Donatella Porrini
dporrini@liuc.it

DIFFERENT ENVIRONMENTAL POLICIES IN THE CASE OF CLIMATE CHANGE

27, 28 FEBRUARY, 2019
LIUC COURSE:
CORPORATE CITIZENSHIP FOR GLOBAL FIRM


Government Policies
Market-based Incentive Mechanisms
Command-and-Control Mechanisms (Standards or Regulations)
Other Policies
Charges
Subsidies
Marketable Pollution Permits
Other MBIs
Ambient Standards
Emission Standards
Environmental quality protection
Liability legislation
Zoning, bans, and fines
Emission Charges
User Charges
Product Levies (or Charges)
Deposit-refund systems
Recycling and EO
Licenses, concessions, quotas
Traditional property rights

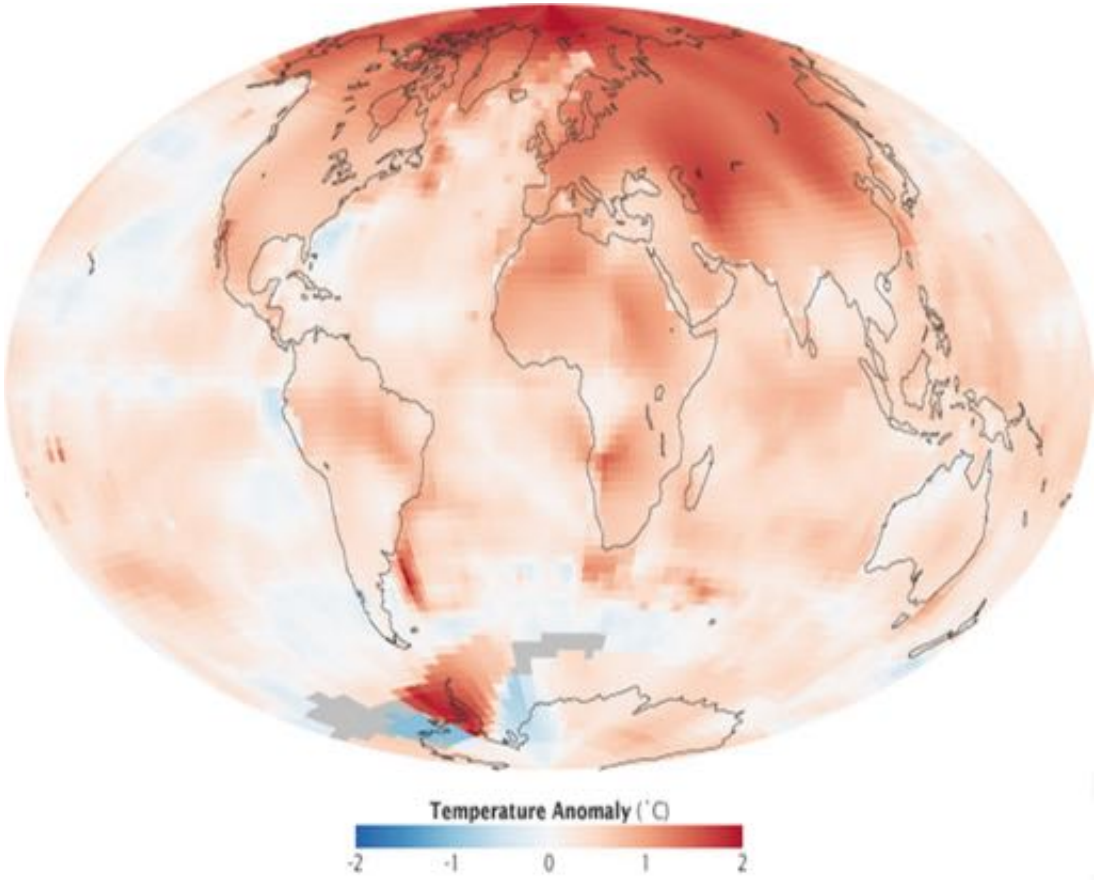
THE ACTUAL ISSUE OF THE CHOICE OF ENVIRONMENTAL POLICY INSTRUMENTS:

THE CASE OF CLIMATE CHANGE CONSEQUENCES

CLIMATE CHANGE IN REALITY

The ten warmest years in the last 132 have all occurred in the time frame from 1998 to the present

2012 was the ninth warmest in the historical series of data collected since 1880



Source:NASA

Temperature anomaly
2000-2009

PAST CLIMATE CHANGES

During the Earth's history have occurred cyclically climate changes that have brought the planet to pass through several ice ages alternated with warmer periods

BUT

There are scientific evidences that current changes in Earth's climate are exceeding those that would be expected due to natural causes, in the past the temperature never went up so drastically…

FUTURE EFFECTS OF CLIMATE CHANGES

Future climate changes, and so global warming, will depend on how the current society will change.

