Klimatpolitikens komplexitet: en framkomlig reglering av industrins kolidoxidutsläpp

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Bakgrund – problemställning (1)

Hur styra mot radikalt lägre utsläpp i konkurrensutsatta och kapitalintensiva industrier, i vilka det dessutom inte alltid finns kommersiellt tillgänglig utsläppsreduktionsteknologi?

Effektivast att styra med ett pris på utsläpp, t.ex. en skatt, i jämförelse med individuella gränsvärden för utsläpp (t.ex. via miljöbalksprövningen).

Men! (a) svårt att finna balans mellan omställningstryck och konkurrenskraft; samt (b) harmoniserade skatter eller utsläppshandel inte alltid politiskt genomförbara.

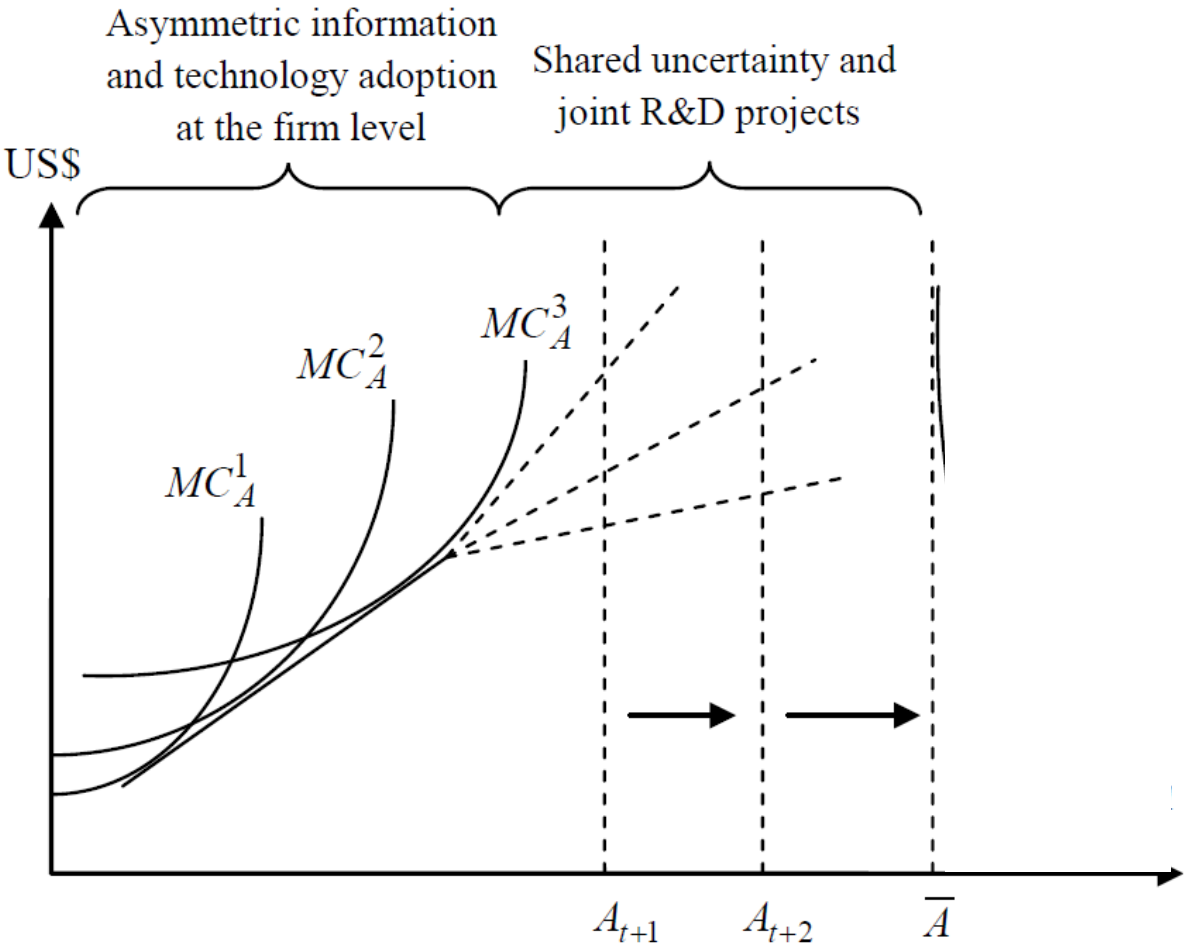
Bakgrund – problemställning (2)

USA: svårt införa pris på koldioxid, i stället individuella gränsvärden (med visst utrymme för handel) enligt den s.k. Clean Air Act.

