Rio de Janeiro

A GLOBAL CO_2 TAX FOR SUSTAINABLE DEVELOPMENT?

CARBON LEAKAGE, RENEWABLE ENERGY AND COALITIONS

Urs Steiner Brandt & Gert Tinggaard Svendsen

(accepted, *Journal of Sustainable Development)*

Outline:

1. Introduction
2. Tax and renewable energy
3. Lobbying
4. The socio-economic impact
5. Conclusion

1. Introduction

1.1 Rio+20 (2012)

Twin goal:

i) Facilitate growth of green industries

ii) Enhance quality of institutions

1.2 Research question

Non-productive negotiations…simple solution?

"Can a CO_2 tax secure the Rio+20 twin goal at the global level?"

Gap: Cost-effective and politically feasible!

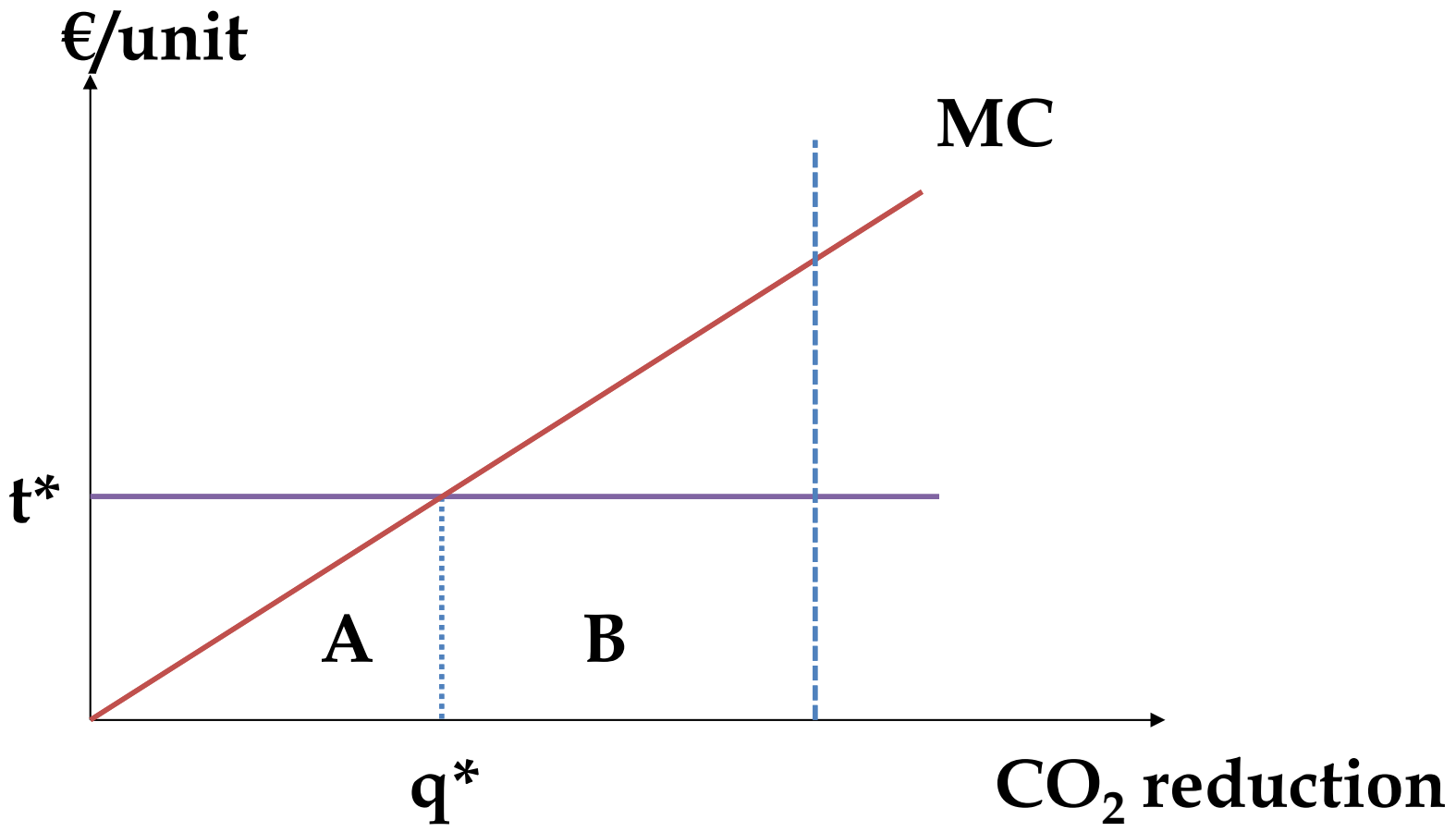
2. Tax and Renewable Energy

2.1 Tax

Economists: Green taxation (Pigou 1920)