In order to describe as realistic as possible the future world scientists described scenarios and the climate changes that will occur for each one.

Different scenarios emphasize wealth and regionalization (A2); globalization and equity (A1B); globalization, sustainability and equity (B1).

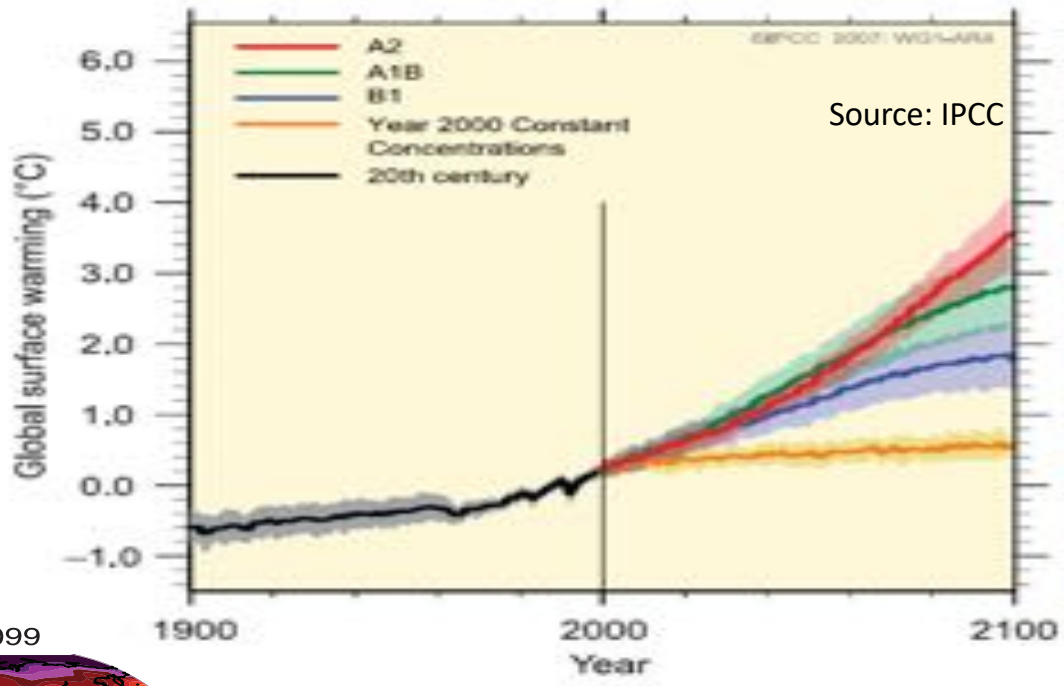
DIFFERENT SCENARIOS

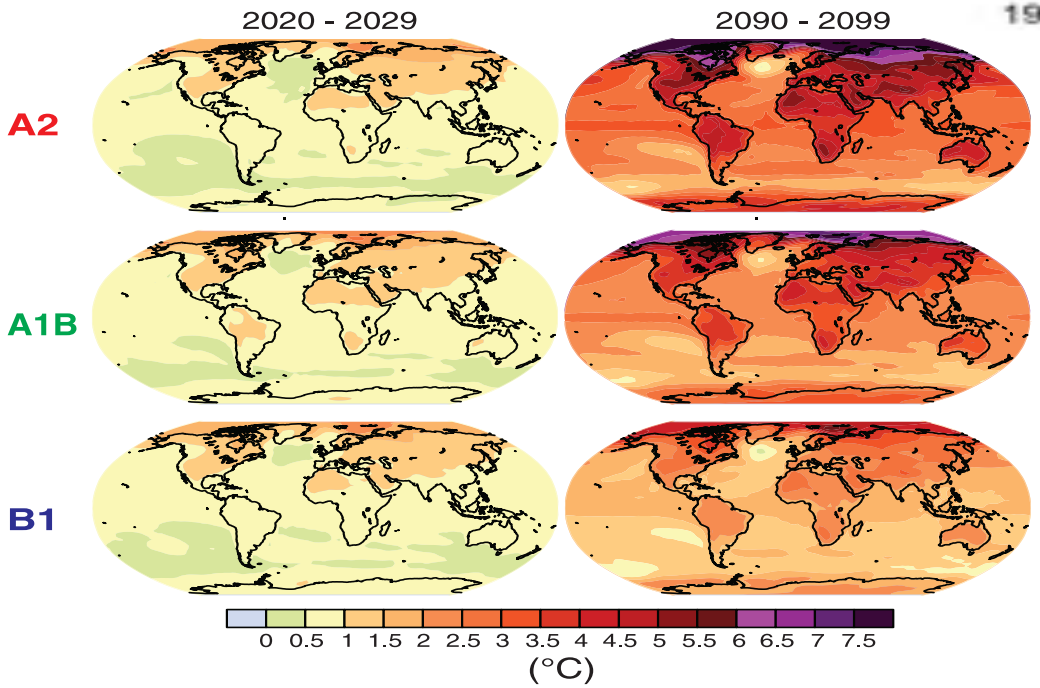
A2: Economic development is primarily regionally oriented and per capita economic growth and technological change are very fragmented

