

Class  
Green Industrial Policy

IPS  
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# Introduction

Environmental policy aims at resolving the market failure linked to the existence of negative externalities created by pollution

Market failure: a chemical firm polluting a river damages the activity of a fishery downstream the river

Solution?

INTERNALISATION of the externality

How?

# Pollution: an economic problem

The externality can be internalised (by inducing the polluter to take account of the damage caused by his activities) in two ways:

- 1) Command-and-control: regulation which imposes certain standards and behaviour (e.g. prohibition to pollute the river, limit to CO<sub>2</sub> emission of cars, etc.)
- 2) Incentive-based: no imposition of limit or other but incentive provision so that agents act in the sense of pollution reduction

## Various incentive-based solutions:

- 1) Tax on the emission of pollutants (the more one pollutes, the more he/she pays)
- 2) Voluntary agreements: agreement signed by the government authorities with the agents whom commit to reduce pollution to a certain limit within a certain time period, leaving them free to choose how to reduce pollution
- 3) Pollution rights markets: some “rights to pollute” are created and are exchanged on markets. Larger polluters will buy more permits on the market while smaller polluters will sell them. As the price of permits rise, firms will have incentive to invest in pollution-reduction.

## What pollution problems in the European Union?

- Emission of polluting gas from public transport (road transport = 25% of of CO<sub>2</sub> emissions)
- Pollution from industrial activity (air, soil, water)
- Pollution from agricultural activities (fertilisers)
- Air pollution energy combustion (heating and air conditioning in houses and offices)

**→ Industry pollutes**

**→ Green industrial policy to develop cleaner technologies and products**

Particular problem for environmental policy:

The risks linked to pollution generally are  
**IRREVERSIBLE**

Damages from pollution are often irreversible: once a river is polluted it is difficult to completely “clean” it (depending on what type of pollution)

Example of irreversible damage: climate change

Consequence: the **precautionary principle** should be implemented

i.e. the irreversibility of potential damages implies that one should try to avoid them: action is ex-ante and not ex-post

## Systemic risk:

- Many environmental issues concerning member states are interdependent and often not limited to the Union: climate change or biodiversity regards the whole planet, not just the Union
- ⇒ A coordination of environmental policies at global level would be necessary
- ⇒ This is what has been attempted with policies against climate change, which have failed (Rio and then Kyoto Protocols): policies now aim at adapting to climate change, not avoiding it

- Environmental challenges are many: also include unsustainable consumption of resources
- Environmental challenges have increased and have become more complex.

Main challenges identified by European Commission:

1. Climate change
2. Biodiversity
3. Resources and waste
4. Human health and environment

# **I. SUSTAINABILITY**

## **1972, “The limits to Growth”**

For the first time raise the issue of whether growth based on ever-increasing use of resources could be sustainable (from essentially demographic point of view: famine and over-population)

## **Brundtland Report, 1987**

Definition of sustainable development

=> Rio Summit (1992) extends the notion of sustainable development to environmental (climate change) problems

Brundtland report:

Sustainable development = development that meets the needs of the present without compromising the ability of future generations to meet their own needs

Critics: quite vague, not operational

How should this definition be used to evaluate policy choices or business decisions?

If we want the world to be a better place for future generations, should they not be able to do more than only meet their needs?

By the mid-1990s, there were well over 100 definitions of sustainability.

This definitional chaos has nearly rendered the term sustainability meaningless and is distracting from the need to address ongoing environmental degradation.

At one extreme, many organisations consider sustainability simply a new term for responsible environmental and labour management practices

## Examples

Corporate sustainability reports

Dow Jones sustainability index

Defines sustainability as “a business approach that creates long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments”

(using this definition, what company does not practice corporate sustainability?)

At the other end of the spectrum,

Definition of sustainability as including a vast, diverse set of goals, such as poverty elimination and fair and transparent governance.

Examples: “sustainability is related to the quality of life in a community, whether the economic, social and environmental systems that make up the community are providing a healthy, productive, meaningful life for all community residents, present and future.”

# **Sustainability**

Products and services that are more environmentally friendly than average, and institutions and organizations that are particularly aware of environmental issues are often labelled as sustainable.

For example, Nike refers to their eco-friendly products as “a sustainable shoe” and “a sustainable running singlet”

## **II. CAN INDUSTRIAL DEVELOPMENT BE GREEN? (i.e. sustainable)**

Is there a trade-off between environmental and industrial policies?