Sverige: EU ETS med låga priser. Ingen prövning av CO2-utsläpp enligt Miljöbalken (dock av ”energihushållning”).

Under vilka förutsättningar kan individuella gränsvärden utgöra en ändamålsenlig reglering för att fasa ut utsläpp i konkurrensutsatta industrier?

Regleringsutmaningen



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Analysis

Command-and-control revisited: Environmental compliance and technological change in Swedish industry 1970–1990☆

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ABSTRACT

This paper addresses the issue of environmental policy instrument choice for achieving deep emission reductions in the industrial sector. Specifically, it provides: (a) a theoretical and empirical review of the conditions under which performance standards can provide efficient incentives for deep emission reductions and technology adoption; and (b) an analysis of the design and the outcomes of the standards-based regulation of industrial pollutants in Sweden during the period 1970–1990. Our empirical findings suggest that the Swedish regulatory approach comprised many key elements of an efficient policy-induced transition towards radically lower emissions in the metal smelting and pulp and paper industries. The regulation relied solely on performance standards, thus granting flexibility to firms in terms of selecting the appropriate compliance measures. These standards were implemented in combination with extended compliance periods, R&D projects and the new knowledge that was advanced incrementally in interaction between the company, the environmental authorities and research institutions provided a direct catalyst to the regulatory process. In these ways the Swedish regulatory approach provided scope for creative solutions, environmental innovation, and permitted the affected companies to coordinate pollution abatement measures with productive investments.

1. Introduction

This paper addresses the issue of environmental policy instrument choice for achieving deep emissions reductions in the industrial sector. In the environmental economics literature a lot of attention has been paid to the efficiency aspects of different types of policy instruments, e.g., market-based policy instruments such as taxes and tradable emission allowances and policies that rely on either performance or technology standards (e.g., Copper and Oates, 1992; Goulder and Parry, 2008). This research emphasizes on analyzing the value of the expected environmental benefits and the costs at which any improvements in environmental quality can be achieved, and previous studies have also addressed the innovation-promoting impacts of different policies (e.g., Requate, 2005; van den Bergh et al., 2011).

However, less attention has been paid to the dynamics of the policy compliance process, not the least in cases where governments face the challenge of imposing an emission reduction target for the future that cannot be met by employing currently existing ('off-the-shelf') technologies (Nentjes et al., 2007; Sandén and Azar, 2005). In this policy setting a number of additional policy criteria become important. For instance, the pollution control policy needs to maintain strong, continuous incentives for emission reductions while at the same time taking into account the risk of excessive compliance costs for those affected by the policy. This is a particular concern in industrial sectors that compete in global markets, and where there may exist a clear trade-off between stringent environmental policies on the one hand and competitiveness on the other (Brännlund and Lundgren, 2009; Jaffe et al., 1995).

Policy instruments that stimulate innovation and permit flexibility over time in identifying, developing and demonstrating new technology are likely to be of central interest in the transition towards deep emission reductions. Sartorius and Zundel (2005) stress that the regulatory 'time-strategy', e.g., extended compliance and trial periods, constitutes an important design issue in strengthening the innovation-promoting elements of environmental policy. Earlier theoretical contributions to the environmental economics literature typically conclude that market-based instruments provide stronger incentives for environmental technology than, for instance, performance or technology standards (e.g., Milliman and Prince, 1989; Requate, 2005). However, empirical studies that take into account also the presence of specific policy designs, credibility, uncertainty, time strategies etc., suggest that there is no single best policy instrument to foster policy compliance and technology adoption in the environmental field (e.g., Ashford and Caldart, 2008; Ashford et al., 1985; Kemp and Pontoglio, 2011; Mohr, 2006; Taylor et al., 2005). Additional theoretical

