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Free entry versus socially optimal entry ☆

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Abstract

This paper reconsiders the well-known comparison of equilibrium entry levels into a Cournot industry under free entry, second best (control of entry but not production) and first best (control of entry and production). Allowing for the possibility of limited increasing returns to scale in production, this paper generalizes the conclusion of Mankiw and Whinston (1986) [10], that under business-stealing competition, free entry yields more firms than the second-best solution. We also show that under-entry always holds under business-enhancing competition. This confirms the general intuition given by Mankiw and Whinston, which does not rely on the convexity of the cost function. The same result is shown to extend (at a similar level of generality) to the comparison between free entry and the first best socially optimal solution, irrespective of business-stealing. Three illustrative examples are provided, one showing that the second-best and free entry solutions may actually coincide.

JEL classification: C72; D43; L13

Keywords: Free entry; Entry regulation; Socially optimal entry; Cournot oligopoly; Supermodularity

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1. Introduction

In a drastic reversal of a long-standing belief, von Weizsacker [23] proved that free entry into a Cournot industry with identical firms, linear demand, quadratic production costs and fixed entry cost leads to excessive entry relative to a first-best socially optimal solution. He postulated an omniscient social planner who can dictate both the number of firms to enter the industry and their market conduct or production levels. Perry [15] derived the same conclusion but with a second-best social planner, one that decides the number of entering firms but not their market conduct. Suzumura and Kiyono [19] address both comparisons–free entry versus first and second-best entry–with competition based on conjectural variations (including Cournot as a special case), but no fixed (entry) costs. With the latter proviso, they extend both von Weizsacker's first-best and Perry's second-best results. Mankiw and Whinston [10], or MW, reconsider Perry's question in a general setting encompassing Cournot competition (among others) with convex costs and a fixed entry cost, and provide a rigorous analysis accounting for the integer nature of the number of firms. Nachbar et al. [13] consider the effect of sunk costs on the welfare comparison at hand.[1] Finally, Amir and Lambson [4] offer an extension to a form of dynamic competition.

The present paper compares free entry into a symmetric Cournot industry with both first-best and second-best socially optimal entry. The main result is that free entry leads to an excessive (resp., insufficient) number of firms relative to second-best planning *if and only if* a "business stealing" (resp., "business enhancing") effect is present, i.e. each firm's Cournot equilibrium output contracts (resp., expands) as more firms enter the market. When holding globally, these two effects correspond respectively to the properties of strategic substitutes and strategic complements of Cournot outputs. This result is obtained under the most general assumption that guarantees the existence of symmetric pure-strategy Cournot equilibrium (based on supermodularity conditions), namely that price or inverse demand falls faster than marginal cost in a global sense.[2]

The second result is that, relative to first-best planning, excessive entry prevails, irrespective of strategic substitutes/complements. For this case, the relevant separation is also into two cases, but depending on whether the cost function is convex or concave. Indeed, the first best number of firms is always one in the latter case, making it a special case for the issue of entry.

With respect to MW's elegant analysis of the second-best comparison, given Cournot competition in the second stage of the game, the present paper adds by establishing that business stealing is essentially necessary as well as sufficient, by not requiring that production costs be convex, or that industry output be monotone in the number of firms. By specifying a Cournot framework at the outset, on the one hand, the present paper forsakes relevant generality in modeling the structure of competition, but on the other hand gains in clarity in allowing assumptions to be placed directly on the primitives of the oligopoly model. The latter step is guided by the requirement that the same assumptions must in the first place guarantee existence of a Cournot equilibrium. With that in mind, the basic strategy underlying the present paper is that MW's result ought to be investigated with as much generality as possible, subject to the conditions for existence. One advantage is that attention need not be restricted a priori to symmetric market equilibria. Rather, asymmetric equilibria are essentially precluded by our basic assumptions. Furthermore, this approach also links together all the important underlying issues that are relevant to

[1] In contrast to the present literature review, past literature on this topic has not always distinguished whether a first best or a second best criterion is used, despite the obvious relevance of the issue.

[2] This translates into a reaction correspondence will all slopes above -1: A firm responds in such a way that total output rises whenever rivals' total output rises, a property consistent with both strategic substitutes and complements.