A1B: Very rapid economic growth, a global population that peaks in mid-century and rapid introduction of new and more efficient technologies. Additionally, this world emphasizes local solutions to economic, social, and environmental sustainability.

B1: Introduction of clean technologies and exploit resources efficiently. It is given great emphasis on global solutions to economic, social and environmental sustainability, including improved equity

GLOBAL WARMING AND DIFFERENT SCENARIOS





Source:IPCC

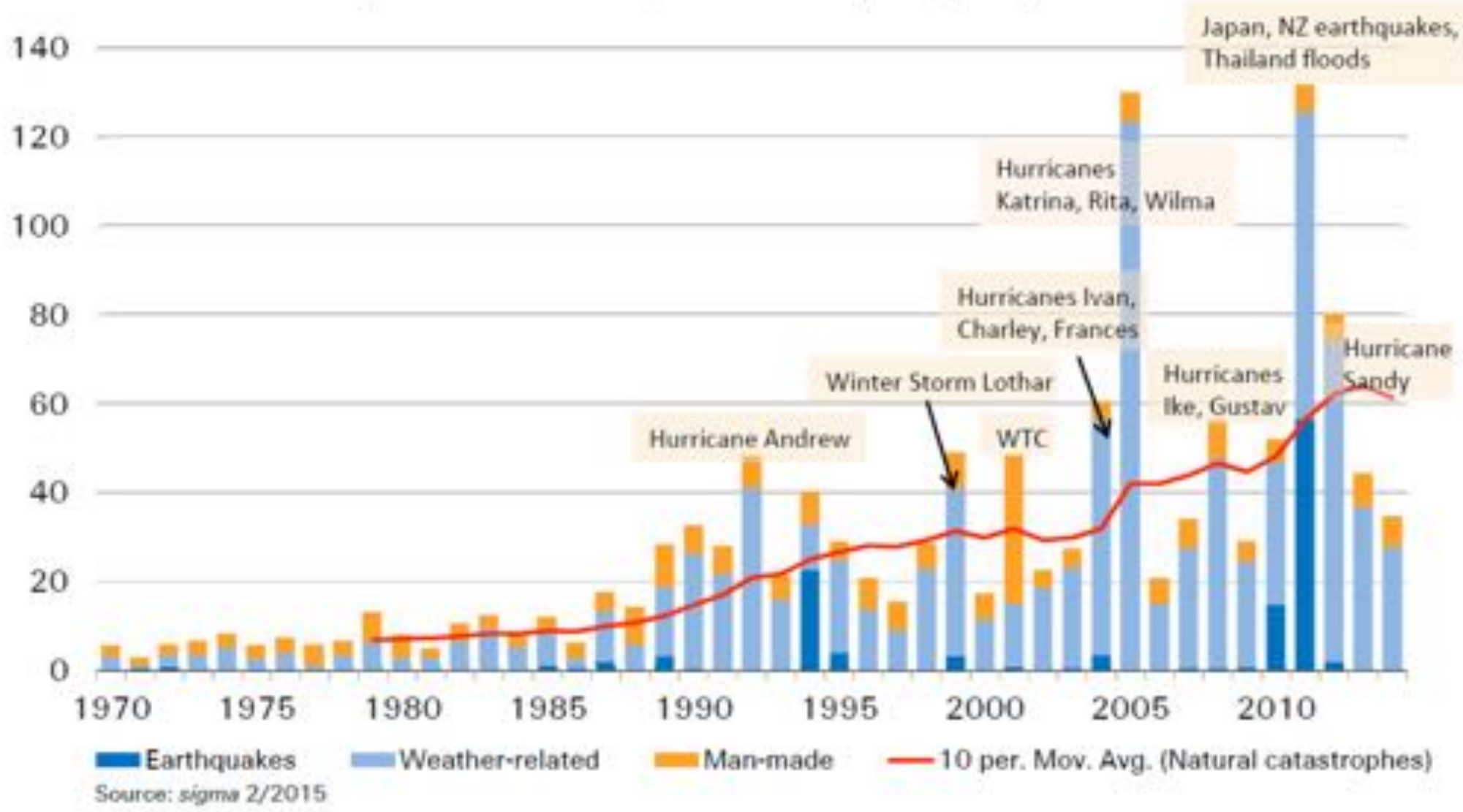
Surface temperature changes for the early and late 21st century relative to the period 1980-1999.

