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Analysis of monthly CO₂ emission trends for major EU Countries: a time series approach

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The following paper analyses monthly trends for CO₂ emissions from energy consumption for 31 European countries, four primary fuels (i.e., Crude Oil, Natural Gas, Hard Coal, Lignite) and three secondary fuels (i.e., Gas/Diesel Oil, LPG, Naphta, Petroleum Coke) from 2008 to 2019. Carbon dioxide emission has been estimated following the Reference Approach in the 2006 IPCC Guidelines for National Greenhouse Gasses Inventories. Country-specific (e.g. Tier 2) coefficient were retrieved from the IPCC Emission Factor Database and the UN Common Reporting Framework. Data on fuel consumption (e.g., Gross Inland Deliveries) were taken from the Eurostat database. This paper will fill some knowledge gap analysing monthly trends of carbon dioxide emissions for major EU Countries. As the progressive phase-out of carbon is taking place pretty much in all Europe, Crude Oil exerted the largest amount of carbon dioxide emissions in the period considered. Analysis of selected countries unveiled several clusters within the EU in terms of major source of emissions. As final step, the paper has endeavoured the task of fitting a model for monthly CO₂ forecasting. The whole series presents two structural breaks and can be explained by an autoregressive model of the first order. Indeed, further speculations on a more appropriate fit and more fuels in the estimation, is demanded to other works.