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A = utsläppsreduktion, *MC* = marginalkostnad för utsläppsreduktion

Villkor för en ändamålsenlig reglering

- *Flexibilitet vad gäller valet av reningsteknik* (BAT utgångspunkten men aldrig specifika teknikkrav),
- *Tidsflexibilitet*, användandet av prövoperioder under vilka företagen kan utveckla och testa ny tekniker etc. Gör det enklare med processrelaterad teknologi snarare än endast end-of-pipe lösningar.
- *Kompetens/kunskap* hos myndigheterna för att överbrygga kunskapsglapp.. Möjliggör även effektiv kunskapsöverföring.
- Koordinering av *offentliga/privata FoU program* och miljöprövning.
- *Förutsägbarhet och transparens* i prövningen.

Flexibilitet – Kunskap - Förutsägbarhet

Angreppssätt

Vi analyserar viktiga erfarenheter och lärdomar från reglering av industrin i **Sverige, Finland samt USA**, dvs. i vilken utsträckning uppfylls ovan nämnda villkor i dessa fall?

Det **svenska historiska exemplet** är speciellt intressant, se även Lundqvist (1980) samt Brännlund och Kriström (1999).

Material: handlingar från koncessionsnämndsprövningar under 1970- och 1980-talen. Fokus på pappers- och massaindustrin.

Övergången till klorfritt pappersmassa

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The transition to chlorine free pulp revisited: Nordic heterogeneity in environmental regulation and R&D collaboration

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ABSTRACT

The purpose of this paper is to analyze the development paths leading to the transition to cleaner bleaching technologies in the pulp industry. It devotes particular attention to the key features of the Swedish transition, but also compares this to the Finnish experiences. The empirical investigation builds on an analytical framework highlighting the conditions under which pollution regulations can provide efficient incentives for deep emission reductions at industrial plants. Existing and new archive material, including not least comprehensive license trial acts for Swedish pulp mills over an extended time period, are studied. Based on this historical analysis our findings contradict previous literature, the latter emphasizing that pressures from consumers and the public were the most significant driving forces behind the adoption of–and innovation in–alternative bleaching technologies during the late 1980s. Instead, this paper asserts, the green pulp transition was characterized by regulation-induced technological change and was made possible by long history of industry-wide cooperation in environmental R&D. Furthermore, while previous research has emphasized the leading role of the Nordic countries in green pulp innovation, we identify a number of profound differences between Finland and Sweden. These emerge from various national contexts in terms of, for instance, industry structures and strategies, political cultures, and regulatory styles. Finally, at a more general level the paper provides a few policy implications for supporting the ongoing transition towards a forest-based bioeconomy.

1. Introduction

This paper investigates the development and adoption of alternative bleaching technologies in pulp production, a research topic that has gained a lot of attention in previous literature. We study and compare the transition to Elemental Chlorine Free (ECF) and Total Chlorine Free (TCF) technologies among producers of bleached chemical pulp in Sweden and Finland in the 1980s and 1990s.[1] In brief, our results contradict the frequently cited conclusion that green consumerism and community pressure were the main driving forces behind this transition (e.g., Reinstaller, 2005, 2008; Rajotte, 2003; Popp et al., 2011). In addition, whereas previous studies emphasize the leading role of the two Nordic countries in green pulp innovation, we point to significant differences between the Finnish and Swedish transitions.

The diffusion and the development of new green technology are portrayed as key solutions to the environmental challenges facing society. Previous studies illustrate, however, that it may often be difficult to identify the determinants of green technology diffusion and innovation (e.g., Bergek et al., 2014; Allan et al., 2014). Much of the existing research has addressed the role of different policy instruments and regulations, but such assessments are complicated for a number of reasons. One difficulty lies in distinguishing between the impacts arising from consumer demand, community pressure, attitudes of CEOs on the one hand and the effects of specific policy instruments and government regulations on the other (e.g., Del Rio González, 2005; Kivimaa, 2007). Positive environmental outcomes at the firm-level may also be a by-product of productive investments aiming at cost savings.

