The Carbon Tax Option: A New Look at an Old Idea

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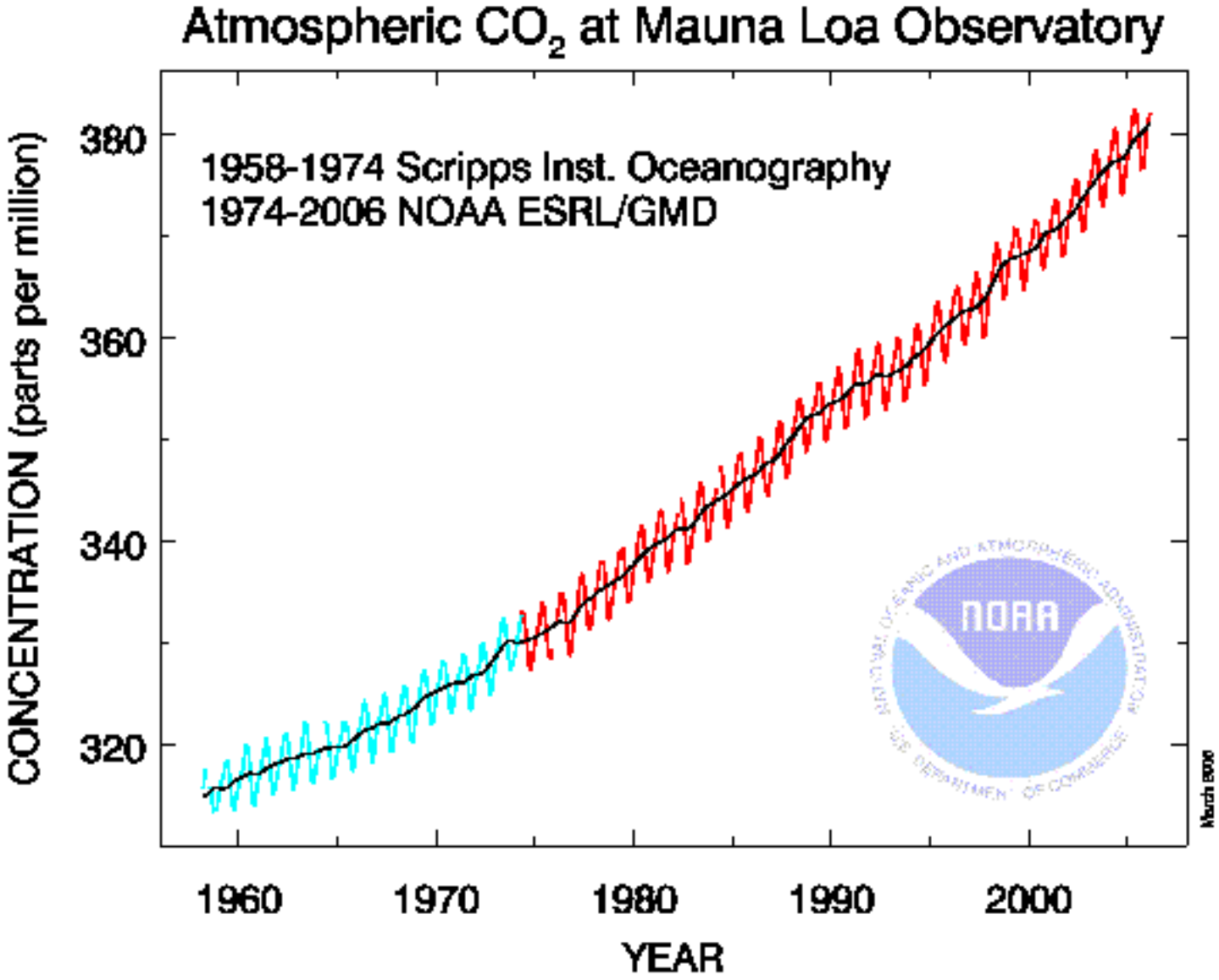
Outline of Talk

