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# Local Analysis of Air Quality Changes in the Community of Madrid before and during the COVID-19 Induced Lockdown

**Manuel Alejandro Betancourt-Odio [1,*], Carlos Martínez-de-Ibarreta [1], Santiago Budría-Rodríguez [2] and Eszter Wirth [3]**

[1] Department of Quantitative Methods, Universidad Pontificia Comillas, 28015 Madrid, Spain; charlie@icade.comillas.edu
[2] Department of Economics and Business, Universidad Antonio de Nebrija, 28015 Madrid, Spain; sbudria@nebrija.es
[3] Department of Economics, Universidad Pontificia Comillas, 28015 Madrid, Spain; ewirth@icade.comillas.edu
* Correspondence: mabetancourt@comillas.edu

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**Abstract:** This paper examines the effect of the COVID-19 induced lockdown upon six pollutants, CO, NO, $NO_2$, $PM_{10}$, $PM_{2.5}$, and $O_3$, in the Spanish community of Madrid. The paper relies on clustering methods and multiple regression techniques to control for a battery of potential confounding factors. The results show that the nationwide lockdown, decreed on 13 March by the Spanish government, exerted a statistically significant effect upon most pollution indicators. The estimates range from approximately −82% (NO and $NO_2$) to −3% (CO). Reversely, the COVID-19 induced lockdown raised $O_3$ levels by an average of 20%. By using data from 43 stations spread out among the region, the paper provides a local level analysis. This analysis reveals substantial differences across areas and across pollutants. This observation indicates that any successful approach to improve air quality in the region must be multidimensional.

**Keywords:** COVID-19; pollution; lockdown