Strategic Cost Allocation in Duopolistic Price Competition

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Abstract

In this study we investigate the strategic implications of the widespread business practice of allocating fixed costs on a per unit basis. Although cost allocation has drawn the interest of accountants since the turn of the century, and has interested economists for a somewhat shorter period, marketing scientists do not appear to have studied its implications for pricing strategy. The accounting literature has been focused upon various tactical issues. Amongst them are (a) preparing tax reports, (b) discouraging managers from over-consumption of perquisites [principal-agent theory], and (c) providing a proxy for the opportunity costs of fixed resources (shared across business functions) that are capacity constrained [queuing theory]. The economics literature has examined cost allocation from the perspective of the multi-product firm. For example, Sweeney (1982) has shown that a partially regulated, multi-product firm will "over-allocate" costs to unregulated markets, thereby raising prices in those markets from the level that would obtain in the absence of regulation. Pavia (1995) has shown that the actual allocation of costs will affect aggregate profits. This effect occurs because marginal revenues are set equal to augmented marginal costs (which themselves are influenced by the actual cost allocation). Therefore, it is of some interest that Stigler (1966) has written, in the context of a single product firm, "any allocation of common costs to a product is irrational if it affects the amount produced."

The basic premise of this study is that in a duopoly situation with a partially substitutable products it is generally rational for single product firms to allocate costs on a per unit basis. In particular, through the use of linear demand, we show that if both firms allocate overhead expenses optimally, the resultant equilibrium profit levels strictly dominate the non-allocation Nash equilibrium. We call this the 'dual allocation Nash equilibrium." Perhaps more surprisingly, if one firm acts as a Stackelberg price leader and the other as a follower, then it is optimal for the follower—but not the leader—to allocate its costs. In this situation there are a family of profit equilibria which dominate the simple, non-allocation Stackelberg equilibrium, with each point being defined by the follower's level of cost allocation. If the follower selects its level of cost allocation optimally, then the resultant profit equilibrium strictly dominates the dual allocation Nash equilibrium. Finally, we demonstrate that there are higher order cost allocation equilibria which are even more profitable for both duopolists. In the limit, profits obtained in the symmetric allocation game move towards the collusive solution.