Increase in the natural disasters

Natural disasters:
land slides,
avalanches,
snow pressure,
storms,
hails,
heavy rain,
floods
Fires ….

In 2000-2010, natural disasters have increased by 40%

Worldwide natural catastrophe losses 1970-2014, in USD billion (2014 prices)



Source: *sigma* 2/2015

Economic Policies Consequences

- GLOBAL WARMING IS A REAL PROBLEM
- IT LEADS TO DRAMATIC CONSEQUENCES
- COUNTRIES MUST INTERVENE IMMEDIATELY THROUGH SOME UNIVERSALLY ACCEPTED INSTRUMENTS AND FOLLOWING STRICTLY CRITERIA OF KYOTO PROTOCOL

CLIMATE CHANGE ISSUE

Over the last century, climate change raised as a very important issue all over the world.

The change in climate results from an increase in the earth's average atmospheric temperature, usually referred to global warming due to both natural and human causes, especially greenhouse gas (GHG) emissions.

In response to increasing scientific evidence that human activities are contributing significantly to global climate change, decision makers are devoting considerable attention to public policies to reduce greenhouse gas emissions and thereby prevent or reduce such change.

CLIMATE AS ECONOMIC GLOBAL PUBLIC GOOD

"Economic global public goods" can be defined as goods with economic benefits that extend to all countries, people, and generations. Following the EAL approach, they are special case of externalities with a global dimension.

Climate is clearly "global" in both causes and consequences and the impact of emissions of GHG on global warming is totally independent of their location and local climatic changes depend only on the world climate system.

CLIMATE AS ECONOMIC GLOBAL PUBLIC GOOD

Climate change has also other important features:

First, it is an inter-generational phenomenon, i.e. the effects of GHG concentration in the atmosphere on climate are persistent across time and the climate system is slow to react to increases of such concentration.

Second, there is a high level of uncertainty, both about dimension and timing of climate change and about costs of the abatement of emissions.

Finally, it is necessary to consider an important equity issue: the countries which have more responsibilities will face less consequences in the future and vice-versa.

COMMAND AND CONTROL INSTRUMENT

The first kind of environmental instrument applied to face climate change consequences is the so called Command and Control (CAC) ones, that are characterized by a public agency that provides a definition of conduct rules and enforcement system
(local, national, international agency?)

Thus, they could be defined as public-oriented instruments, which require the use of a particular technology or the observation of a performance standards, authorizing for the maximum amount that a source can emit.
(global standards?)

PROS AND CONS

The choice to develop a CAC regulatory system is based on the advantage of centralized agencies to assure a cost-effectiveness calculation on the base of the expected damage and of the marginal cost of different level of preventive care.

The centralized structure presents the advantage to provide a continual oversight and a broad array of regulatory tools.

Following the traditional EAL approach, well-defined standards generate the correct incentive for the firm to act with caution and make the best production and prevention decisions.

How can it work at a global level?

MARKET BASED INSTRUMENT

Market-based instruments are characterized by a private administration and enforcement system, and stimulate indirectly the behavior of the firm.