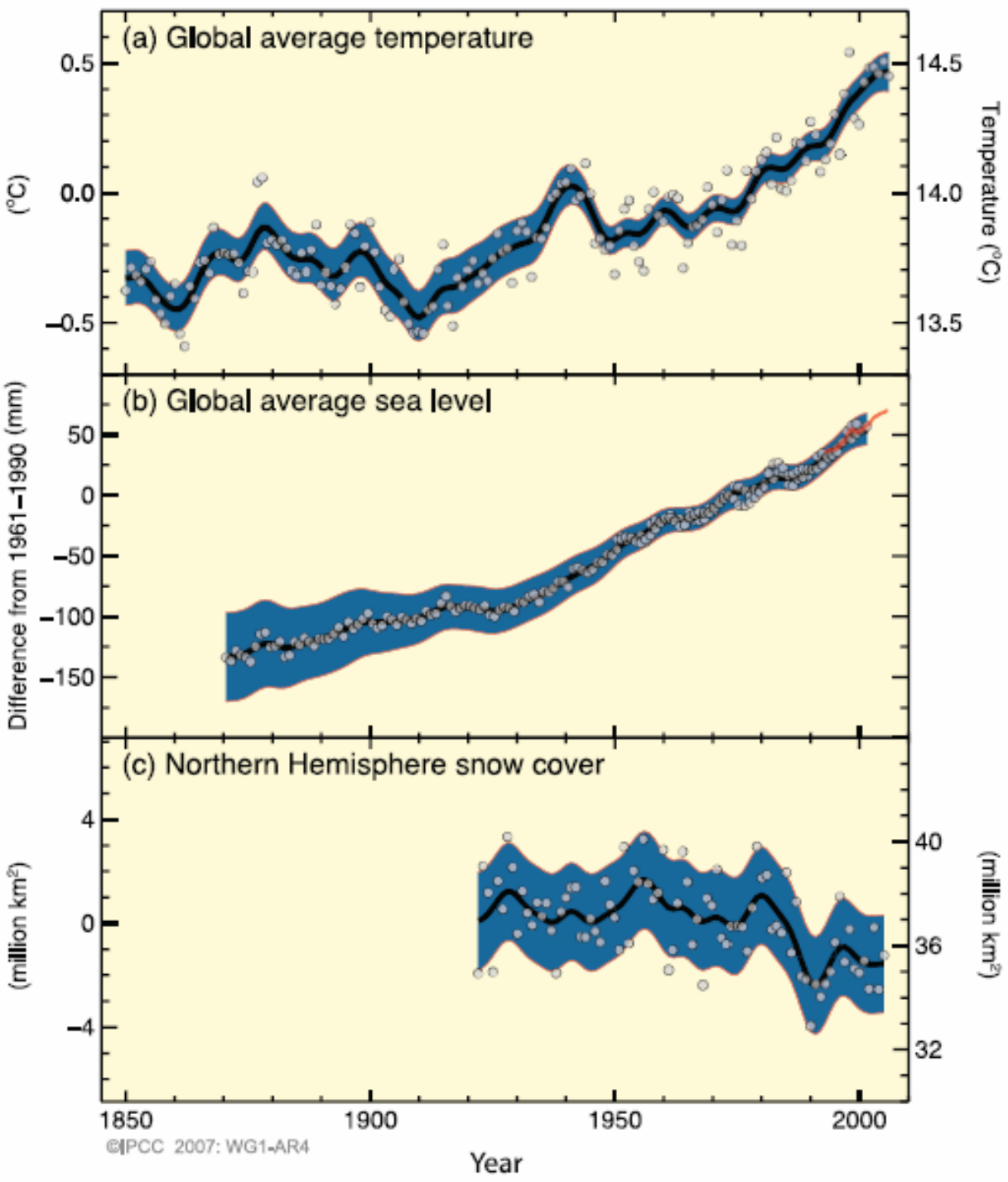
- The problem
- Market based incentives as part of the solution
- Carbon tax or cap and trade?
- Concerns with a carbon tax
- An illustrative proposal

Carbon Emissions and Climate Change

"Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture"

IPCC (2007)


Atmospheric CO_2 at Mauna Loa Observatory
1958-1974 Scripps Inst. Oceanography
1974-2006 NOAA ESRL/GMD
CONCENTRATION (parts per million)
380
360
340
320
1960
1970
1980
1990
2000
YEAR
NOAA
March 2006

