

Viewpoint

Firm performance and employment in the EU emissions trading scheme: An empirical assessment for Germany

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Received 26 June 2007; accepted 5 September 2007

Available online 18 October 2007

Abstract

This paper empirically investigates the role of the EU Emissions Trading Scheme (EU ETS) for firm performance and employment in Germany. We provide an overview of relative allowance allocation within the EU ETS as well as an econometric analysis for a large sample of German firms covered by the scheme in order to assess the impacts of EU emissions regulation on both firm revenues and employment. The dataset indicates that the EU ETS was in an overall long position in 2005, although allowance allocation was very heterogeneous across member states. Our econometric analysis suggests that, within the first phase of the EU ETS, relative allowance allocation did not have a significant impact on firm performance and employment of regulated German firms.

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Keywords: EU ETS; Competitiveness; Employment

1. Introduction

In 2005, the European Union Greenhouse Gas Emissions Trading Scheme (EU ETS) was launched (European Union, 2003). The scheme represents a cornerstone of the efforts by EU member states to fulfil the emissions reduction targets under the Kyoto Protocol. This agreement requires European countries to reduce their greenhouse gas emissions on average by 8% until 2012 compared with 1990 emissions levels (UNFCCC, 1997). The EU ETS covers European producers in four sectors, namely energy (e.g. electric power, oil refinement), production and processing of ferrous metals, minerals (e.g. cement, glass), as well as pulp and paper. The ETS currently covers almost half (46%) of the total CO₂ emissions of EU countries. While in the scheme's first phase (2005–2007) almost all emission allowances are grandfathered by means of National Allocation Plans (NAPs) of each member state and only up to 5% may be auctioned, in the second phase (2008–2012) the auctioning

limit rises to 10%. Furthermore, the amending directive linking the EU ETS with the Kyoto Protocol's project-based mechanisms enables EU companies to generate emissions reductions by means of the Clean Development Mechanism (CDM) or Joint Implementation (JI) (European Union, 2004).

Since its initiation, the EU ETS has been accompanied by discussions on potential losses in competitiveness in international markets of companies that are covered by the EU ETS legislation.² Against this background, this paper presents a first empirical assessment of the effects of the EU ETS on firm performance, i.e. competitiveness, and employment. Following Balassa (1962), we define competitiveness as a firm's ability "to sell on foreign and domestic markets" and approximate this ability by firms' market revenues. We rely both on real-world data on allocated allowances and verified emissions for the first trading period from the EU Community Independent Transaction Log (European Union, 2007) and on economic firm-level data from two comprehensive databases.

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²For a recent overview on model-based assessments of costs and competitiveness effects of the EU ETS, see Oberndorfer and Rennings (2007).

Previous quantitative studies have assessed the efficiency aspects and competitiveness implications of the EU ETS predominantly in numerical modeling frameworks. Böhlinger et al. (2005) show that the exclusive coverage of energy-intensive installations by EU ETS implies that—in the absence of the potential use of CDM and JI—the remaining industries have to be regulated by complementary abatement policies in order to meet the national Kyoto targets. Such a hybrid emission regulation can cause large inefficiencies within EU economies, but may also worsen the prospects of linking the EU ETS to emerging emissions trading schemes beyond Europe (see Anger, 2007). Unlike employment aspects of the EU ETS, competitiveness implications of the current European trading scheme have been analyzed in numerical model frameworks (Kemfert et al., 2005; Klepper and Peterson, 2004; Peterson, 2006). The sectoral competitiveness implications of allowance allocation under the EU ETS have been assessed both for the European electricity industry (Neuhoff et al., 2006) and for the cement sector (Demailly and Quirion, 2006). Enlarging the purely European perspective, Alexeeva-Talebi and Anger (2007) assess both the economy-wide and the sectoral competitiveness effects of linking the EU ETS internationally to emerging trading systems outside Europe (such as Japan, Canada or Australia) within an applied general equilibrium model framework.

The previous empirical literature on emissions regulation under the EU ETS is rather scant. Analyzing the verified emissions of the participating installations as well as the respective allowances allocated, Ellerman and Buchner (2006) conclude that “over-allocation occurred and that its magnitude may have been as much as 100 million EU allowances”. Kettner et al. (2007) present similar findings, suggesting that in the first EU ETS trading year the scheme was in a long position regarding emissions allowances. Moreover, to date there is no empirical contribution available assessing the competitiveness or employment impacts of emissions allocation under the EU ETS. Our paper aims at starting to fill this gap. In this respect, the contribution of this analysis is twofold: Relying on installation-level allocation data from the EU Community Transaction Log in 2005, we (i) descriptively assess the relative allowance allocation under the EU ETS at the national level and (ii) econometrically test for competitiveness and employment impacts of the EU ETS for a large sample of German companies.

The present article is structured as follows. Section 2 summarizes the empirical literature. Section 3 discusses the relative allowance allocation in Europe as well as the data underlying the empirical analysis for Germany. Section 4 presents the econometric assessment and Section 5 concludes.

2. Literature review

The necessity of environmental regulation is mainly based on the reasoning that there are social costs of

negative externalities such as pollution. However, strict environmental regulation is often accused of harming the competitiveness of the affected sector or firm. Such adverse economic effects (and especially effects on competitiveness) of environmental regulation are challenged by the so-called Porter hypothesis, suggesting that environmental regulation provides incentives for companies to innovate and that these innovations can stimulate economic growth and competitiveness of the regulated country (Porter and van der Linde, 1995).

In the context of competitiveness and employment, an important characteristic of emissions trading schemes is the choice of the underlying allocation method. There are several studies dealing with this issue: Demailly and Quirion (2007) quantify the impact of the EU ETS on production and profitability as two dimensions of competitiveness for the iron and steel industry. They find that competitiveness losses for this sector are small but are significantly determined by pass-through rates and the updating of allocation rules. While emissions-based updating should be avoided as it creates perverse investment incentives, output-based updating has ambiguous competitiveness effects—softening production losses, but reducing the likely gains in earnings before interests, taxes, debt and amortization. Böhlinger and Lange (2005) investigate the trade-off between compensation and economic efficiency for output- and emissions-based allocation rules in an international emissions trading scheme. They find that the output-based rule not only induces substantially lower efficiency losses than the emissions-based rule, but also performs better in ameliorating adverse production and employment effects for energy-intensive industries. Fischer and Fox (2007) present a welfare analysis of alternative emissions allocation rules within a domestic US emissions trading scheme, focusing on sectoral and international leakage as generated by restricted sectoral coverage of domestic ETS and unilateral action. They find that, given domestic and international leakage, output-based allocation of emissions permits to the covered sectors is preferable to auctioned permits in welfare terms, even when allowing for pre-existing tax distortions. Moreover, grandfathered permits generate the highest welfare costs of emissions regulation.

Our empirical literature review focuses on competitiveness, as the empirical literature on employment effects of environmental regulation is rather scant. One exception is Golombek and Raknerud (1997), who empirically assess the employment effects of imposing environmental standards on polluting firms. Using Norwegian data they find that, for two out of three manufacturing sectors, firms under strict environmental regulations had a higher tendency to increase employment and a lower tendency to exit than firms under weak or no environmental regulation.

Empirical analysis of the effects of environmental regulation on competitiveness or, more general, economic performance of firms or sectors is rather rare, too, as truly

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