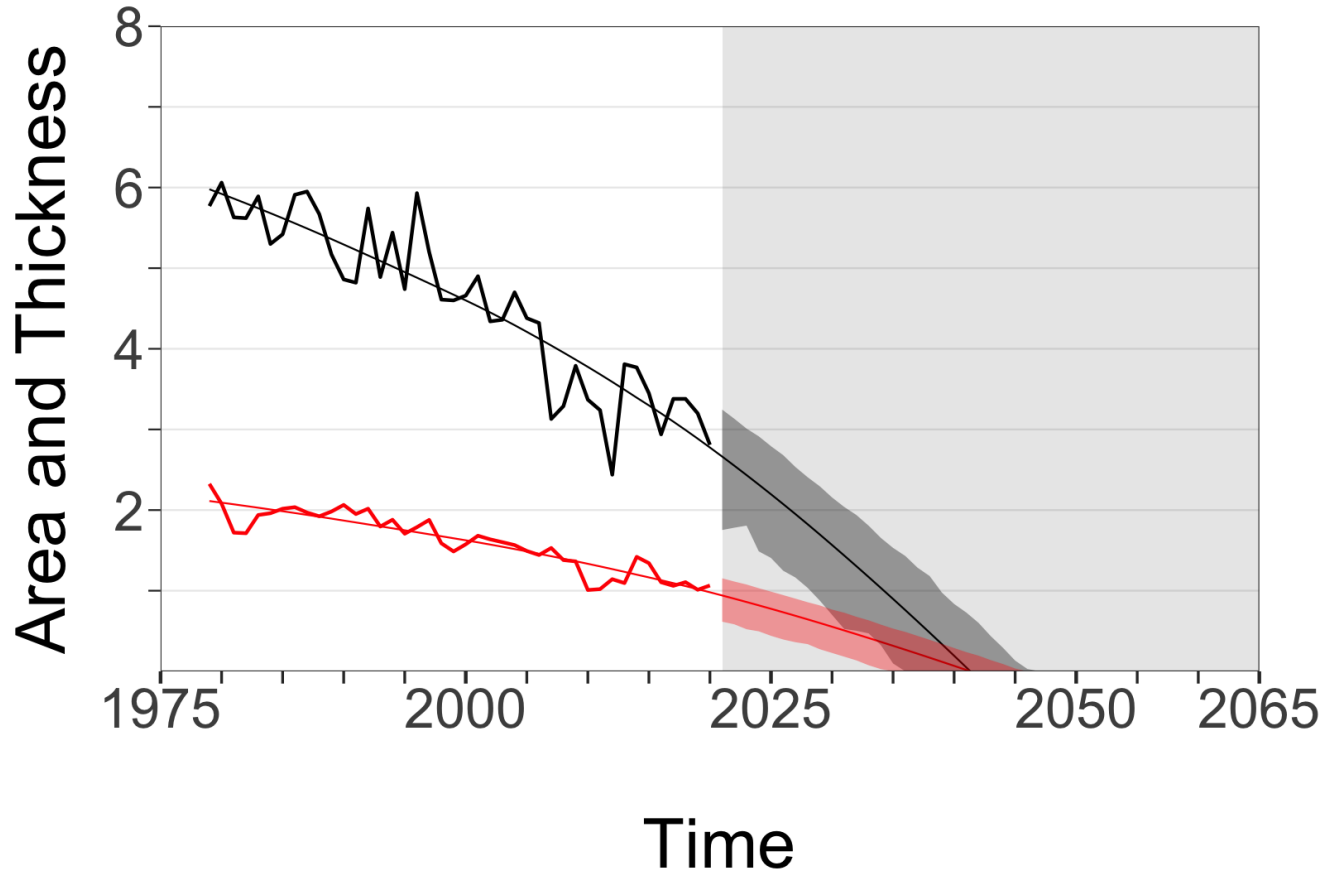
Arctic Sea Ice Area & Thickness Data, Constrained Linear Carbon Trends, and Projections in Ice-Time Space



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Arctic Sea Ice Area
Distributions of First Near-Ice-Free September

	Mean	Median	Mode	Std	5%	20%	80%	95%
SSP3 7.0	2031	**2031**	2031	2.47	2026	2029	**2033**	**2034**
SSP2 4.5	2034	**2034**	2035	3.33	2028	2031	**2037**	**2039**

[Diebold, F.X., Rudebusch, G.D., Goebel, M., Goulet Coulombe, P. and Zhang, B. (2022), "When Will Arctic Sea Ice Disappear? Projections of Area, Extent, Thickness, and Volume," Working paper, arXiv:2203.04040.]

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Conclusions

The Stern Review was correct:

1. We should have taken decisive action decades ago.
2. We didn't.
3. We will pay the price.
4. But it's never too late...