Furthermore, there appears to be meagre evidence of one type of policy instrument being superior compared to others in promoting green technology adoption and innovation. Specific policy designs and the institutional contexts that typically have evolved

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[1] The distinguishing factor between these two processes is the use of chlorine dioxide, which is used in ECF but not in TCF. To compensate for the lack of chlorine dioxide, TCF will either imply the addition of higher dosages of peroxide or supplement the process with ozone (Jour et al., 2012).

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0959-6526/

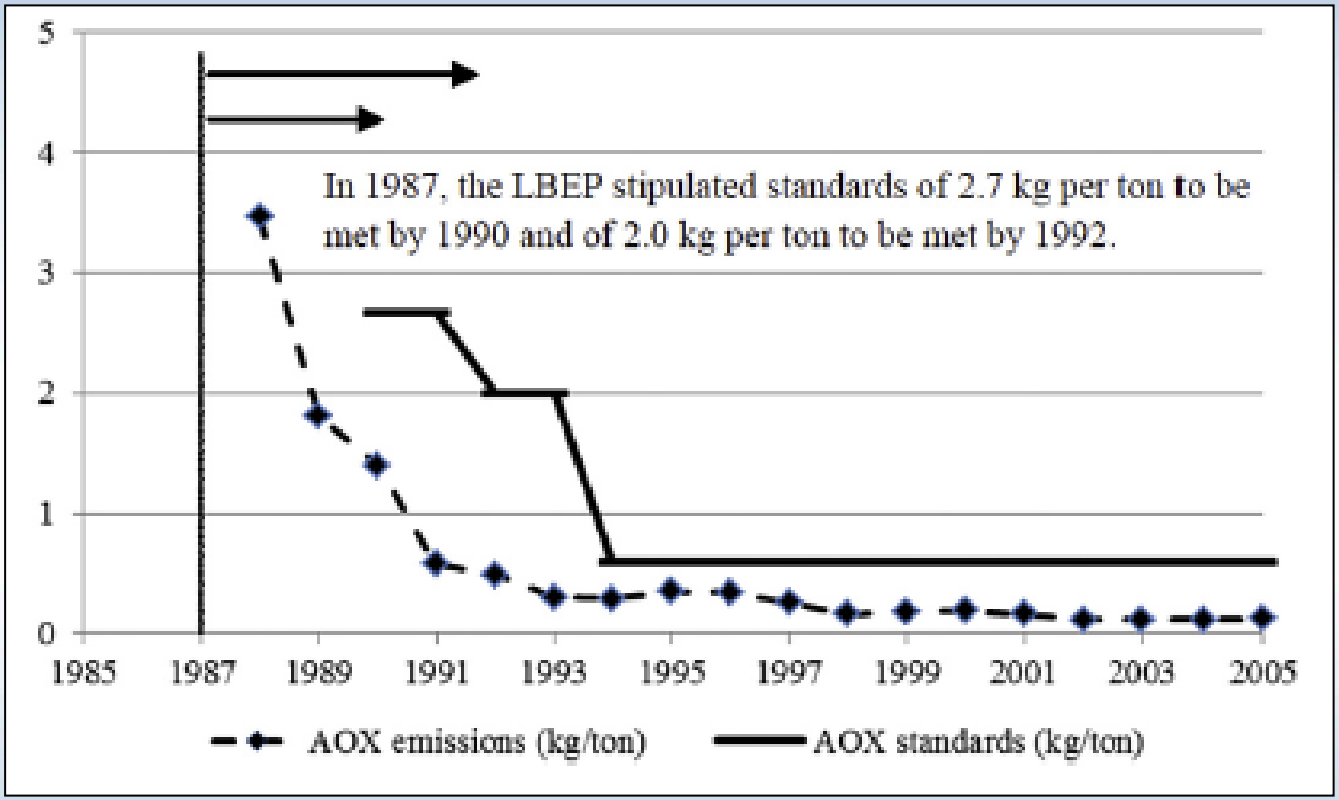
Hur gick det till i Sverige respektive Finland?