There are essentially two different types of those instruments: Taxes that are fees imposed on emitters proportionate to the total amount of emissions released into the environment (they could be divided into emission charges, product charges and user charges)

MARKET based INSTRUMENTS

Taxes are instruments that minimize costs by maximizing flexibility of response:

- Price approach: put a price on emissions (e.g. carbon tax); producers adjust quantity (level of emissions)

Price-based system: 2 effects

1 Raises cost of the polluting product/process, thereby lowering consumption demand for it

2. Leads producers to seek ways reducing emissions (i.e. by changing energy source or technology) that cost less than the tax

CARBON TAX

A carbon tax is a particular tax based on (GHG) emissions generated by burning fuels and biofuels, such as coal, oil and natural gas.

It has been introduced with the main goal to level the gap between carbon intensive (firms based on fossil fuels) and low carbon intensive sectors (firms that adopt renewable energies).

The implementation in quite all industrialised countries on a national level without coordination

CARBON TAX FEATURES

- A carbon tax seeks to level the playing field between carbon intensive (fossil fuel based firms) and low carbon emitting sectors (renewable energy and energy efficient technologies).
- Although this option does not set a fixed quantitative limit to carbon emission over the short term, a carbon tax at an appropriate level and phased in over time to the "correct level" will provide a strong price signal to both producers and consumers to change their behaviour over the medium to long term.
- The introduction of a carbon price will change the relative prices of goods and services, making emission-intensive goods more expensive relative to those that are less emissions intensive: this provides a powerful incentive for consumers and businesses to adjust their behaviour, resulting in a reduction of emissions

PROS AND CONS

The introduction of environmental taxes may harm international competiveness.

Also concerning international competiveness, many proposals for environmental taxes have been made at the international level.

For example the European Community has proposed that a carbon tax be introduced in its member countries, but its implementation is dependent on other major countries introducing measures with comparable effect.

These international agreements are inevitably difficult to complete
Due to the introduction of taxation, the relative prices of goods and services will change: emissions of intensive goods will be more expensive, while emissions of less intensive goods will be lower.

Thus, carbon tax provides a strong incentive for individuals and firms to adjust their conduct, resulting in a reduction of the emissions themselves. Hence, by reducing fuel emissions and adopting new technologies, both consumers and businesses can reduce the entire amount they pay in carbon tax.

Taxing “bads” and not “goods”

GLOBAL COORDINATION FOR TAXATION

First of all, the instruments based on tax mechanism need a method of coordinating policies among countries: it could assume the form either of an international tax or of an harmonized domestic tax system.

In the case of an international tax, the nations (and not the firms) pay the tax to an international agency, which receives and redistributes the tax revenues.

On the other hand, in the case of harmonized domestic tax, the international community should negotiate an agreed level of a domestic emission tax, establishing adequate compensation for the losing countries from the gaining countries.

LINKING DIFFERENT NATIONAL POLICIES

In the recent COP 21 meeting in Paris, global climate policy has faced the tension between the efficiency benefits of uniform global policy and national and regional variation in tastes for differing policies.

In reality, different countries are undertaking different policies ranging from Command and Control to Market-Based approaches, like carbon taxes and tradable permits systems.

Variations in policies can lead to substantial inefficiencies and the target will be to reach an optimal degree of policy homogenization.

Figure 1. Regional, national, and subnational carbon pricing initiatives: share of global emissions covered[a]

