Preemptive entry in differentiated product markets

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Summary. Models of spatial competition are typically static, and exhibit multiple free-entry equilibria. Incumbent firms can earn rents in equilibrium because any potential entrant expects a significantly lower market share (since it must fit into a niche between incumbent firms) along with fiercer price competition. Previous research has usually concentrated on the zero-profit equilibrium, at which there is normally excessive entry, and so an entry tax would improve the allocation of resources. At the other extreme, the equilibrium with the greatest rent per firm normally entails insufficient entry, so an entry subsidy should be prescribed. A model of sequential firm entry (with an exogenous order of moves) resolves the multiplicity problem but raises a new difficulty: firms that enter earlier can expect higher spatial rents, and so firms prefer to be earlier in the entry order. This tension disappears when firms can compete for entry positions. We therefore suppose that firms can commit capital early to the market in order to lay claim to a particular location. This temporal competition dissipates spatial rents in equilibrium and justifies the sequential move structure. However, the policy implications are quite different once time is introduced. An atemporal analysis of the sequential entry process would prescribe an entry subsidy, but once proper account is taken of the entry dynamics, a tax may be preferable.

Keywords and Phrases: Product differentiation, Rent dissipation, Entry deterrence, Entry timing, Sequential entry.

JEL Classification Numbers: L13, D43, R12.

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1 Introduction

Product differentiation is an important dimension of firm competition, from computer software and cable television to grocery stores and restaurants. Existing models of product differentiation are typically static, by which we mean that firms' location decisions are made simultaneously. These static models are of limited usefulness. In particular, models with endogenous location choice (in characteristics or geographical space) and potential entry typically allow multiple equilibria. This means that there is a wide range of possible firm numbers consistent with equilibrium. Roughly speaking, these range from a densest packing of firms at which all earn zero profit, to a loosest packing at which any new entrant in a niche between existing firms would just be unprofitable. Market performance is hard to evaluate because the socially optimal level of product diversity typically lies within the range of possible equilibrium levels. This leaves the analyst with no way of knowing whether entry or exit ought to be encouraged, so policy questions can scarcely be addressed without a way of choosing among the equilibria. The most usual assumption is that the equilibrium involves zero profit for all existing firms (see e.g. Salop, 1979). This is likely to be the wrong benchmark if firms can somehow influence the equilibrium selection.

One reaction to the multiple equilibrium problem is to conclude that "history matters" (Eaton and Lipsey, 1978). History can be modeled via a sequential location process of far-sighted firms (see e.g. Prescott and Visscher, 1979; Neven, 1987). under this modeling strategy, firms rationally anticipate how their actions affect the behavior of subsequent entrants. Early entrants recognize how their own locations affect the location (or product choice) decisions of later entrants and whether or not they will enter the market.1 A major drawback to this approach is that a firm’s profit depends on its position in the (exogenously specified) order of moves: earlier entrants earn more. Thus firms would gain by moving higher in the order although the models do not allow them to act on this incentive.2

We explicitly introduce time to model the ability and the costs of moving before others. Specifically, we suppose that it is known far in advance that a market will open.3 Firms compete in the timing of entry into the market, with earlier entry garnering a position that has higher expected flow profit. Timing competition dissipates the rents accruing to desirable locations: an entrant must locate sufficiently early that all such rents are exhausted via early commitment.

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1 By contrast, the “long-run” equilibrium of the static model is usually specified as a set of locations such that no firm wishes to enter, exit, or choose a different location. These decisions could be coordinated by an imaginary “auctioneer”, but the process raises the obvious problem of how firms in practice figure out which is to locate where. This is also troublesome because (in all but the zero-profit equilibrium) firms that actually enter the market earn positive profits while those that do not enter earn zero.

2 The same criticism can be levelled against standard Stackelberg sequential output choice models: see Eaton and Ware (1987) and Anderson and Engers (1994).

3 As we point out below, it suffices that the probability that the market opens is a continuous function of time. For example, legal restrictions are removed or a market is liberalized. Alternatively, this assumption is a stylized version of a growing market without dealing with the intricacies of the growth path (see also Eaton and Lipsey, 1979).