Tidigare litteratur noterar att denna övergång var speciellt snabb och effektiv i de nordiska länderna, och kan förklaras av miljömotiverat konsumenttryck….

Vi hävdar att:

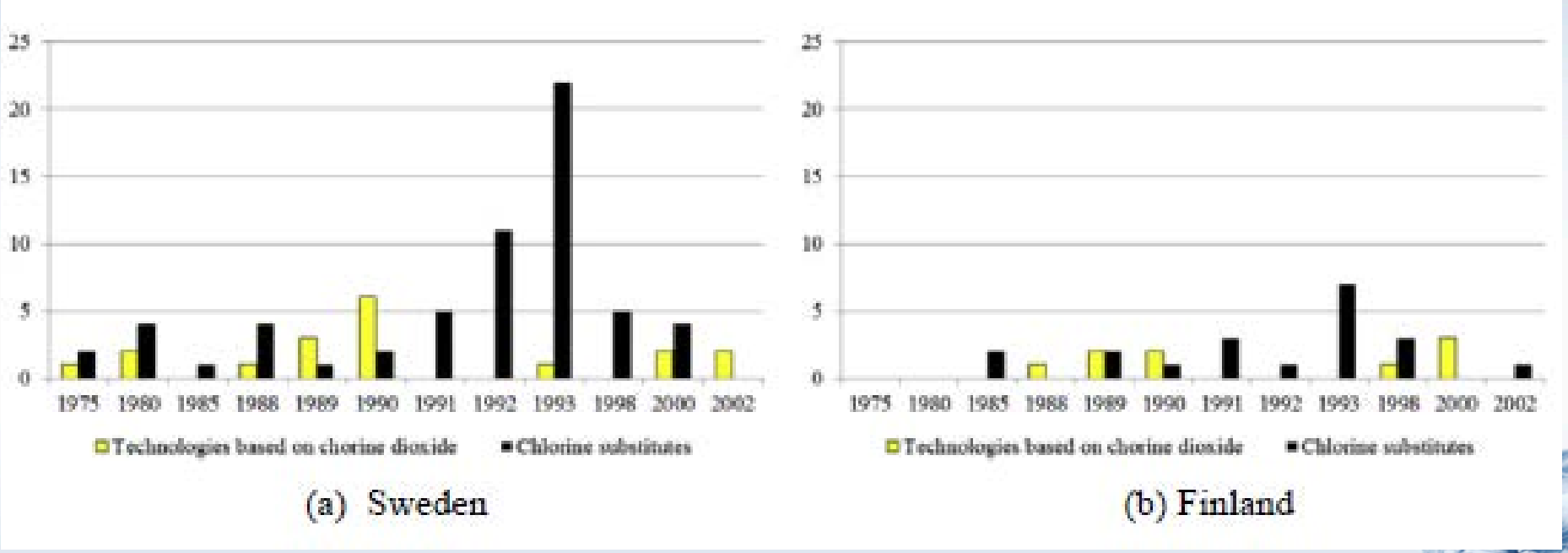
- skillnaderna mellan Sverige och Finland är stora; samt att
- övergången var reglerings- snarare än konsumentdriven….!

Utfall: exemplet Skutskärs massabruk



- Gränsvärden snarare än teknikkrav
- Långa prövoperioder för att testa ny teknik
- Hög reglerarkompetens & intensiv kunskapsöverföring
- Snabb anpassning förklaras av ett sedan lång tid etablerat industrisamarbete kring miljöforskning.

Teknisk utveckling: antal patentansökningar rörande alternativ blekteknologi i Sverige och Finland



Teknikutveckling även i fallet med administrativa styrmedel

Fokus på mer ”radikal” teknologiutveckling i Sverige….

Tack!

Take-Home Point:

Flexibilitet – Kunskap – Förutsägbarhet