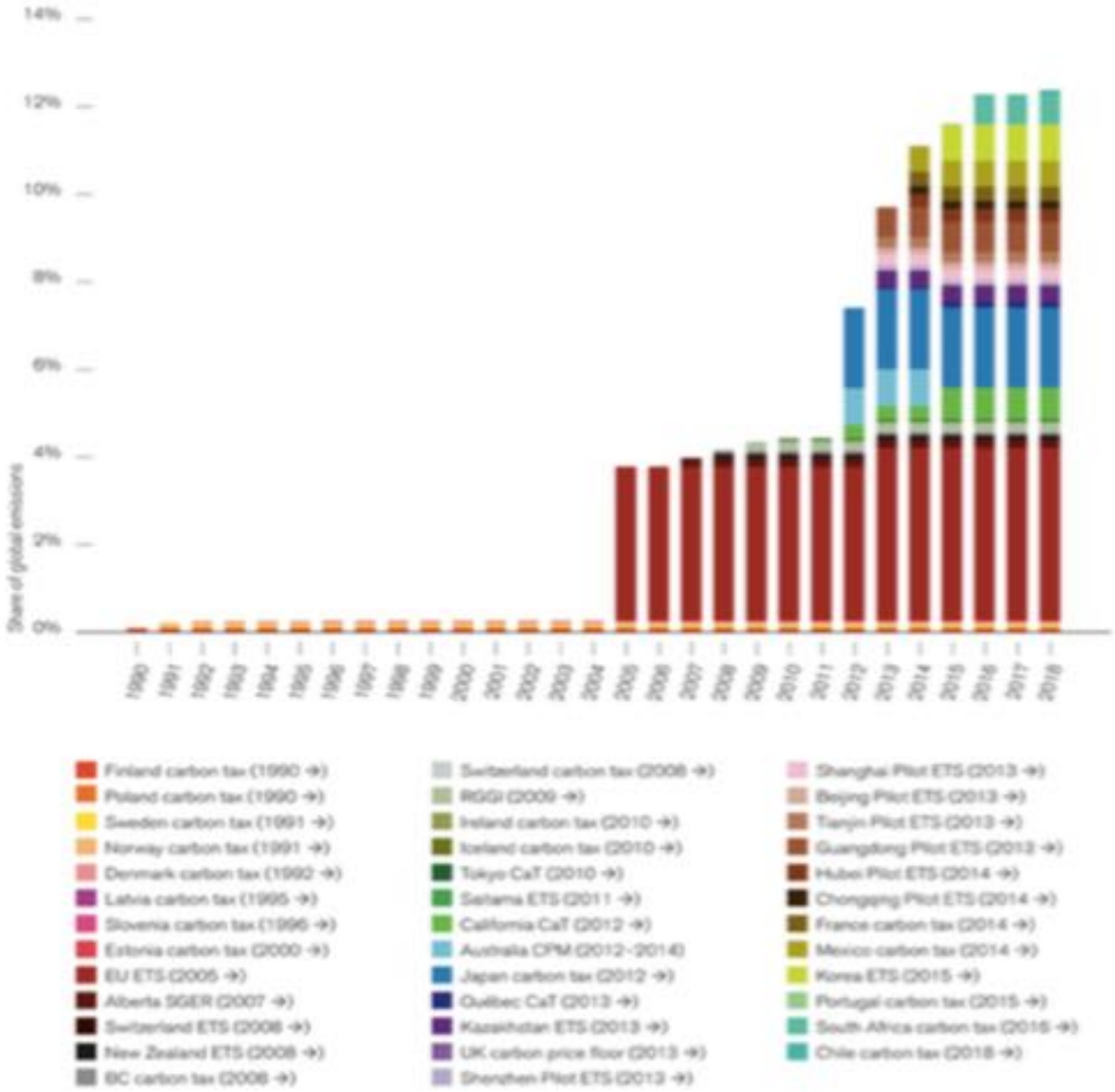
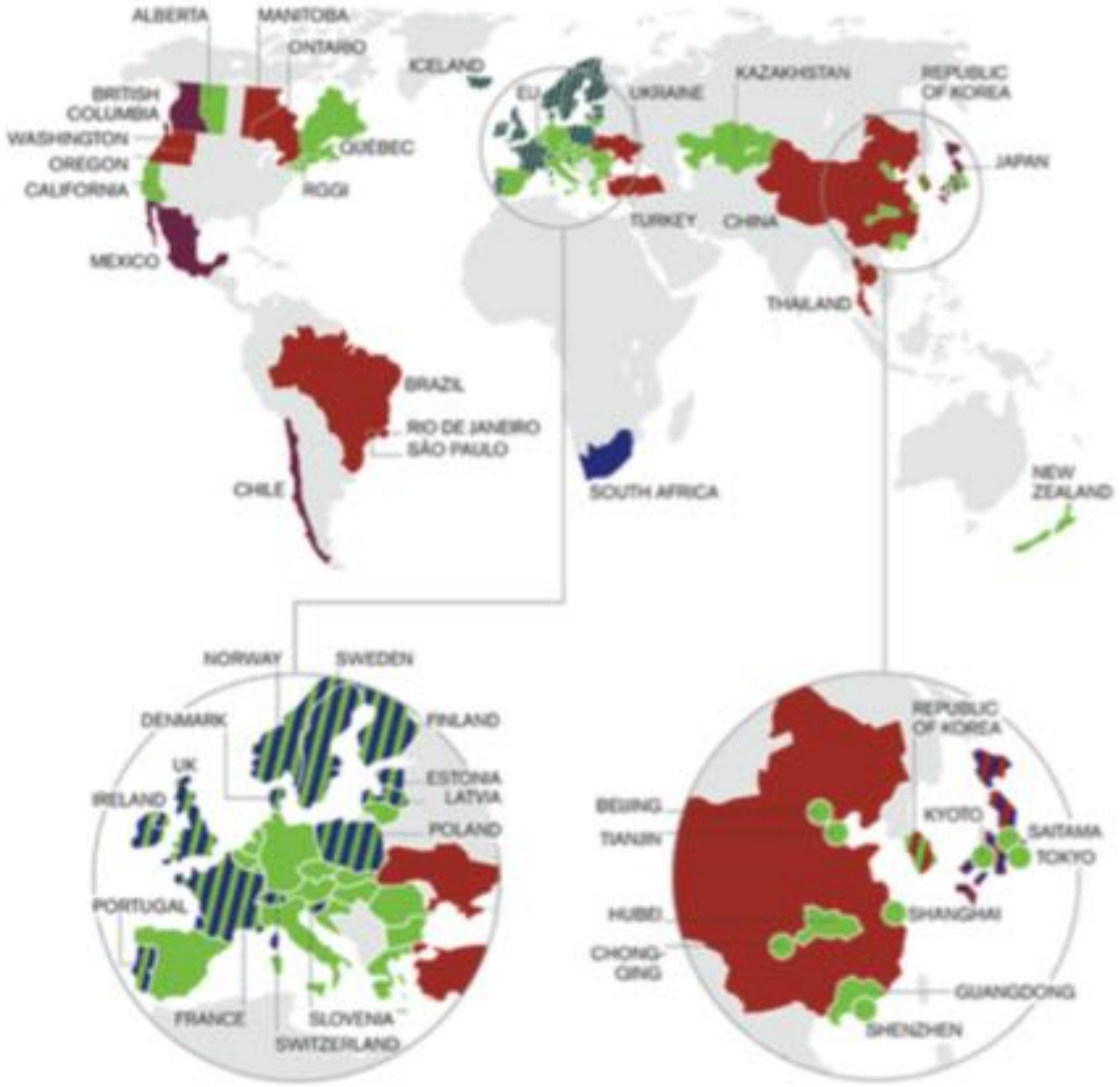


