European Green Deal and Efficiency of Taxation in Promoting Biofuels

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Overview

Launched by the European Commission in 2019, the European Green Deal is a set of policy initiatives aimed at achieving climate neutrality in the European Union (EU) by 2050. It emphasizes sustainability and reducing carbon emissions through cleaner, renewable energy sources. Biofuels, derived from renewable resources, are identified as a key alternative to minimize transportation emissions but face challenges such as cost-effectiveness and sustainability.

The transportation sector accounts for 25% of the EU's greenhouse gas emissions and 31% of its final energy consumption. In 2022, renewables and biofuels constituted 6.4% of energy consumption in road transport, with this share steadily increasing. However, taxation regulations and policies supporting biofuels remain contentious due to inconsistent implementation across EU members and potential negative effects, such as food insecurity and biodiversity loss.

Methods

Panel Regression Modeling Method is used to analyze the drivers of biofuel production (volume) and key variables in the 10 largest producing countries in Europe: Germany, Netherlands, France, Spain, Italy, Poland, Finland, Belgium, Austria and Sweden. The study covers the period from 2012 to 2022.

The regression equation is expressed as follows: Production of biofuels (biodiesel & ethanol) = (share of environmental and energy tax revenue in overall tax revenues in $country_i$ in $month/year_t$) + (available land) + (how friendly is the country for crop growing) + (price of land & labor) + (energy intensity of GDP) + (CO2 per capita emissions) + (% of imports of biofuels in total biofuels consumption in $country_{i,\ t}$) + (Net exports of biofuels) + (adoption of EU legislations) + (subsidies for production) + (oil price) + (international market prices) + (domestic demand for biofuels)

Environmental and energy taxation, being the central variable, represent the change in tax incentives on biofuels over the years and helps assess the effect of taxation on production levels. Since biofuels often rely on crops and feedstock production, the agricultural aspect of available land in those countries and how friendly is the country in crop growing is also assessed. Variations of the price of land and labor could also impact production process of biofuels and will be incorporated in the regression. Energy intensity of GDP measure the energy reliance which can influence policy decisions related to biofuels. The variable of CO2 per capita emissions tracks CO2 emissions over time, since biofuels are often seen as a way to lower carbon emissions. Percentage of imports of biofuels in total biofuels consumption in the studied countries as well as net exports of biofuels can show how global market dynamics are influenced by national tax policies. Adoption of EU legistlation is also an important factor because any changes in national policies, especially those related to energy, environment or agriculture, could affect biofuel production. Subsidies for production are another fiscal measure to promote biofuels, which may interact with tax policies. Oil prices and international market prices are also key since energy prices also affect the competitiveness of biofuels companred to conventional fuels and could be correlated with shifts in biofuel demand driven by taxation. Domestic demand for biofuels, measured via consumption trends or specific policies like required blending, helps in tracking the demand of biofuels which is often influenced by tax incentives or subsidies.

Including these variables in the panel regression model can help in understanding the multifaceted impacts of taxation on biofuel promotion..

Results

This study employs a panel regression model to investigate the relationship between environmental and energy taxes and biofuel production across the 10 largest producers in the EU countries from 2012 to 2022. Preliminary results show a positive correlation between taxes on substitute fuels to biofuels and the production on biofuels. The study also highlights the complex relationship of the list of independent variables to biofuel production.

Conclusions

In conclusion, this study highlights the critical role of taxation and provides an analysis of the complex relationship between the listed variables and biofuels production and their impact on successfully achieving the objectives of the European Green Deal.

While biofuels present an important opportunity for decarbonizing the transportation sector, challenges related to sustainability, market competitiveness, and social equity must be addressed to optimize their effectiveness. The research findings show a positive impact on the taxation in promoting the biofuels market, and underscore the importance of policy coherence across EU member states and the need for targeted interventions that balance environmental goals with economic and social considerations. Ultimately, this study provides valuable insights for policymakers and stakeholders, offering a pathway to refine taxation measures and ensure their alignment with the European Green Deal's long-term vision for climate neutrality by 2050.

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