Figure 1, global CO_2 tax

CO_2 Taxation

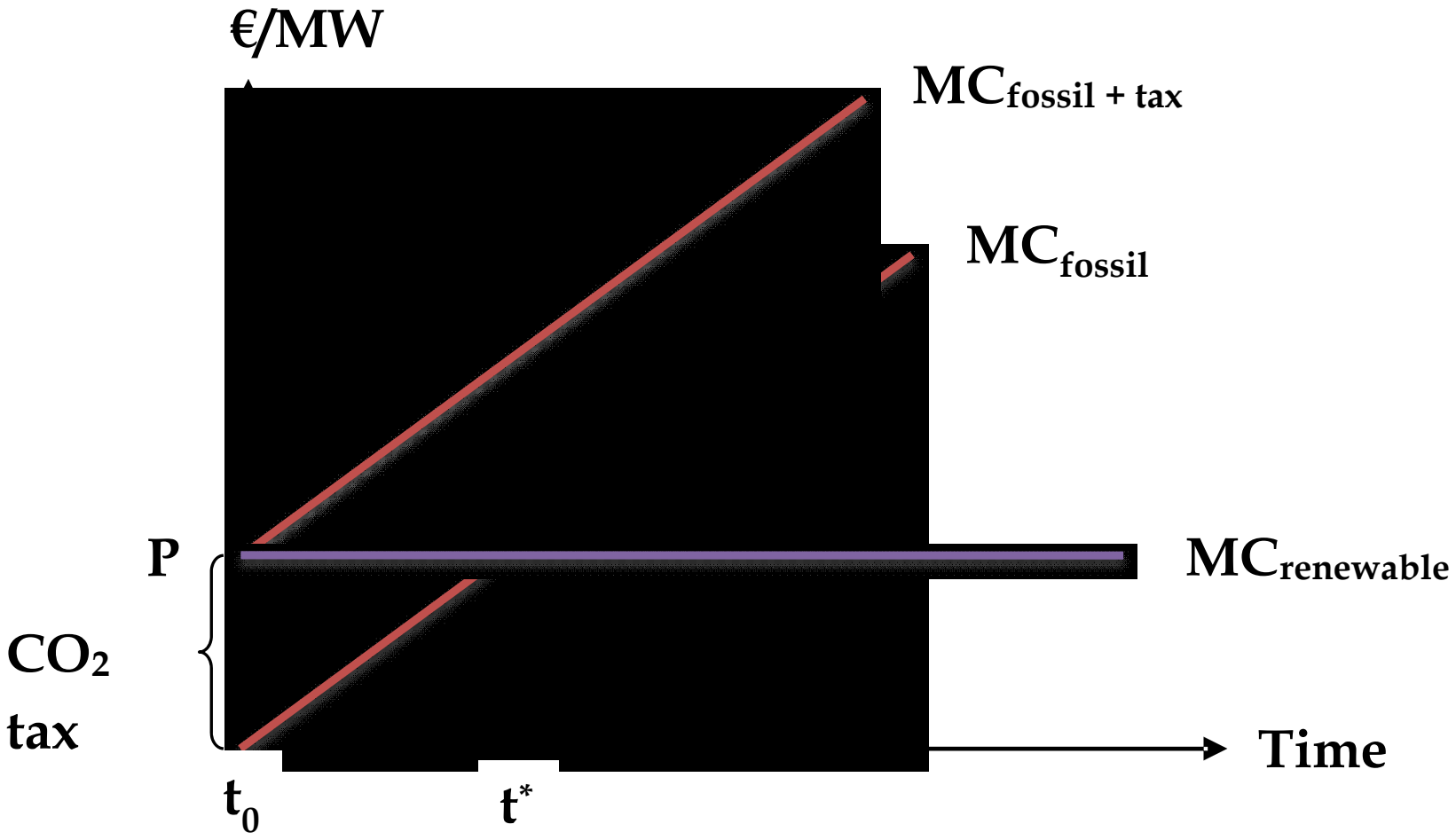


2.2 Renewable energy

How does a global CO_2 tax affect the potential shift from non-renewable to renewable energy (green economy)?

Figure 2: Switch point.

From fossil fuels to renewable energy when taxing CO_2



3. Lobbying

3.1 Winners/Losers

Economic part: ”green light” for the global use of CO_2 taxation.

What about the political feasibility?

Consumers: Potential winners (tax revenue can be used to lower distortive taxes).

Producers: Losers (reduction costs and tax payments).

Asymmetry.

3.2 Negotiations

So far not possible to introduce a common CO_2 tax in the EU or the US!

Main argument: loss of jobs.

”Carbon leakage”

China/India!

Competitiveness, however, not ruined when all countries are taxed the same (uniform)!

3.3 New coalitions

"Brown" industry vs. environmental groups.

Brandt and Svendsen (2002): How wind turbine producers joined forces with environmental organizations in promoting ambitious target levels for renewable energy.

3.4 Administration simple

Possible to implement global CO_2 taxation even when national institutions are “bad”.

CO_2 tax basically a ‘painted’ energy tax according to CO_2 content in fossil fuels.