Figure 2. Summary map of existing, emerging, and potential regional, national and subnational carbon pricing instruments (ETS and tax)[1]



MARKET based INSTRUMENTS

- Quantity approach: set a maximum quantity of pollution allowed (CAP: e g tons of CO_2 emissions); price adjusts according to supply and demand (TRADE)

Quantity based system:

- Similar in effect to standard setting, except the allocated quantity target can be bought and sold
- Polluters are free to find best way to adjust to the target
- Price of the permit has similar effect as pollution tax; leads producers to seek cheaper ways to reduce emissions, thus lowers costs

A DIFFERENT TYPE OF MBIs

- A relatively new MBIs is the **marketable (or tradeable) permit system.**
- Under this system, the government issues a fixed number of permits or "rights to pollute" equal to the permissible total emissions and distributes them among polluting firms in a given area.
- A market for permits is established and permits are traded among firms.
- Firms that maintain their emission levels below their allotted level can sell or lease their surplus allotments to other firms or use them to offset emissions in other parts of their own facilities.

INDIVIDUAL TRANSFERABLE QUOTAS

- The concept of marketable permits may be used to manage natural resources such as fisheries.
- This system is referred to as Individual Transferable Quotas (ITQs).
- Under this system, property rights to a specified quantity of fish harvest are distributed among firms or auctioned off to the highest bidders.
- The holders of ITQs may use, sell or lease them to other firms.
- Over time, the ITQ systems leads to an efficient use of effort and harvest.

ADVANTAGES OF PERMITS

- Allocation of permits is determined by market forces.
- The ability to sell permits is an incentive for firms.
- The system makes allowance for industrial development.
- The system can generate income for the government.

