



# Emission Pricing: Some Implementation Issues

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# Outline

1. The logic of controlling the *Price* not the *Quantity* of emissions
  - The case for *P* targets
  - Optimists versus Pessimists
2. How much to charge?
3. What to do with the money?
4. A Proposal for Climate Policy

# P's and Q's

## ■ How clean is your bathroom?

- At a certain point – clean enough
- To get it even cleaner would take more time than you are willing to spend



# P's and Q's

- How clean is the air?
  - At a certain point – clean enough
  - To get it even cleaner would cost more than we are willing to spend



# $P$ 's and $Q$ 's

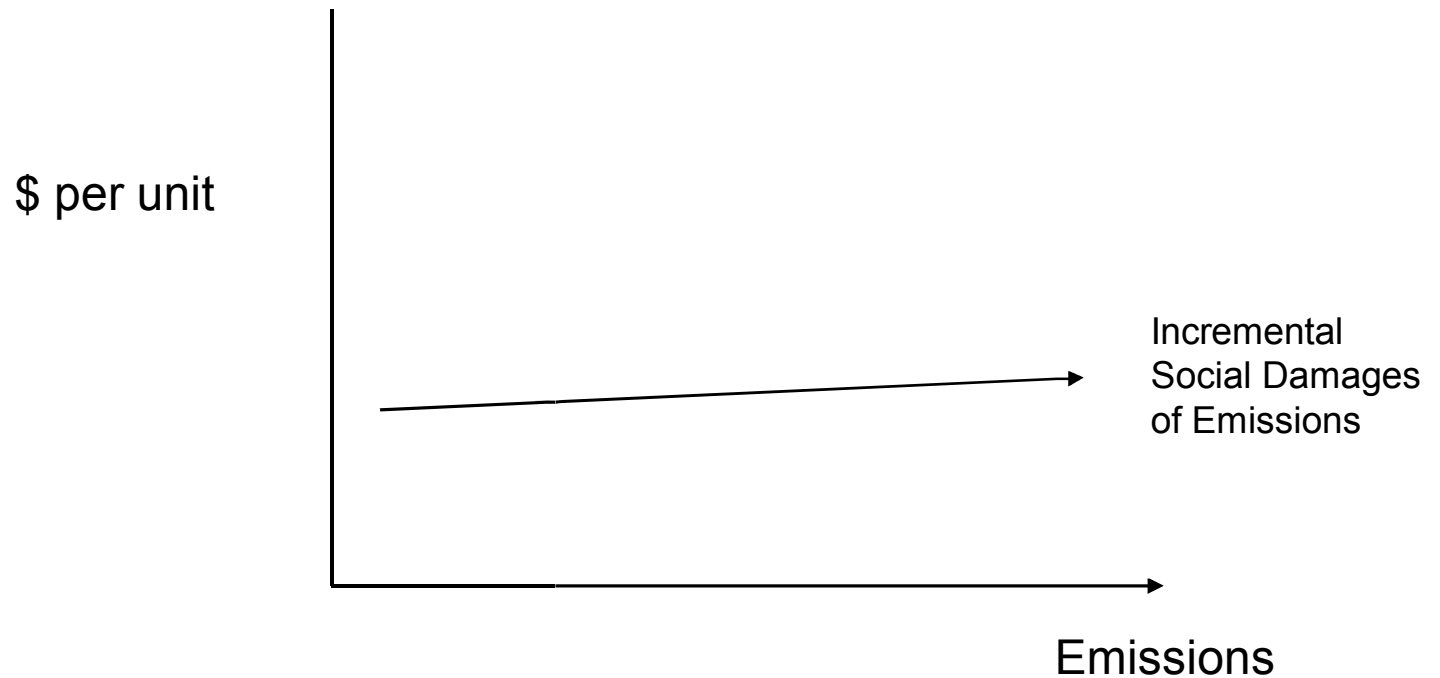
- Controlling the quantity of emissions says, in effect:
  - Pollution has to fall to level  $Q$ , regardless of the cost of abatement efforts along the way
  - Appropriate if there are thresholds for major hazards
- Controlling the price of emissions says, in effect:
  - Abatement efforts that cost less than  $P$  must be implemented, regardless of the resulting quantity of emissions
  - Appropriate when damages per unit tend to be roughly constant

# $P$ 's and $Q$ 's

- When is controlling  $P$  a better option?
  - When social costs per unit of emissions tend to be fairly constant, and/or
  - When the incremental costs of abatement tend to rise rapidly
  - Many current air emissions fit this description

