Implementing efficient market structure

Optimal licensing in natural oligopoly when tax revenue matters

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Abstract. This article studies the design of optimal mechanisms to regulate entry in natural oligopoly markets, assuming the regulator is unable to control the behavior of firms once they are in the market. We adapt the Clarke–Groves mechanism, characterize the optimal mechanism that maximizes the weighted sum of expected social surplus and expected tax revenue, and show that these mechanisms avoid budget deficits and prevent excessive entry.

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1 Introduction

In recent years public policy has been engaged in redesigning markets on a massive scale. In Eastern Europe, many formerly state owned enterprises were privatized after the breakdown of formerly communist regimes, and further privatization programs are on the way. And in Western economies, privatization and deregulation were launched in many tightly regulated industries, ranging from public utilities to telecommunications. These policies have by and large been successful in building private markets and raising revenue. However, they have often failed to pay sufficient attention to the market structure implied by particular privatization and deregulation schemes.
The recent allocation of government franchises for operating wireless telecommunications through spectrum auctions is a case in point. These auctions raised an enormous amount of revenue, which earned them high praise both in the profession and the general public, but they may not have created the best market structure.

Usually an auction is said to be efficient if the objects are allocated to the bidders who value them most. However, in the case of awarding spectrum rights, this principle does not apply without qualification. Bidders maximize expected profits, not welfare. Therefore, the auction ignores consumer welfare as well as the deadweight loss of alternative forms of taxation.

The recent spectrum auctions did not completely ignore market structure. Indeed, in the U.S. the market was broken down into many regional submarkets which, in the case of mobile phone services, had to be supplied by two providers, and various affirmative action schemes were employed to give preferential treatment to minority operated firms. However, in other countries, nationwide spectrum rights were sometimes auctioned strictly to the highest bidder. For example, in Germany the regulator recently auctioned ten twin–paired radio frequencies for mobile telecommunications in the 1.800 MHz range in this way. All four existing providers did participate in the auction, but in the end all frequencies were awarded to the two major providers (see Cane 1999: Mannesmann Mobilfunk, who won the larger share, and DeTeMobil (Deutsche Telekom)).

If the concern for market structure is taken seriously at all by public policy, it is usually accounted for by imposing restrictions on the (minimum) number of suppliers who must serve the market. However, the issue is usually complicated by the fact that the regulator has incomplete information about relevant market characteristics, and cannot know how many firms should serve a particular market unless firms reveal their individual characteristics. Therefore, the design of franchising or privatization schemes usually cannot be separated from the design of mechanisms that detect and implement the right market structure.

Market structure is also a concern in private industry. A well-known case in point is the relationship between the Holland Sweetener Company that challenged the monopolistic position of Monsanto, the producer of NutraSweet, and the major buyers of such sweeteners, such as Coke and Pepsi. The latter wished to continue buying NutraSweet, but also had a vested interest to keep the new competitor alive and well in order to restrain Monsanto’s monopoly. Similarly, a patent holder who contemplates issuing patent licenses to competitors, takes into account how these licenses affect the market structure (see Kamien 1992).

The purpose of the present paper is to design optimal mechanisms to implement the optimal market structure under conditions of incomplete information, when the regulator cannot know which and how many firms should participate in the market, unless he induces firms to reveal their relevant private information. In particular, we

– characterize the optimal Groves mechanism that yields the highest tax revenue in the class of mechanisms that implement efficiency;

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1 For a detailed analysis of this auction, see Grimm et al. (2001).