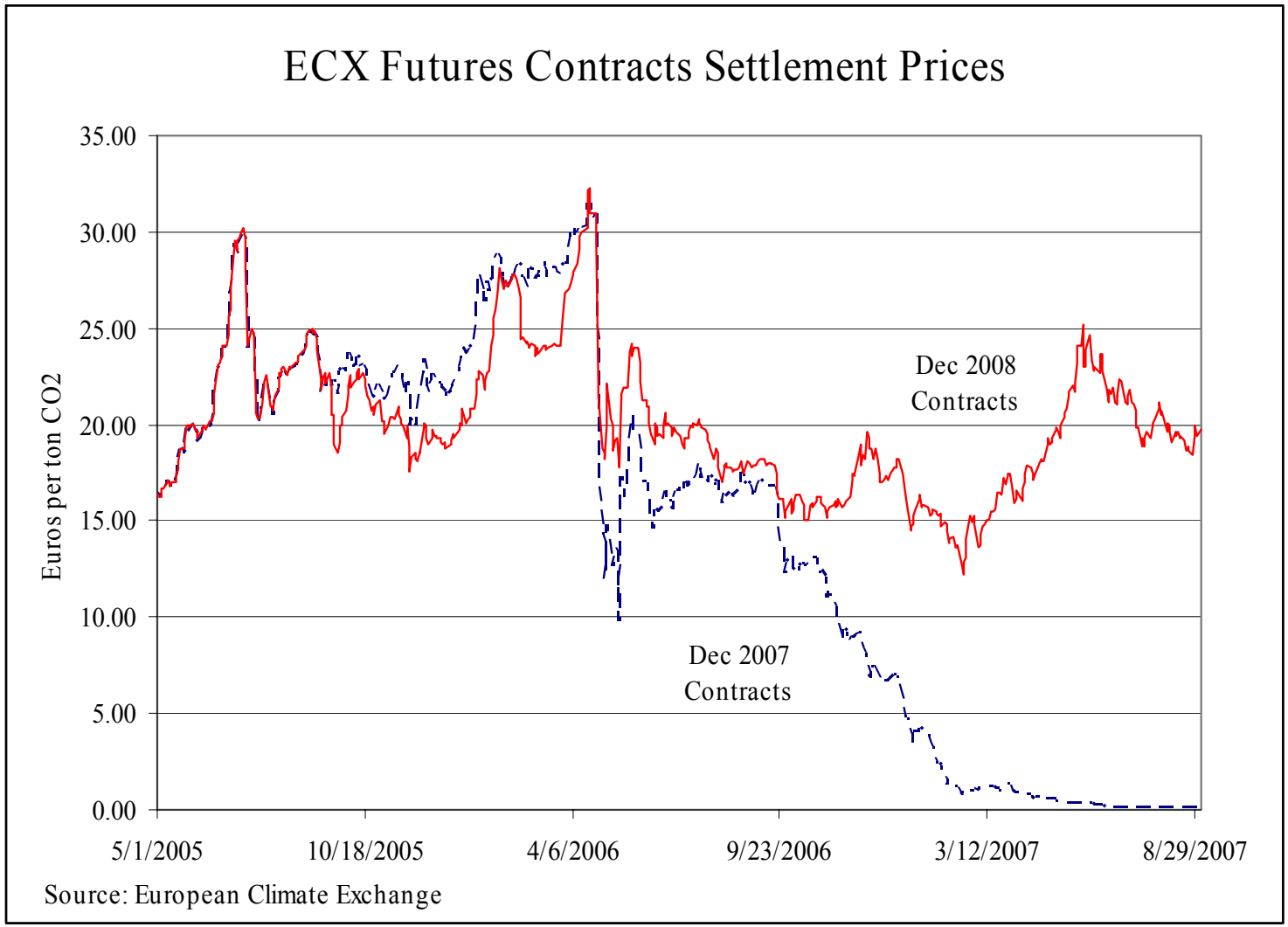

(a) Global average temperature
0.5
0.0
−0.5
(°C)
14.5
14.0
13.5
Temperature (°C)
(b) Global average sea level
50
0
−50
−100
−150
Difference from 1961–1990 (mm)
(c) Northern Hemisphere snow cover
4
0
−4
(million km²)
40
36
32
(million km²)
1850
1900
1950
2000
Year
©IPCC 2007: WG1-AR4

Policy Choices

- A carbon tax and a cap and trade system are examples of *market based instruments*
- Both put a price on carbon emissions
- Raising costs provides the incentive to reduce emissions
- Efficient policy instruments

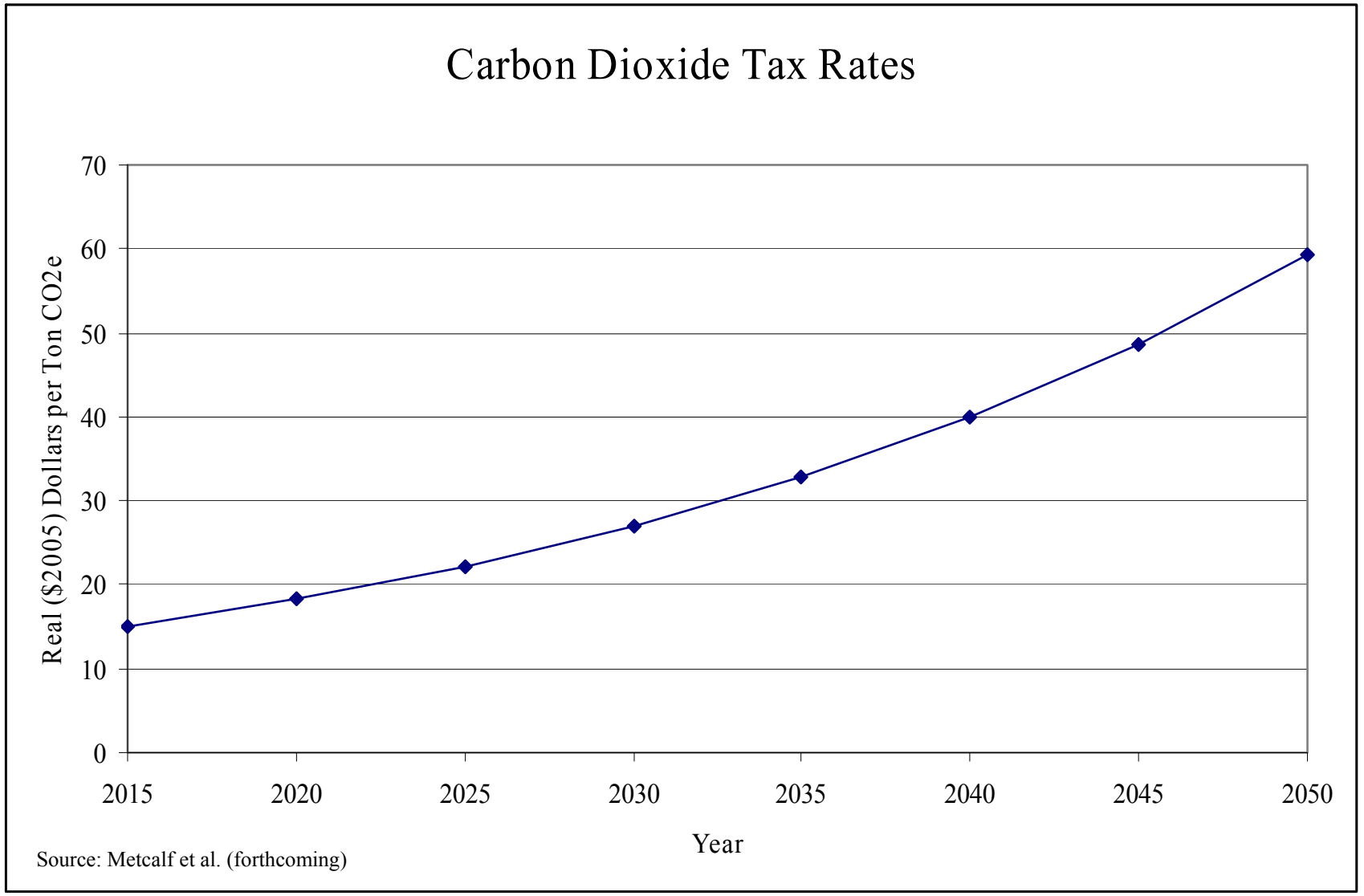
Why Choose a Carbon Tax?

