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Decarbonizing Transport: Crosscountry-Country Evidence on Electric Vehicle Use and Carbon Emissions

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Abstract

Rising atmospheric carbon dioxide emissions are widely recognized as the primary driver of global warming. In light of environmental concerns and the depletion of fossil fuel reserves, the use of electric vehicles in transport has become one of the strongest technological alternatives to gasoline-powered cars. Compared with their gasoline counterparts, electric vehicles reduce air-pollution costs and adverse human-health impacts. By virtue of these attributes, they not only steer the transformation of the global automotive industry but also constitute a key element of the transition to a sustainable future. Electric vehicles include battery electric vehicles (BEVs) and plug-in hybrids (PHEVs). The difference is that fully battery electric cars do not have an internal combustion engine, whereas plug-in hybrids combine a rechargeable battery and an electric motor with a gasoline-fueled internal combustion engine. PHEVs and EVs are considered among the most promising avenues for substantially reducing automobiles' dependence on oil, air pollution, and carbon dioxide emissions. Many countries aim to achieve their greenhouse-gas reduction targets by promoting electric vehicles. The purpose of this study is to examine, for selected countries and/or country groups, the impact of the electric-vehicle stock and the share of electric vehicles in new-car sales on carbon emissions, taking into account variables such as per-capita income, the urbanization rate, fossil-fuel prices, and total vehicle ownership. In this context, and in line with the existing literature, the study empirically tests whether electric vehicles in fact reduce carbon emissions.

Keywords: Carbon; Electric Vehicles; Emissions; Greenhouse Gas