DISADVANTAGES OF PERMITS

- The market for permits may not be perfectly competitive.
- Well-developed markets may constraint the permits' system.
- Administrative, monitoring and enforcement costs may be high.

First instrument: TAXES

A tax is a way to attribute a price to emissions that may be incorporated by the firm in the price of its products.

- The incentive for the adoption of abatement techniques relies on the market mechanism because a firm that does not apply the optimal techniques, will produce more emissions, pay more taxes and sell its products at a higher price than its competitors.

Second instrument: TRADEABLE PERMITS

Tradeable Permits are instruments that shape behavior through price signals rather than explicit instructions on emission control levels or methods.

- They can encourage firms to undertake actions that serve both their own financial interest and public policy goals.

Both the instruments require to determine the quantity of polluting emissions. This implies regulatory tools to design a specific environmental target, a monitor procedure, and the distribution of the costs to the firms through a tax or through permits based on their polluting emissions.

First instrument: TAXES

Informational issues connected with the taxation system in implementing an optimal tax on a distributional point of view. Plus evasion problems.

Second instrument: TRADEABLE PERMITS

Informational issues connnected with the implementation of an optimal system of allocation of permits (theory of auction)

TRADABLE PERMITS

A tradable permit system is defined as quantity-based environmental policy instrument.

The regulatory authority stipulates the allowable total amount of emissions (cap) and the right to emit becomes a tradable commodity.

Under a cap-and-trade system, prices are allowed to fluctuate according to market forces. Thus, the price of emissions is established indirectly.

Permits could be allocated to firms via auction or through free allocation.

TRADABLE PERMITS FEATURES

- Set overall quota corresponding to allowed emissions
- Allocate to firms via:

  Auction (producers/polluters bid for permits)– fair and efficient

  Allocation according to historical emissions – unduly rewards heavy polluters (grandfathering)

- Once allocated, firms are free to buy or sell them;
- It is the market that sets price

IMPLEMENTATION OF A TRADEABLE PERMITS SYSTEM

- From an environmental standpoint, greenhouse gas (GHG) emissions can be considered homogenous and substitutable, an ideal setting for the introduction of a market instrument
- Potential problem: technology and socio-economic dynamics could constrain future reduction paths
- The benefits of tradable permits hinge on cost-minimising behaviour based on market prices
- Kyoto GHG emission objectives apply to nations
- Sovereign states may not be in a position to, or be willing to act purely on the basis of economic rationale

PROS AND CONS

Reduced industrial competitiveness (carbon taxes or tradable permit system raises costs of producers vis-à-vis those in countries with no measures)

"Carbon leakage" when efforts to reduce CO2 emissions lead to higher emissions elsewhere:
relocation of trade to non-regulating countries;
substitution effects with lower pre-tax oil prices lead to higher use in other sectors

A well functioning emissions trading system allows emissions reductions to take place wherever abatement costs are lowest.

Emissions trading has the advantage of fixing a certain environmental outcome: the aggregate emissions levels are fixed, and companies pay the market rate for the rights to pollute.

This also makes emissions trading more conducive to international environmental agreements, such as the Kyoto Protocol, because specific emissions reduction levels can be agreed upon easily.

CARBON TAX VS TRADABLE PERMITS

Carbon Tax

- Price certainty – fixed price
- Emission reductions – **quantity uncertain**
- **Administration** and compliance – back on existing administrative systems
- **Visibility** of tax
- **Design** – tax base, collection point, price level

Tradable Permits

- **Price uncertainty** – volatility
- Emissions are capped – **quantity certain**
- **Complexity** – negotiations, high transaction costs, new institutions.
- Some costs (and benefits) are **hidden**
- **Coverage**, point of obligation, cap level

GLOBAL COORDINATION FOR TRADABLE PERMITS

It is possible to establish an agreement which sets quantitative limits of emissions and allocates emission permits to firms (or States) but allows to trade among countries, in order to minimize abatement costs.

Under an auction, government (or the international community) sells the emission permits, while, under the grandfather rule, the allocation of emission permits is based on historical records.

In the global-warming context, quantitative limits set targets on the time path of GHG emissions of different countries that can administer these limits in their own fashion, and the mechanism may allow transfer of emissions allowances among countries, as is the case under the Kyoto Protocol.

https://www.rff.org/publications/issue-briefs/emissions-trading-versus-co2-taxes-versus-standards/

http://science.sciencemag.org/content/359/6379/997