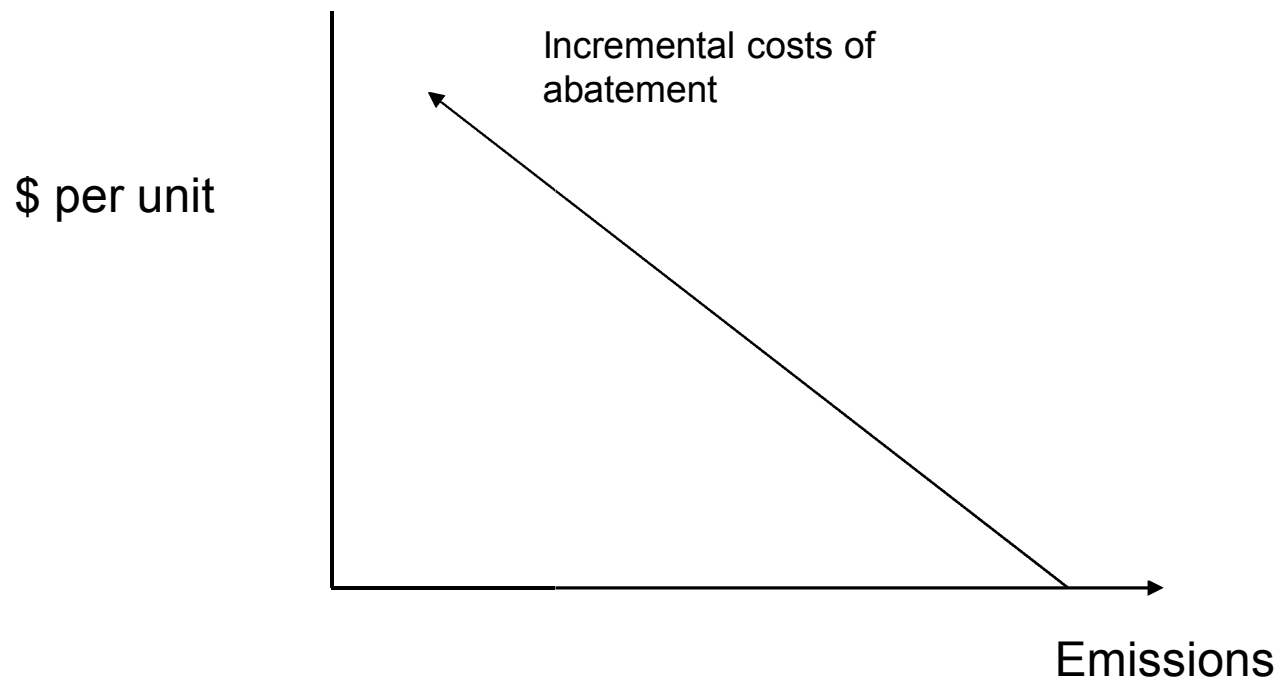
# *P*'s and *Q*'s

- The economic model



# *P*'s and *Q*'s

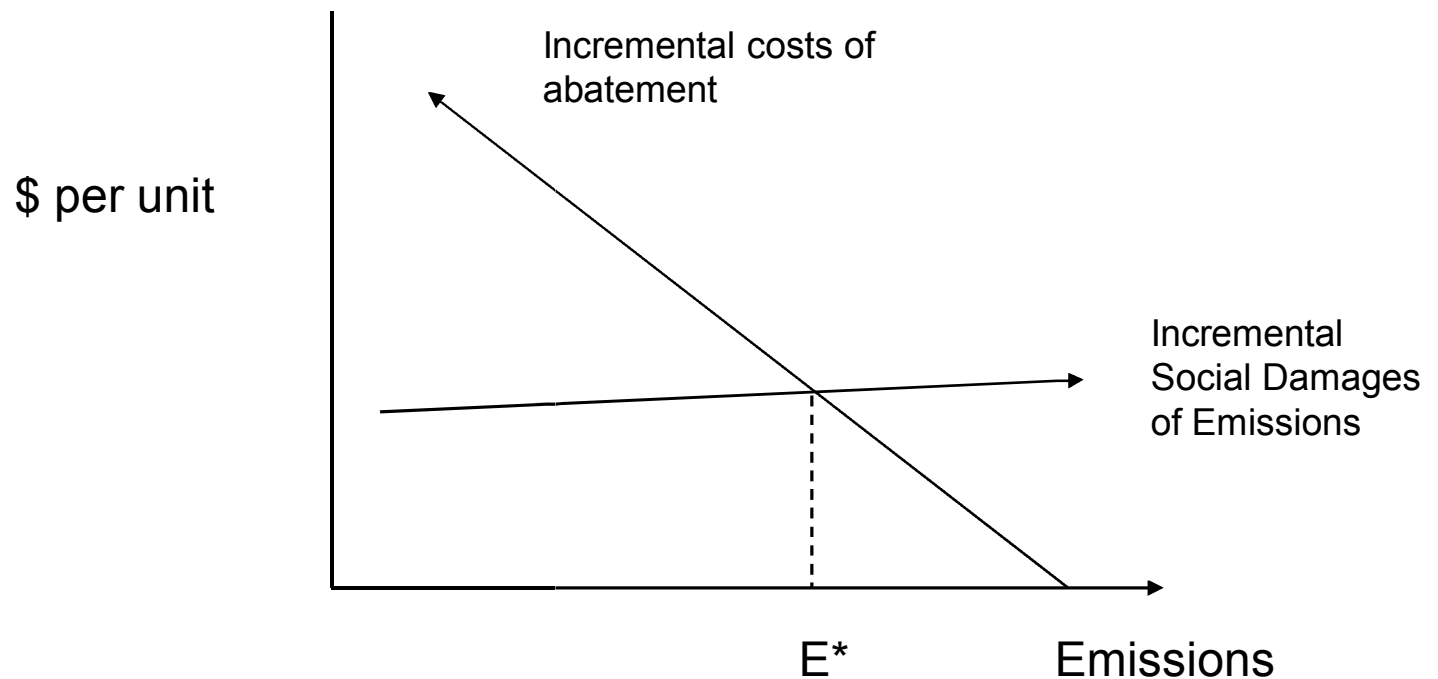
- The economic model