Can industrial policy be green?

This is an **old debate**: problem is when industrial policy aims at competitiveness in a **static framework** (taking the current competitive conditions as given and fixed)

Hypothesis generally made:

Environmental protection is costly

i.e.

There is a tradeoff between economic development and environmental protection

But is this always the case?

Pigou (1920) noted that the divergence between marginal private costs and benefits and marginal social costs and benefits create “externalities”

These externalities are conceived as transaction spillovers, or costs and benefits unaccounted for in the given price of a good or service

Pigouvian tax = tax on the activities that produce negative externalities

# Environment protection as opportunity

- **Porter and Van den Linde (1995)**: strict environmental regulation induces firms to invest in clean technologies, to improve their production processes (competitive advantage)

=> Porter Hypothesis: properly designed environmental policies that make use of market incentives can encourage the introduction of new technologies and reduce production waste

Components of a healthy environment, such as clean air and water, are considered public goods in that they are non-rivalrous and non-excludable.

Thus, it is up to the public sector to maintain the provision of these goods and services.

Market-based mechanisms to internalize the complete costs of pollution and ensure long-term stability of the environment, i.e. sustainable development.

## Porter and Van den Linde (1995)

If technology, products, processes, and customer needs were all **fixed**, the conclusion that regulation must raise costs would be inevitable.

But companies operate in the real world of **dynamic competition**, not in the static world of much economic theory.

Properly designed environmental standards can trigger innovations that lower the total cost of a product or improve its value.

Innovations made by firms allow them to raise their resource productivity

Hence rising competitive advantages

Example of flower production in the Netherlands:

- High flower production that was damaging soil
- introduction of innovations to produce flowers in water and rock wool, not in soil, with high control of infestations, reduction of the need for fertilisers and pesticides

Result: flower quality has improved while environmental costs reduced

Argument of Porter and Van den Linde:

Debates on environmental regulation have focused on static costs and benefits

But there are also dynamic costs and benefits that should be taken into account.

This leads to highlight the importance of **resource efficiency**:

Environmental damage importantly comes from waste

When scrap, harmful substances, or energy forms are discharged into the environment as pollution, it is a sign that resources have been used incompletely, inefficiently, or ineffectively.

⇒ **Waste is sign of ineffective production processes (e.g. poor material utilization that produces waste, defects and stored materials)**

⇒ waste is also costly because it has to be stored, disposed of, destroyed

⇒ companies should include waste minimisation and recycling in their production strategies to make them efficient

## Problems:

1.If they are profit opportunities in reducing waste and pollution, why should firm managers not have thought about it???

2.Porter and Van den Linde base their empirical evidence on a few cases, not on systematic data (anecdotal evidence)

⇔ Major critics to Porter and Van den Linde's hypothesis

⇔ see article by Palmer, Oates and Portney (1995, JEP) (Journal of Economic Perspectives)

Palmer et al show in simple models that environmental regulation generally reduces firms' profits even considering pollution-reducing technological innovations.

There are two major cases where environmental regulation might not decrease profits:

- Strategic behaviour: considering strategic interactions among firms (not perfectly competitive models)
- firms did not see possible profit opportunities stemming from pollution-abatement new technologies

Jaffe et al. (1995) JEL (Journal of Economic Literature)

Debate on whether environmental regulation negatively affects industry competitiveness was going on vivid but unsettled

Jaffe et al. (1995) review the evidence on that issue.

# **Indicators of (international) competitiveness to measure effect of environmental policy on competitiveness**

3 indicators used:

- a. Change in net exports of certain goods, the production of which is heavily regulated, and with comparisons between net exports of these goods and others produced under less regulated condition (envt regul reduces competitiveness by raising production costs).

b. extent to which the locus of production of pollution-intensive goods has shifted from countries with stringent regulations toward those with less (effect of envt regul on competitiveness is by reducing production in the home country).

c. If regulation is reducing the attractiveness of the United States as a locus for investment, then in highly regulated US industries there should be a relative increase in investment by U.S. firms overseas (towards countries with less stringent regulation)

