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## Equilibrium existence in the circle model with linear quadratic transport $\cot^{\ddagger}$

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## Abstract

We treat the problem of existence of a location-then-price equilibrium in the circle model with a linear quadratic type of transportation cost function which can be either convex or concave. We show the existence of a unique perfect equilibrium for the concave case when the linear and quadratic terms are equal and of a unique perfect equilibrium for the convex case when the linear term is equal to zero. Aside from these two cases, there are feasible locations by the firms for which no equilibrium in the price subgame exists. Finally, we provide a full taxonomy of the price equilibrium regions in terms of weights of the linear and quadratic terms in the cost function. © 1999 Elsevier Science B.V. All rights reserved.

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JEL classification: C72; D43

## 1. Introduction

Hotelling's (1929) model of spatial competition provides an appealing framework to address the nature of equilibrium in characteristic space and in geographic

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