Biomass Burning and Carbon Losses in Different EU Countries; An Empirical Research - Abstract

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Summary

The issue of climate change has received high interest within the last few decades as well as its impacts. An aspect of climate change issue is the interaction of climate change with forest fires. More specifically, the increasing frequency in forest fires as well the increasing burned area is a major determinant in carbon losses (Turesky et.al, 2011).

Additionally the impact of wildfires on carbon emissions is also affected by the severity of burning. The way climate change affects the severity of biomass burning caused by fires presents difficulties in assessment (Charnley ey.al, 2017).

Previous modeling results in the existing literature suggest that increasing fire frequency in regions has a serious impact on forest composition, while it increases greenhouse-gas emissions, and serves as a main determinant of carbon balances. However, the net effect of burning on carbon stocks is determined by both fire frequency and severity, and the consequences of climate changes in rates of lost biomass consumption are uncertain.

Based on the above and having in mind the particularities of different countries in EU the present manuscript tries to estimate behavior of carbon losses by forest per hectare of burned area for four countries with different soil and weather conditions. The data of burning loss and burned area were derived by FAOSTAT. In particular having calculated the burning loss in terms of carbon emissions storage per hectare of burned area we employed different panel unit root tests including those of Im Pesaran and Shin (2003), or Breitung (2000; Breitung and Das 2005), Levin–Lin–Chu (2002), Im–Pesaran–Shin (2003), and Fisher-type (Choi 2001) tests have as the null hypothesis that all the panels contain a unit root.

The countries in our sample involve Greece, Italy and Spain, three Mediterranean countries, and Austria a country with significant forest cover area and totally different climatic conditions. The time period studied involves almost three decades (1990-2017).

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The major objective of our study was to estimate the behavior of carbon losses by forest per hectare of burned area for four countries with different soil and weather conditions. With the assistance of different panel unit root tests having rejected the unit root hypothesis we may well argue that we have evidence that a statistically significant proportion of the units are stationary. Therefore the behavior of biomass loss is a variable that need to be further studied in order the determinants of its behavior to be identified and to enable policy makers to reverse the existing situation. The results are indicative of potential problems in forest management that actually are different for each country while policy implications are derived. The policies and programs Development aiming to support the use of prescribed fire on lands and in particular surface soil treatments may provide an efficient and economic tool to reduce fire hazard for all the economic agents.

Resilience, a significant reaction of fire forest ecosystems to high – severity wildfire, has important socioeconomic implications such as, protection of homes and structures, protection of timber assets and production, protection of scenic quality and recreation opportunities, and protection of certain ecological values (Charnley et.al, 2017).

Last but certainly not least is the notion that wildfire is a landscape-scale disturbance process and, therefore coordinated activities are essential aiming to combine to alter landscape-scale conditions. More specifically, strengthening the collaborations and encouraging interaction between forest and fire management networks may be vital for local actors to build and improve their capacity to manage forestlands for wildfire resilience.

Keywords: biomass; forest fires; carbon losses; climate change; panel unit root test.

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