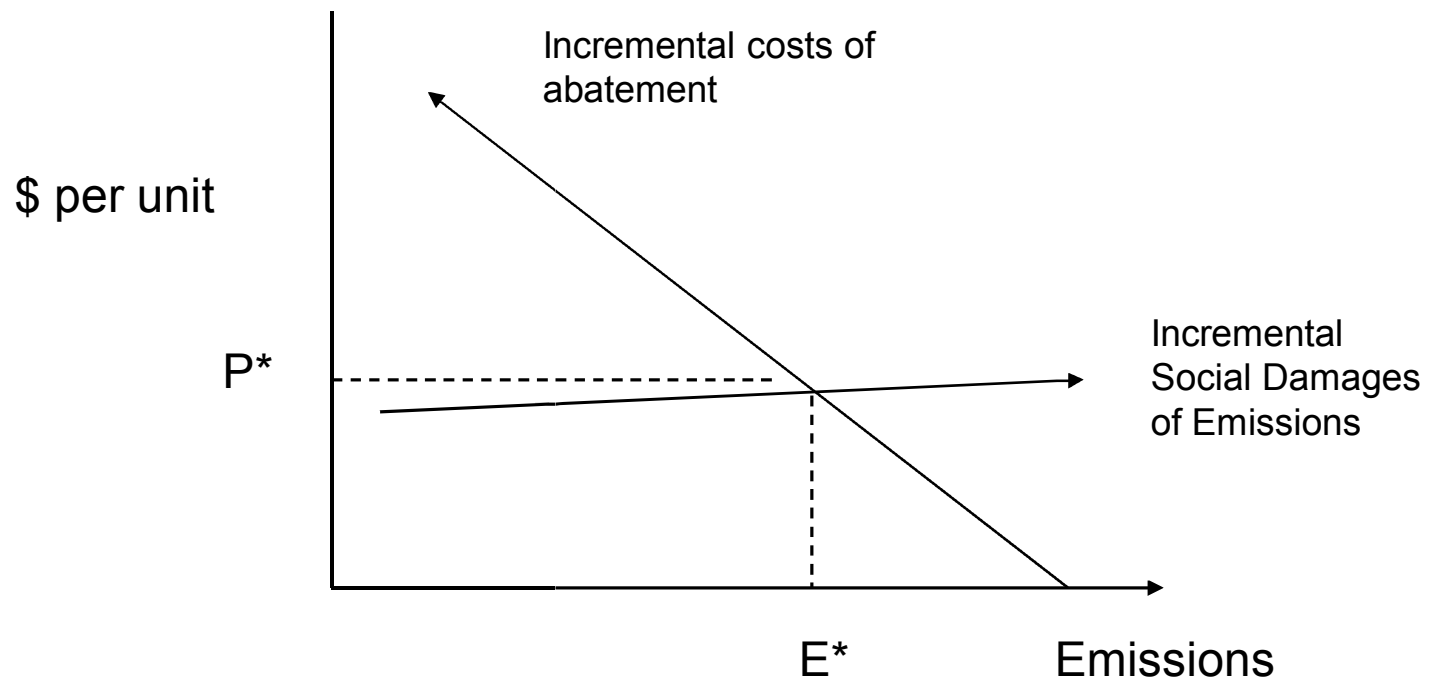
# P's and Q's

## ■ The economic model



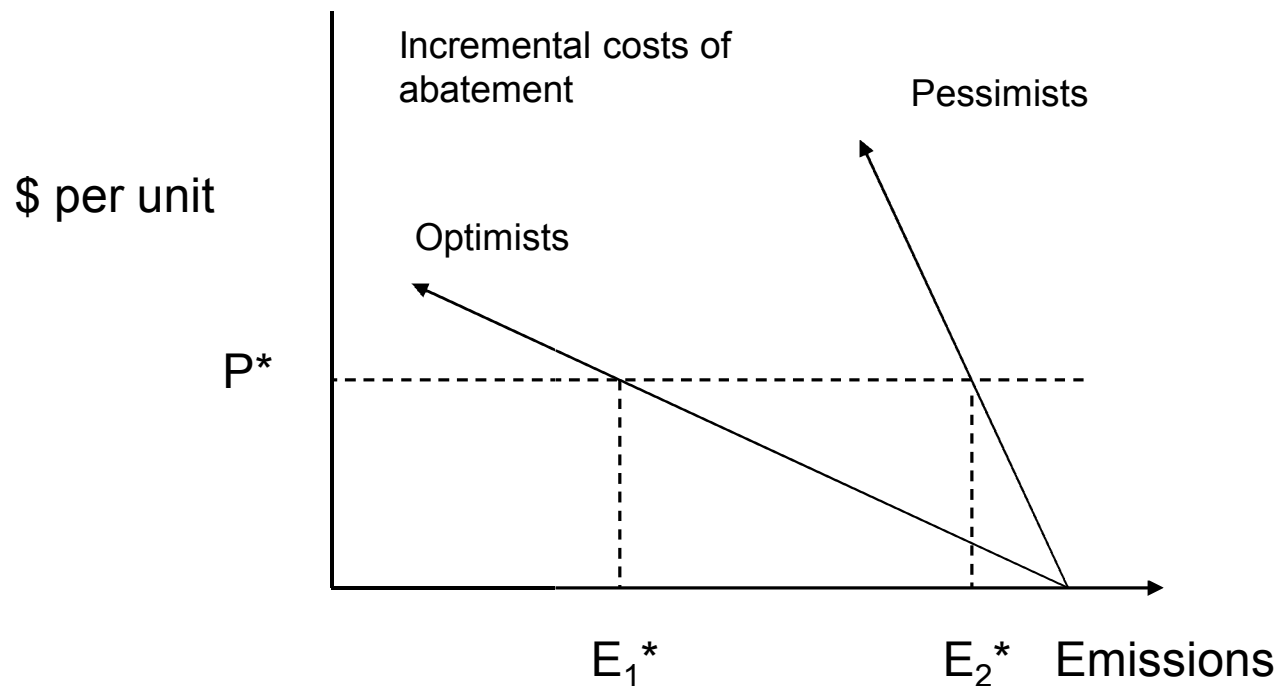
# $P$ 's and $Q$ 's

## ■ The economic model



