

**Title:** When too much penalty is too much: antibiotics over-prescription through a doctor-patient dynamic micro-modelling

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**Abstract:** We examine the drivers of antibiotics over-prescription by developing a microeconomic dynamic modelling of a doctor-patient relationship in which the doctor has to prescribe drugs producing a negative externality (bacterial resistance effect). For physicians competing with each other on mobile clienteles, we determine the mechanisms by which market conditions and patient nomadism prevent the physician from properly controlling the patient's consumption dynamics. We highlight the major roles of the local physician density, the patients' co-payments for the drug and prescription targets from the health authority. In this setting, and somewhat paradoxically, too much penalties on excessive prescription practices could be counterproductive.

**Keywords:** drug prescription; antibiotics; bacterial resistance; microeconomic dynamic modelling; doctor-patient relationship; medical nomadism; pay for performance