



# Energy Efficiency and Rebound Effect in European Road Freight Transport

EPRG Working Paper 1622

Cambridge Working Paper in Economics 1654

**Manuel Llorca and Tooraj Jamasb**

**Abstract** Energy efficiency has become a primary energy policy goal in Europe and many other countries and has conditioned the policies towards energy-intensive sectors such as road freight transport. However, energy efficiency improvements can lead to changes in the demand for energy services that offset some of the expected energy savings in the form of rebound effects. Consequently, forecasts of energy savings can be overstated. This paper analyses the energy efficiency and rebound effects for road freight transport in 15 European countries during the 1992-2012 period. We use a recent methodology to estimate an energy demand function using a stochastic frontier analysis approach and examine the influence of key features of rebound effect in the road freight transport sector. We obtain on average a fuel efficiency of 91% and a rebound effect of 18%. Our results indicate that the achieved energy efficiencies are retained to a large extent. We also find, among other results, that the rebound effect is higher in countries with higher fuel efficiency and better quality of logistics. Finally, a simulation analysis shows significant environmental externalities costs even in countries with lower rebound effect.

**Keywords:** European road freight transport; stochastic frontier analysis; energy efficiency; rebound effect.

**JEL Classification:** C5, Q4, Q5, R4

Contact                      manuel.llorca@durham.ac.uk  
Publication                September 2016  
Financial Support        EPSRC Center for Sustainable Road Transport