# $P$ 's and $Q$ 's

## ■ Optimists versus Pessimists



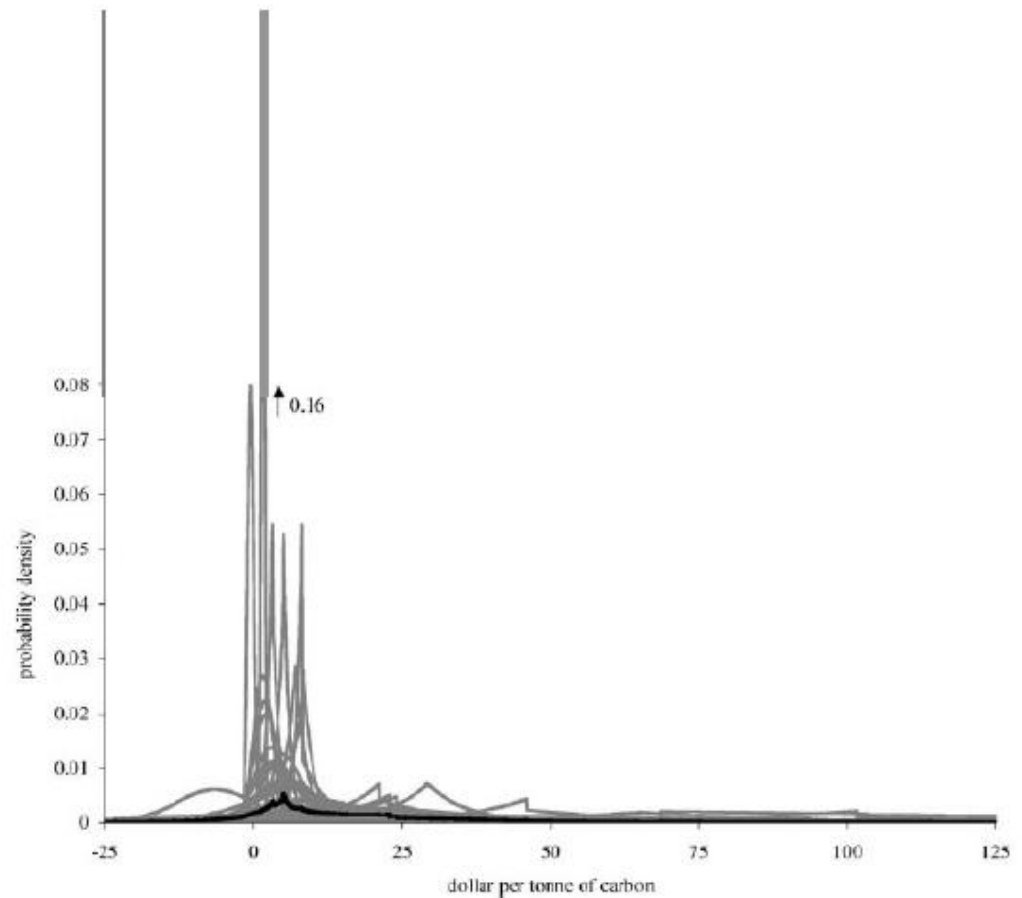
# How much to charge?



- Ideally, should be based on estimates of peoples' willingness-to-pay to avoid the damage
- In practice, these can be contentious
- However the price should not bounce around as much as it does under cap-and-trade