Developing countries may find CO2 taxation highly attractive as a tool to collect taxes.

Tax revenue may be invested in better institutions, for example by fighting corruption efficiently.

4. The socio-economic impact

2009 Copenhagen meeting (COP15):

Limit the increase in global mean temperature below 2 degrees Celsius (compared to 2000).

→ Carbon tax in the 2 degrees scenario?

→ How this tax will affect various countries and how are the incentives to reduce emissions?

Carbon price

Carbon price in the 2 degrees scenario (Nordhaus, 2010) (2010 prices, $/ton CO_2)

Year	2015	2025	2035	2045	2055	2105
CO_2 tax ($/ton)	24.24	43.63	69.32	107.04	160.04	277.18

IPAT – measure

We illustrate the consequences of a tax for different countries by use of the IPAT identity.

This identity is given by

$$I \equiv P \cdot A \cdot T$$

$$Impact \equiv population \cdot affluence \cdot technology$$

For CO_2 emissions, we plug in:

$$CO_2 \equiv population \cdot \frac{GDP}{population} \cdot \frac{CO_2}{GDP}$$

Given emission in country i $E^i_{CO_2}$, and uniform tax rate t_u, total tax payment (revenue) in country i (R^i_t) is given by:

$$R^i_t = t_u \cdot E^i_{CO_2}$$

Inserting:

