What Is the Right Price for Carbon Emissions?

The unknown potential for devastating effects from climate change complicates pricing.

BY BOB LITTERMAN
Stranded Assets

The carbon budget consistent with an 80% probability of DC < 2°

Proven Reserves

Stranded Assets = 2230

Source: Carbon Tracker Initiative
Economists call this “The social cost of carbon”

Where Should Climate Risk Be Priced?

- **Diversifiable Risk**
  - Low risk aversion
  - Expected Damage
  - The price of climate risk today

- **Non-Diversifiable Risk**
  - High risk aversion
  - Risk Premium
Pricing carbon emissions is a risk management problem involving trade-offs between consumption today and potential bad outcomes in the distant future.

- This trade-off depends crucially on the degree of societal risk aversion.
- Higher risk aversion lowers the discount rate and increases the Social Cost of Carbon.
- Societal risk aversion can be calibrated to the equity risk premium.
The Appropriate Price for Carbon Emissions Is Part of an Optimal Plan

1. The Appropriate Price
   - Trades off current consumption against future damages
   - Recognizes unknown impacts, and the potential for time compression and catastrophic outcomes
   - Builds in a margin of safety
   - Anticipates risk reduction over time

2. Higher Risk Aversion
   - Increases the risk premium
   - Lowers the discount rate for future damages
   - Raises the price today and potentially lowers the expected future price
Think About Dynamic Optimization

With Uncertainty, Tipping Points And Nonlinear Responses

Because we've wasted precious time; we need to immediately slam on the brake.
Higher societal risk aversion shifts the appropriate emissions price path upward.

Forward prices will be driven by the rate of technological change in emissions mitigation.
A low carbon pathway would be too expensive, thus none of our assets will become stranded.
Stranded Assets

Stranded asset = any asset whose value will be negatively impacted by higher emissions prices

Stranded assets will re-price to reflect changing expectations of forward prices, rather than changes in actual emissions prices
This recognition has implications for:

- **Portfolio construction**: Tilt away from stranded assets e.g. coal and tar sands
- **Governance**: Appropriate, transparent business plan assumptions about future emissions prices
Stranded Assets Total Return Swap

¾ Coal Index Return + ¼ Oil Sands Index Return

WWF

Deutsche Bank

S&P 500 Index Return

Coal index -- 12 stocks
market cap weights

Oil sands index -- 13 stocks
market cap weights
Aviation

- **Aviation has promised:**
  - A “market-based measure” to reduce emissions
  - but seems to have no intention to create appropriate incentives

- **Aviation will need capacity to create emissions**
  - requires high energy content of liquid fuel for takeoff and ascent
  - atmosphere’s capacity to safely absorb emissions is limited
  - thus aviation has a special incentive to lead on this issue

- **Owners of aviation shares have an important role to play**
  - management often focuses too much on short term profits
  - long-term owners have longer term priorities, such as creating appropriate global incentives to reduce emissions