



**ECONOMIC MODELS and THE FRAMING OF
CLIMATE POLICIES**

*Twenty years afterwards ...
a new space for discussion*

Template for an introspective exercise

International workshop for experts & policymakers

25 March, 2009

Modelers and policymakers: The feeling of semi-failure?

- Successes/failures in creating negotiation language
 - The timing of action
 - The ‘when and where’ flexibility
 - The ‘no-regret’ and ‘double-dividend’ perspectives
 - The climate/development Gordian Knot
- What relevance and efficacy of this language?
 - Adequate representation of interests and their balance?
 - Descriptive vs prescriptive vocation?
- In situations where the vocation is prescriptive, what causes the implementation gap?
 - Irrationality of collective behaviors?
 - Credibility of the models?
 - Is anyone listening to anyone? Translation failure?

Is conventional wisdom wrong?

Conventional interpretation of economic analysis and of modelling results	Observations
Separability of Equity / Efficiency	Differences in opinion on equity as one key reason for post-Kyoto failure
Cost minimization requires a uniform carbon value (tax or tradable quotas)	Large implementation gaps, social preference for country-specific P&M
Carbon value should increase almost exponentially	Depends on expectations concerning technical change; no control on the future profile of the carbon value
Total costs restricted to just a small percentage of GDP	Reluctance to adopt ambitious targets

Deaf and irrational policymakers or spaced-out economists?

Is conventional wisdom wrong?

Some recurrent division lines

Basic division lines		
Behavioral assumptions	Intertemporal utility maximisation under perfect foresight	A certain degree of short-sightedness, context-specific decision routines
Growth engine	A balanced pathway, economies almost at their production frontier?	Transitional disequilibrium and path-dependency; economies below their production frontier?
Uncertainty	Normal distributions, 'certainty equivalence' and Bayesian learning	Non-linear catastrophic surprises, imprecise probabilities
Technology	Exogenous technical change and 'division of labor' between engineers and economists	Induced technical change and endogenous interactions between TC and economic growth

Inspired by a presentation made by T. Barker (2008)

The results gathered by the IPCC: Encouraging?

Category	Radiative forcing (W/m ²)	CO ₂ concentration ^{c)} (ppm)	CO ₂ -eq concentration ^{c)} (ppm)	Global mean temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity ^{b), c)} (°C)	Peaking year for CO ₂ emissions ^{d)}	Change in global CO ₂ emissions in 2050 (% of 2000 emissions) ^{d)}	No. of assessed scenarios
I	2.5-3.0	350-400	445-490	2.0-2.4	2000-2015	-85 to -50	6
II	3.0-3.5	400-440	490-535	2.4-2.8	2000-2020	-60 to -30	18
III	3.5-4.0	440-485	535-590	2.8-3.2	2010-2030	-30 to +5	21
IV	4.0-5.0	485-570	590-710	3.2-4.0	2020-2060	+10 to +60	118

Table SPM.4: Estimated global macro-economic costs in 2030^{a)} for least-cost trajectories towards different long-term stabilization levels^{b), c)}

Stabilization levels (ppm CO ₂ -eq)	Median GDP reduction ^{d)} (%)	Range of GDP reduction ^{d), e)} (%)	Reduction of average annual GDP growth rates ^{d), f)} (percentage points)
590-710	0.2	-0.6-1.2	<0.06
535-590	0.6	0.2-2.5	<0.1
445-535 ^{g)}	not available	<3	<0.12

Table SPM.6: Estimated global macro-economic costs in 2050 relative to the baseline for least-cost trajectories towards different long-term stabilization targets^{a)} [3.3, 13.3]

Stabilization levels (ppm CO ₂ -eq)	Median GDP reduction ^{b)} (%)	Range of GDP reduction ^{b), c)} (%)	Reduction of average annual GDP growth rates ^{b), d)} (percentage points)
590-710	0.5	1-2	<0.05
535-590	1.3	slightly negative - 4	<0.1
445-535 ^{e)}	not available	<5.5	<0.12

What should we do with this caveat?

‘Most models use a global **least cost approach** to mitigation portfolios and with universal emissions trading, assuming **transparent markets**, **no transaction cost**, and thus **perfect implementation** of mitigation measures throughout the 21st century.’

(AR4 WGIII SPM Box 3)

Outlining our discussions

What do models really do?

How are their results are conveyed?

How should their results be used?

Main sources of misinterpretation:

- ***About Costs***: Technical cost curves / social and private cost / social value of carbon value / carbon price signal ? The shifting in meaning of these concepts in models and in policy debates
- ***About trajectories*** : From modeled price-costs-emissions *trajectories* to the *sequence* of overlapping policy actions?
- ***About international coordination***: The when and where of flexibility, the stabilization of expectations, untying the Gordian Knot in climate development, and bridging the many credibility gaps

And from now on?

- How can we best use the current state-of-the-art to inform the post-Copenhagen discussions?
- What conditions for a new research agenda for the long-run?