***EXAMINING THE ENVIRONMENTAL IMPACT OF EUROPEAN UNION EMISSIONS TRADING SCHEME (EU-ETS) - AN INPUT OUTPUT APPROACH.***

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## Overview

The consequences of environmental challenges resulting from climate change manifestation are not a new subject of debate among scholars, NGOs and Intergovernmental Institutions. Climate change occurrences are enhanced by increasing concentration of greenhouse gases (GHGs) in the atmosphere, with carbon dioxide (CO2) emission being the main contributor. Policy makers around the globe have device various market based instruments such as carbon taxation and carbon emissions trading to successively control GHGsemissions. In line with the above, the European Union (EU) launched the world’s first cap-and-trade program for carbon emissions in 2005 - the European Union’s Emissions Trading Scheme (EU ETS). However, serious concerns have been raised about the scheme’s ability to reduce emissions in a cost-effective manner due to the inherent uncertainties associated to Emissions Trading. Moreover, this mechanism might not necessarily guarantee emissions reduction unless its value reflects positive socioeconomic and environmental impacts.

This paper analyses the environmental impact of the EU ETS. Using the environmentally extended input–output (EEIO) techniques, it evaluates the impacts of the scheme on EU energy use and CO2 emissions. The paper employ a disaggregate measurement of the EU energy related CO2 emissions in 22 economic sectors and 6 (six) fossil fuel use to estimate the price effects and environmental impact of EU ETS in the EU-15 Member countries.

This paper is structured into five parts. Part 2 examines Kyoto target and its implementation in EU-15, with an emphasis on the mechanisms and operations of the EU ETS. Part 3 explain the environmentally extended input-output (EEIO) model and the data preparation. Part 4 yields the results of the exercise and offers result interpretation. Part 5 presents the conclusion.

## Methodology

This study employs the input-output methodology to evaluate the economy-wide environmental impact and price effect of an emissions trading scheme in the EU. The work utilizes the environmentally extended input-output model to calculate the CO2 emissions intensity for each industrial sector (i.e. the total carbon content of their product), which allows for a computation of the price effect after emission trading. Following the information provided by Eurostat’s ESA 95 input-output tables, the study analyse twenty two (22) producing sectors and six (6) types of fossil fuels (Lignite, Peat, Lignite Coke, Natural Gas, Liquid Fuels and Diesel Oil) in the EU-15 Member countries.

## Results

The energy related CO2 intensity shows that energy intensive sectors such as Electricity, Metal Ore, Transport and other mineral product are those with the highest CO2 intensities.

The observed change in demand resulting from emissions prices maintained the pattern followed by the CO2 intensities with the energy intensive sectors (i.e Metal Ore, Electricity, Basic Metals and Transport) suffering the highest price effects both in percentage and absolute terms.

The environmental impact (in percentage) of carbon emissions trading in the EU resulting from a change in final demand illustrate that an average emissions price of €22 per tCO2 will lead to a 0.17%, 0.12%, 0.27% and 0.09% reduction in emissions from metal ore, basic metals, electricity and transport sectors respectively.

## Conclusions

The paper has provided input-output matrixes disaggregate estimation of EU-15 energy-related CO2 emissions and the effects of EU ETS allowance prices levied in EU during 2005. These results were largely derived from the calculation of the 2005 EU energy related CO2 intensities through an input–output demand model.

The empirical analyses of EU CO2 emissions and of the allowance price effects have reiterate the need for a comprehensive market base strategy in EU climate change policies. The results also signify the need to improve the overall efficiency of the EU energy system, and not only focus on the actual CO2 emitters. Moreover, the study has found the emissions trading mechanism to be a viable and efficient instrument, both in environmental and economic terms.

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