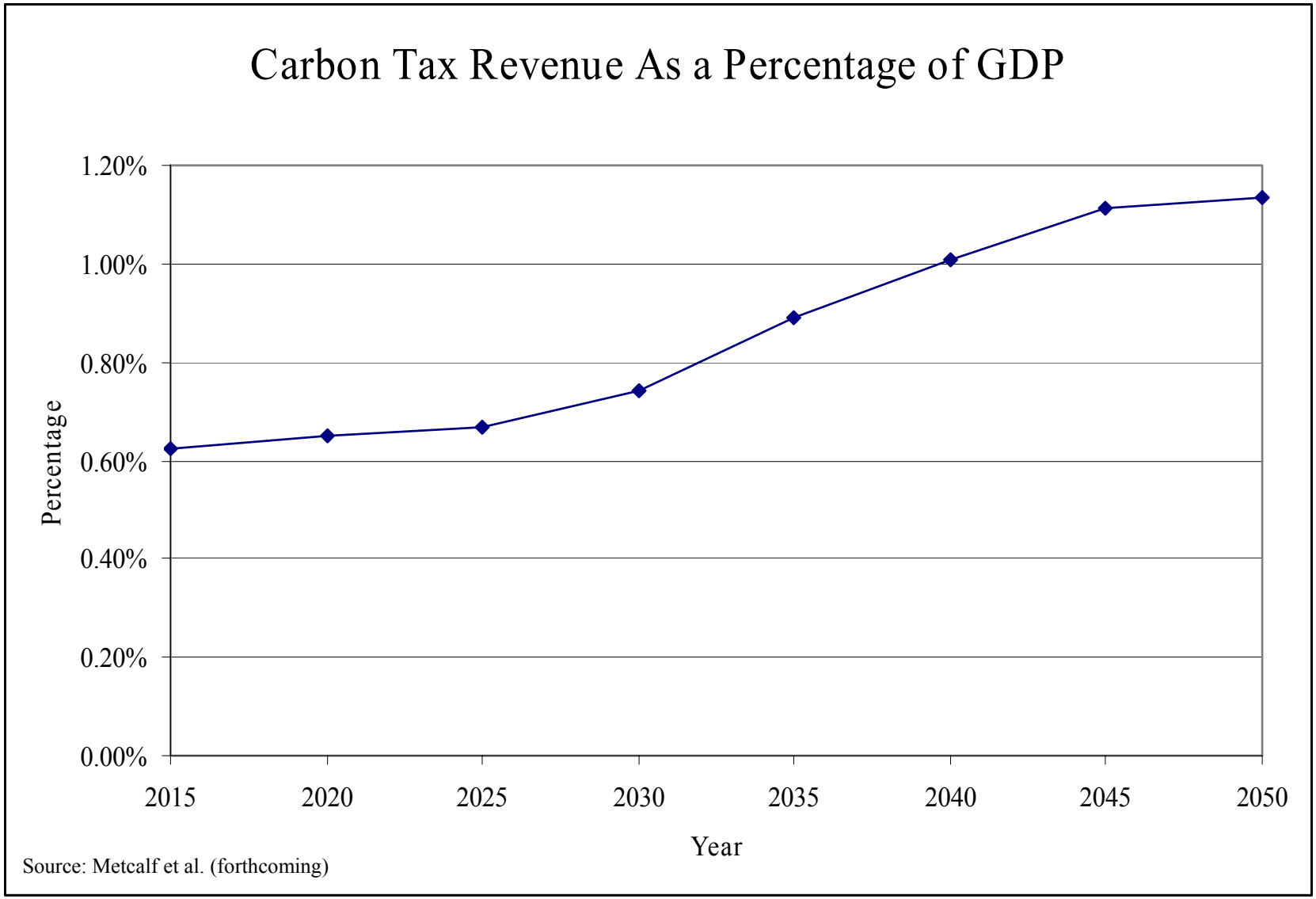
- No precedent for large-scale auctioning of permits in cap and trade programs
- Permit allocation and rent seeking
- Administrative costs
- Efficiency
- Price volatility