**TABLE 3**  
**A TAXONOMY OF COSTS OF ENVIRONMENTAL**  
**REGULATION**

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Government Administration of Environmental  
Statutes and Regulations  
Monitoring  
Enforcement  
Private Sector Compliance Expenditures  
Capital  
Operating  
Other Direct Costs  
Legal and Other Transactional  
Shifted Management Focus  
Disrupted Production  
Negative Costs  
Natural Resource Inputs  
Worker Health  
Innovation Stimulation  
General Equilibrium Effects  
Product Substitution  
Discouraged Investment  
Retarded Innovation  
Transition Costs  
Unemployment  
Obsolete Capital  
Social Impacts  
Loss of Middle-Class Jobs  
Economic Security Impacts

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## Effects of environmental regulation on competitiveness:

-Studies have not found a significant effect on net exports (indicator a)

-Studies have found evidence of effect b: over the period 1965 – 1988:

- ✓ The share of polluting goods in world trade has reduced (by 3%);
- ✓ The share of environmental-polluting goods in total US trade has reduced by 7%;
- ✓ The share of pollution-intensive products originated from Southeast Asia has risen by 5%
- ✓ Developing countries gained a comparative advantage in pollution-intensive products at higher rate than advanced countries

Effect c: evidence is weak

## **Effects on growth (productivity)**

### **5 effects of envt regul on productivity:**

1. the measured productivity of the affected industry will fall because measured inputs of capital, labour, and energy are being diverted to the production of an additional output - environmental quality - that is not included in conventional measures of output and hence productivity

2. When and if firms undertake process or management changes in response to environmental regulations, the new practices may be less efficient than old one.

3. Environmental investments could conceivably crowd out other investments by firms.

4. Many environmental regulations exempt older plants from requirements: hence there is a “new-source bias” which can discourage investment in new, more efficient facilities

5. Regulation imposing firms to adopt the best available technologies may impede innovation in the MT and LT because if no new technologies are invented no need to adopt them.

Evidence of these effects is weak.

More recent works:

-Greenstone et al (NBER, 2012) find negative impact of environmental regulation (air quality) on firms' productivity; negative impact higher for specific industries (chemicals, refineries, ...)

- Dechezlepretre and Sato, LSE, 2014

- Environmental regulations can reduce employment and productivity by small amounts, in particular in pollution- and energy-intensive sectors, at least during the transitory period when the economy moves away from polluting activities and towards cleaner production processes.

- There is little evidence to suggest that strengthening environmental regulations deteriorates international competitiveness.

The effect of current environmental regulations on where trade and investment take place has been shown to be negligible compared to other factors such as market conditions and the quality of the local workforce.

However, the impact could increase in the future if efforts to control pollution diverge significantly across countries.

- The costs of environmental regulations need to be weighed up against the benefits they provide and which justify those regulations in the first place.

The benefits are often important and severely underestimated.

For example, the estimated health benefits from the Clean Air Act in the United States are two orders of magnitude greater than the employment costs of the policy.

- There is ample evidence that environmental regulations induce innovation in clean technologies and discourage research and development in conventional (polluting) technologies.

**Thus, environmental regulations can help economies break away from a polluting economic trajectory and move to a ‘clean’ one.**

**⇔ “green growth”**

**⇔ This is about embarking on new development path, so there is cost for some firms / industries at some point but these costs are compensated in the longer term by development of new green activities**

e.g. Clean technologies generate new knowledge in the economy which can spill over to the other sectors, thereby contributing to (green) growth

# **III. GREEN INDUSTRIAL POLICY**

## **Green Industrial policy:**

Green growth requires green technologies, which both lowers social costs in the transition to a green growth path and helps achieve a satisfactory rate of material progress under that path.

Important aim of green industrial policy = ensuring that investments in green technologies take place on an appropriate scale

Failures in the market for new clean technologies:

- Externalities (spillovers)
- Carbon is mispriced

⇒ Private returns to investments in new green technologies are below social returns

⇒ Carbon abatement = global public good: everybody would benefit from it but national governments will not provide effort to do it unless all countries contribute (free riding is likely)

**HOWEVER, countries investing in green technologies may take first mover advantage in these technologies.**

Strongest green industrial policies in the last 10-15 years: China and Germany

with both **direct policies**: R&D grants, public procurement, subsidised loans and subsidies; and

**indirect policies**: policies not aimed at industry but which have an impact on it, e.g. incentives to buy energy-efficiency technologies on the demand side, trade policy

e.g. China entry in the global car industry by investing in the clean car segment (now China leads in electric cars and battery)

## **Sector specific industrial policy is called for to move to green industrial development**

Because policies can affect sectors differently, this should be assessed on a sector-by-sector basis, depending on the abatement opportunities available and the level of competition the sector is exposed to.

