

## A Unified Theory of CO2 Emissions Convergence and Evidence

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### Abstract:

The objective of this paper is to develop a solid theory-based per capita CO2 emissions convergence equation and to test it. To this end we modify the Solow growth model by including depleting energy as a factor of production and by defining the channel through which CO2 emissions are created. Then we empirically estimate the derived per capita CO2 emissions convergence equation by employing system GMM approach on a panel data set of 65 countries over the period between 1970 and 2014. Results suggest strong evidence towards the existence of convergence for the global sample over the whole period. We also find that Annex I parties of UNFCCC converge and that non-Annex countries diverge in terms of per capita CO2 emissions. Our robustness check via stochastic convergence tests confirms our system GMM results for Annex I countries.

**Keywords:** Carbon Dioxide Emissions; Convergence; Solow Model; System GMM, Stochastic Convergence

**JEL Codes:** C23; O47; Q53; Q56