ECX Futures Contracts Settlement Prices
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Euros per ton CO2
Dec 2008
Contracts
Dec 2007
Contracts
5/1/2005
10/18/2005
4/6/2006
9/23/2006
3/12/2007
8/29/2007
Source: European Climate Exchange

Concerns with a Carbon Tax

- Stability of tax base
- No guarantee of emission reductions
- Efficiency and expediency
- Clinton’s BTU tax


Carbon Dioxide Tax Rates
Real ($2005) Dollars per Ton CO2e
70
60
50
40
30
20
10
0
2015
2020
2025
2030
2035
2040
2045
2050
Year
Source: Metcalf et al. (forthcoming)



Source: Metcalf et al. (forthcoming)

No Guarantee of Emission Reductions

- Economic and ecological consequences of GHG concentrations matter – not reductions per se
- No definitive scientific evidence yet on the precise amount of emission reductions required to prevent large economic and ecological losses
- To give primacy to specific emission reductions regardless of the cost is to suggest a greater certainty in the climate science than currently exists

Efficiency and Expediency

- Pressure in cap and trade to grandfather some or all emissions
- Large revenue and efficiency cost
- Pressure in carbon tax to provide industry exemptions
- Large revenue and efficiency cost
- Which is worse? Empirical question

Past Experience with Energy Taxes

- Clinton's BTU tax
- Passed the House but failed in Senate
- The BTU tax did not have a sharply articulated focus
- Lessons:
  - need for a clearly articulated rationale
  - need to address distributional concerns