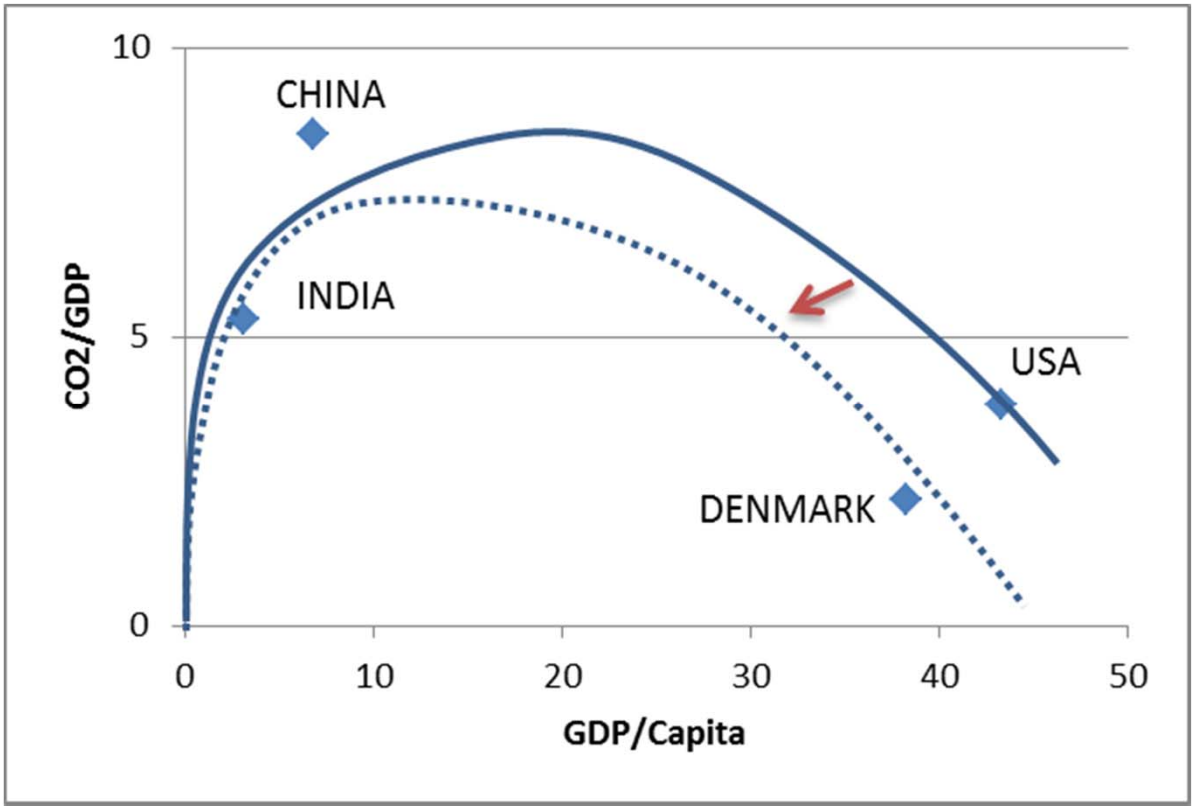
$$\frac{R^i_t}{P^i} \equiv \frac{GDP^i}{P^i} \cdot t_u \cdot \frac{E^i_{CO_2}}{GDP^i}$$

IPAT measures for four countries

10$/ton CO_2 tax (2009 numbers).

Countries	GDP ($)	CO_2 (ton)	pop	GDP/pop ($)	CO_2/GDP Ton/$	t*CO_2/GDP	taxpayment/pop
USA	1.39E+13	5.3E+09	3.07E+08	45305.1	3.81E-04	3.81E-03	172.7
China	9.05E+12	7.69E+09	1.33E+09	6797.8	8.49E-04	8.49E-03	57.7
India	3.73E+12	1.98E+09	1.19E+09	3132.9	5.31E-04	5.31E-03	16.6
Denmark	2.11E+11	4.57E+07	5.52E+06	38268.0	2.16E-04	2.16E-03	82.7

The main effect of a CO_2 tax



› Red arrow indicates how a tax moves countries towards a lower CO2/GDP path

Reasons

We consider that the (main) reason for this is that the tax-system punishes inefficient use of fossil fuels (column 8, taxpayment/pop).

While the US does not have any significant price on carbon, there are several price mechanisms in place for Denmark such as CO_2 taxes and other energy taxes combined with the European Emission Trading System.

Further consequences

i) Punish inefficient energy usage:
The CO_2/GDP in the US and China will decrease following the CO_2 tax because the tax system punishes inefficient usage of fossil fuels.

ii) Eliminating leakage:
Some of the Danish reduction in CO_2 might be caused by leakage effects. Such effects will be eliminated in the global uniform tax system.

5. Conclusion

Bold conjecture:

A global CO_2 tax should be considered to meet the two main challenges of green economy and better institutions from Rio+20.

Economically: double dividend

Politically: carbon leakage and new coalitions

Administratively: simple, even bad institutions.

Policy recommendations

Future climate negotiations:

Define specific and binding global CO2 target levels and tax at the right level.

If somebody cheats, supranational authority such as WTO (potential trade sanctions)…