For each sector, policies will need to be fine-tuned to balance the policy goals with the multiple impacts of environmental regulations on pollution, employment, trade, productivity and innovation.

USA: green industrial policy implemented quite late (2009), because of debate on whether there is climate change or not

Obama implemented industrial policy after the financial crisis from 2009 on (including support to car industry, re-shoring initiative of 2012)

Now Trump has little interest for sustainable industrial development...

**→ The USA will be left behind in green industrial development**

Obama:

*“If we want to compete with China, which is pouring hundreds of billions of dollars into this space, if we want to compete with other countries that are heavily subsidizing the industries of the future, we’ve got to make sure that our guys here in the United States of America at least have a shot”*

# **Green industrial policy for SMEs:**

## **EU: Green Action Plan for SMEs**

- ⇔ Support to access to information on green technologies and the circular economy, investment subsidies for the greening of their product / production processes
- ⇔ ensuring appropriate infrastructure is also key: especially clean energy
- ⇔ **same instruments as normal policy for SMEs, but used for adopting environment-friendly products and production processes**

# **New Agenda for the EU 2020 – 2030**

- 1. EU Strategic Agenda 2019 – 2024**
- 2. European Commission new agenda:  
the Green Deal**

# **EU Strategic Agenda 2019 – 2024**

Defined by Heads of State and European Parliament

1. Protecting citizens and freedoms
2. Developing a strong and vibrant economic base
3. Building a climate-neutral, green, fair and social Europe
4. Promoting European interests and values on the global stage.

# 1. Protecting citizens and freedoms

Citizens' rights in all Member States

Migration policy

Fight against terrorism and threats

Protection against natural and manmade disasters

Protection against cyber attacks and disinformation

## 2. Developing a strong and vibrant economic base

- Deepening EMU and international role of euro, completing the banking and capital markets union
- strengthening cohesion in the EU
- Digital revolution and artificial intelligence: infrastructure, connectivity, services, data, regulation and investment
- Develop R&D collaboration in the EU
- ensuring fair competition within the EU and on the global stage

### 3. Building a climate-neutral, green, fair and social Europe

- Reducing emissions towards COP objectives
- accelerating the transition to renewables and increasing energy efficiency
- improving the quality of our air and waters
- promoting sustainable agriculture
- implementing the European Pillar of Social Rights at EU and member state level

## 4. European interests and values on the global stage

UN global societal challenges

Collaboration with international organisations

Cooperation with Africa in particular

Cooperation within NATO

# **European Commission's proposal in December 2019: the Green Deal**

= embarking on a sustainable growth path, both from environmental and social point of view

Transition to a green economy for citizens' health and wellbeing, in an inclusive way

↔ Sort of joint economic, social and environmental policy approach

# The Green Deal: includes

- Mobilising industries towards a clean and circular economy
- Clean energy
- More sustainable agricultural sector

# March 2020: A New Industrial Strategy for Europe

Aims at favouring the twin challenge of the green and the digital transformation

Idea that green and digital are complementary

New circular economy action plan: stimulate the development of lead markets for climate neutral and circular products, in the EU and beyond.

Energy-intensive industries, such as steel, chemicals and cement: decarbonisation and modernisation

Resource-intensive sectors such as textiles, construction, electronics and plastics: specific action

Developing strategic industries:

- battery industry for the car sector
- 5G and big data for better monitoring of pollution and prevention of disasters linked to climate change

Actions at European level will use instruments at that level:

- R&D collaboration at European level
- Objectives of the green deal to be pursued in all European policies: agriculture and regional policies in particular, but also trade policy (climate change is a global challenge)
- Invitation to Member States to adopt green budgets

# **Will the coronavirus crisis induce the EU to change priorities?**

- Businesses are calling for a halt in the implementation of environmental policy in order to concentrate on restarting production / facing the emergency
- Resilience concept: recovery can aim at returning to the previous situation (pre-crisis) or take the opportunity to embark on new growth path, favouring measures that work in the direction of the Green Deal