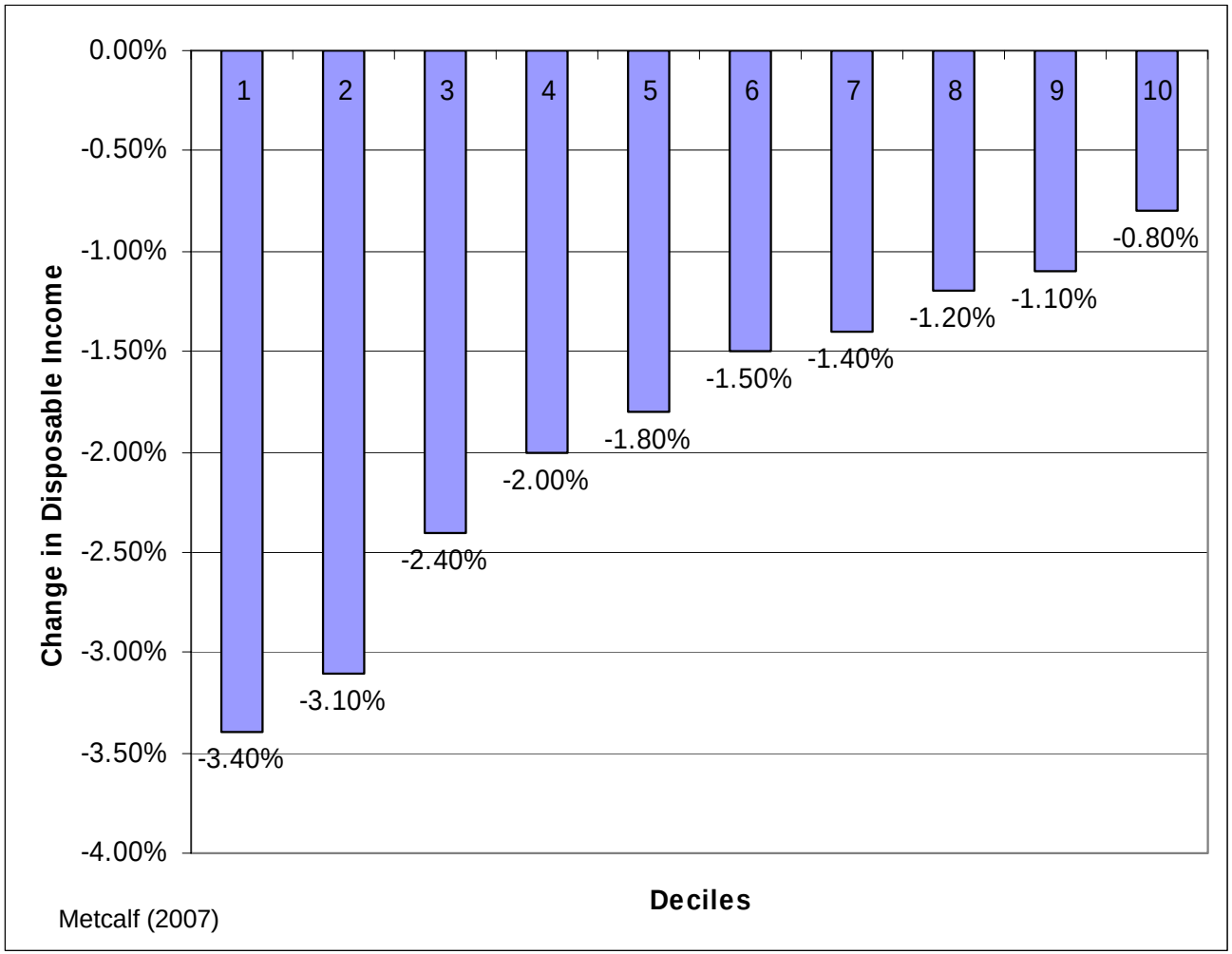
A Carbon Tax Swap

- Initial $15 per ton of CO_2e tax on emissions
- Refundable tax credit for sequestered GHGs and other approved sequestration activities.
- Border tax adjustment on carbon emissions
- An environmental earned income tax credit in the personal income tax equal to the employer and employee payroll taxes on initial earnings.

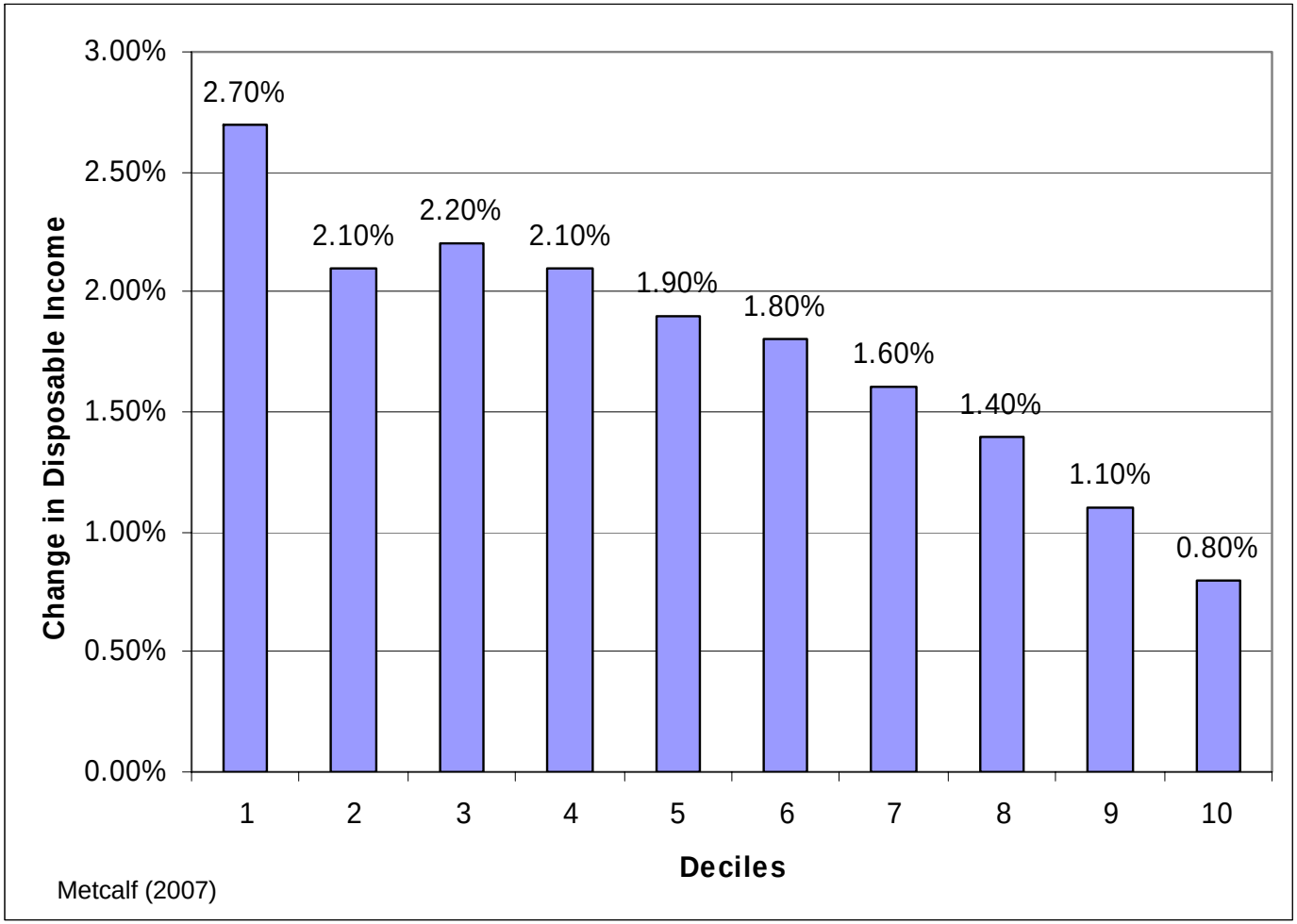
Short-Run Emissions Reductions With a Carbon Tax			
Source	**Reference**	**Carbon Tax**	**Percentage Reduction**
Emissions (mmt CO_2e)			
Greenhouse Gases	8201.5	7049.8	14.0%
CO_2 Emissions	6995.2	6408.8	8.4%
Other GHGs	1206.3	641.0	46.9%
Primary Energy Use (EJ)			
Coal	25.8	22.0	14.7%
Petroleum Products	49.6	46.8	5.6%
Natural Gas	26.8	25.9	3.4%

