

**Volume-outcome effect in a NHS: the Portuguese case**Pedro P. Barros<sup>1</sup>, Gisele T. Braun<sup>1</sup><sup>1</sup> NOVA School of Business & Economics, Universidade Nova de Lisboa, Lisbon, PORTUGALContact: [gbraun@fe.unl.pt](mailto:gbraun@fe.unl.pt)

**Objetivos (Objectives):** The objective of the paper is to analyse the correlation between the number of medical procedures and outcomes of selected DRGs in the Portuguese health system. We try, in a context of NHS, to answer the question "Does centralization of some medical procedures increase the quality of health indicators?". The novelty of this paper relates to the nature of the system analyzed. Private and public markets share similar features. However, public health markets present characteristics that are idiosyncratic to them, like the fact of not being exposed to competition.

**Metodologia (Methodology):** Using a dataset ranging over eight years (2001 to 2008), from the Portuguese NHS, this study concentrates on the existence or not of benefits in terms of better health outcomes coming from increases in volume of medical procedures. These potential benefits are considered at both hospital and patient level. Using linear regressions and probit models, we provide evidence that support a significant negative relation between volume of medical procedures and outcome for some DRGs.

**Resultados (Results):** At the hospital level, 6 out of 21 DRGs showed correlation between volume and outcome, whereas 10 of them did so at the patient level. Sensitivity analysis excluding the data corresponding to observations of transferences between hospitals revealed a very similar result, but 4 more DRGs at patient level analysis appeared to be significant, suggesting that a transference to another hospital is more likely to occur in the most complicated cases (in the medical sense). Probit models were run to show that PMP hypothesis works mainly by static scale effect with little evidence for learning-by-doing. The strongest evidence of volume-outcome effect, with causality from volume to outcome, was found for the following DRGs: cerebral infarction (14), circulatory disorders with AMI (121), cirrhosis (202), malignancy of pancreas (203), hip and femur procedures (210) and malignant breast disorders (274).

**Conclusões (Conclusions):** The volume-outcome effect has indeed been identified for some medical procedures. The gains in the outcomes are mainly caused by scale effects. Weak evidence of learning-by-doing is observed. The centralization of those medical procedures is recommended given that such policy, keeping all other variables constant, would save a relevant number of lives.