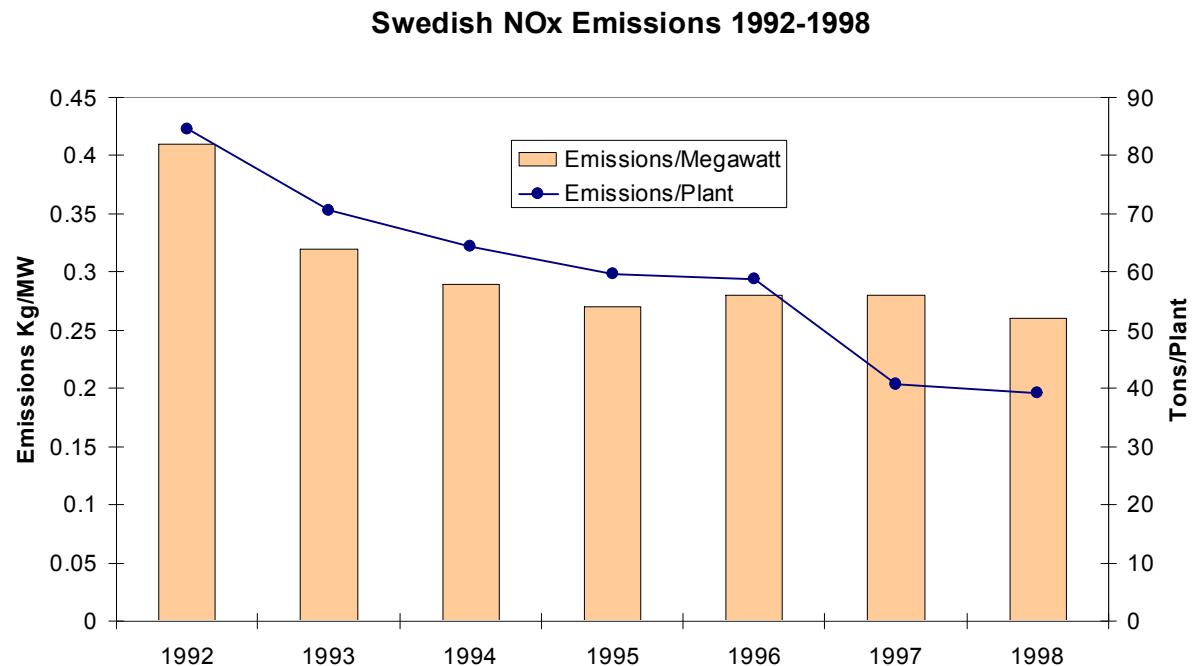
# Current estimates for CO<sub>2</sub>

- Tol (2005)
- Median < 10\$
- Mean \$16-50



# What to do with the money?

- Economic theory:
  - Use it to reduce factor income taxes
- Swedish system (~\$7/kg):
  - Refunded to industry by output share





# A Proposal for Climate Policy

- Most policy proposals in Canada, US and Europe are  $Q$  controls (Cap and Trade)
- Most economics literature favours  $P$  control
- Tax should start low,  $\sim 10\$$ ; but what then?
- Some proposals call for automatic increases over time (e.g. at rate of interest, etc)



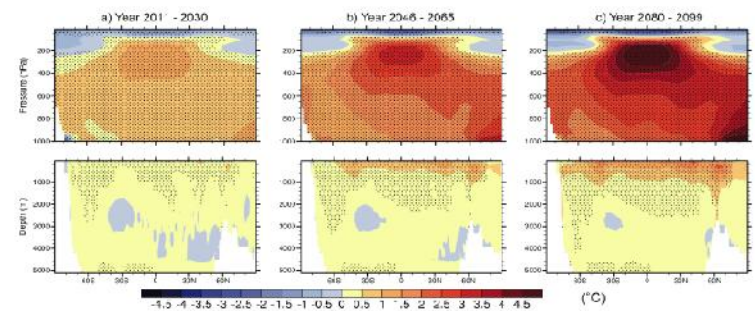
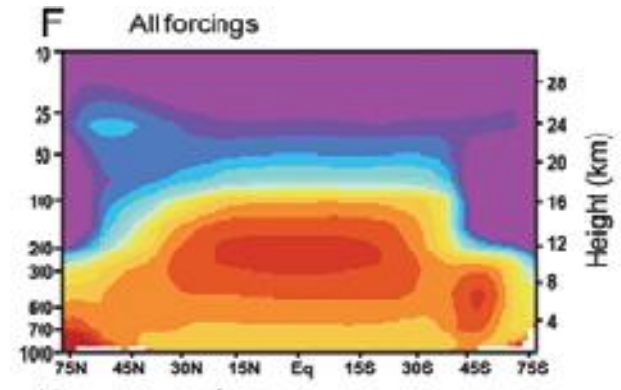
# A Proposal for Climate Policy

- My proposal: the T3 Tax
- tie the tax rate to a key climate parameter:
  - the Annual Mean Tropical Tropospheric Temperature Anomaly



# A Proposal for Climate Policy

- Rationale: Climate models identify troposphere over tropics as the center of GHG-induced warming
- Pattern should be evident now and builds all through warming interval
- Unique to GHG-pattern, ie not associated with solar or other forcing



**Figure 10.3.4.** Zonal means of change in atmospheric and oceanic temperatures, shown as cross sections. Values are the multi-model means for the A1B scenario for three periods (a-c). Stippling denotes regions where the multi model ensemble mean divided by the multi model standard deviation exceeds 1.0 (in magnitude). Anomalies are given relative to the average of the period 1980–1999. Results for individual models can be seen in supplementary material for this chapter.

# A Proposal for Climate Policy

- Directly measured by NOAA weather satellites
- Current value (UAH) = 0.13C for 2006
- IPCC A1B forecast: +0.5C / decade
- My proposal:
  - Set T3 tax =  $50 \times T$  per tonne of carbon, where  $T$  = annual mean tropical troposphere temperature anomaly from NOAA satellites
  - Use \$ to reduce income taxes
  - Current value = \$6.50/tonne



# A Proposal for Climate Policy

- Advantages:

- If IPCC is right, tax will rise by \$10-25 per decade to >\$250/ton by 2100
- But if skeptics are right, tax won't rise at all.
- Either way it will be the right outcome, and we don't need to decide who's right ahead of time
- It also creates an incentive for private sector climate modeling, with a strong financial incentive to get things right