Source: Metcalf et al. (forthcoming). Results are for a $15 per ton CO_2e carbon tax in 2015. The tax is in year 2005 dollars.

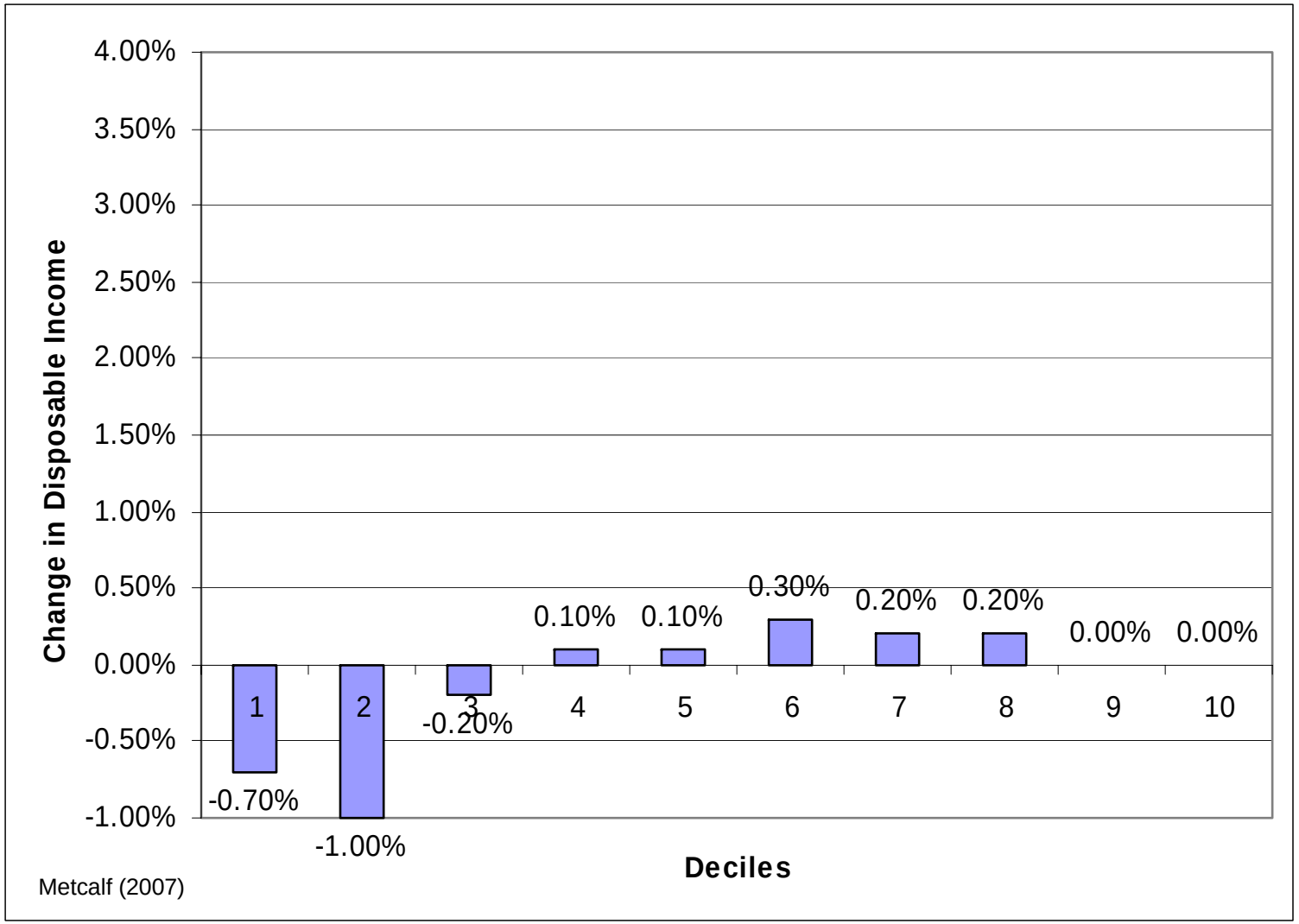
Carbon Tax Impact



Environmental Tax Rebate Impact

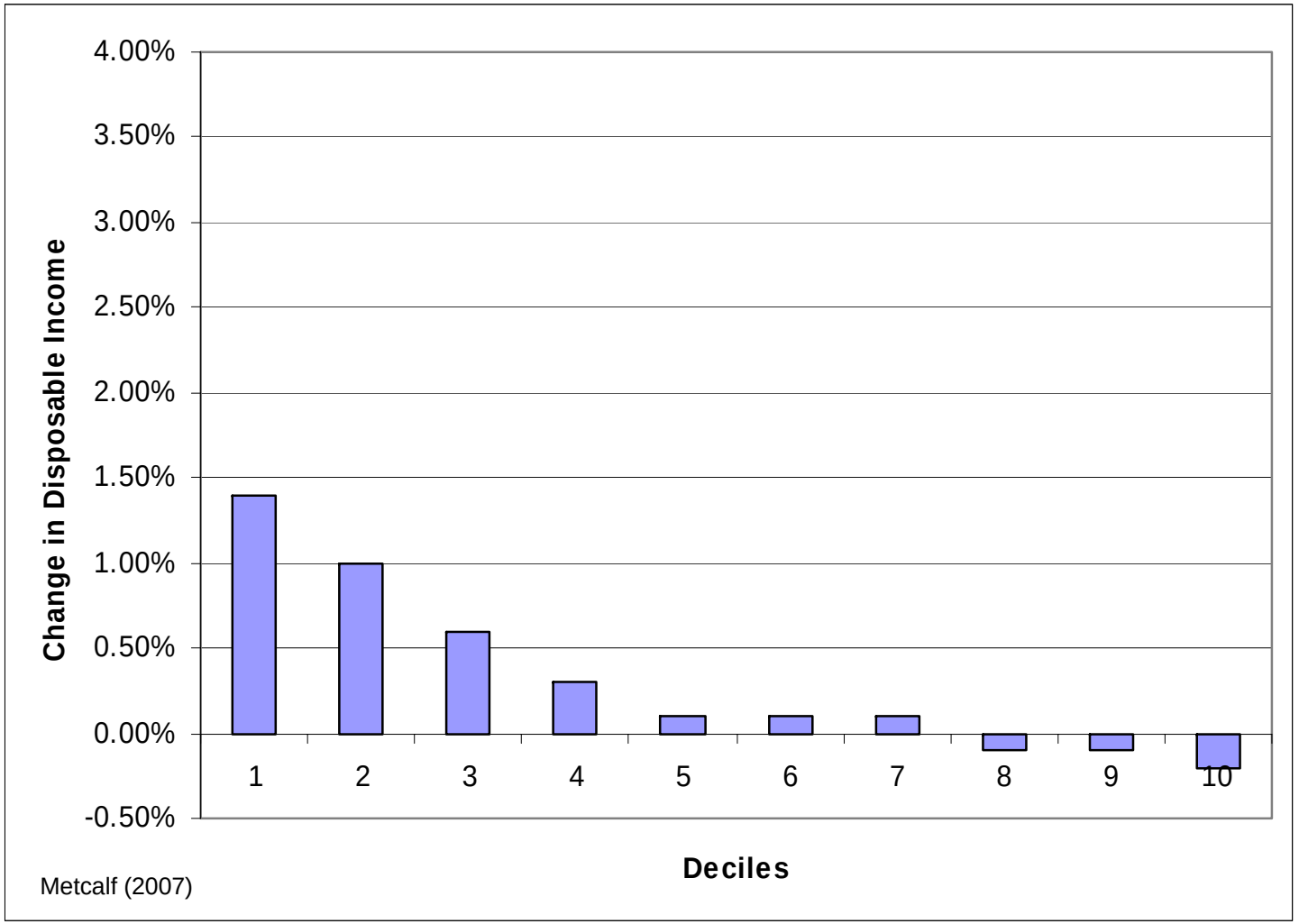


Net Impact on Income Distribution



Metcalf (2007)

Protecting the Elderly



Metcalf (2007)

Regional Distribution

Region	Net ($)	Net (%)
New England	17	0.0
Middle Atlantic	−9	−0.2
East North Central	**30**	**−0.2**
West North Central	30	0.1
South Atlantic	24	−0.1
East South Central	−75	−0.5
West South Central	−12	0.0
Mountain	17	0.1
Pacific	5	0.0

Metcalf (2007)

Conclusion

- Carbon tax and cap and trade examples of market based instruments
- A carbon tax can be designed to be revenue and distributionally neutral
- Economic efficiency and administrative advantages to a carbon tax
- Public opinion supports a tax increase to combat global warming