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Monopoly Pricing with Core Goods and Side Goods

It is hard to find companies that offer a single product, and often the companies' products are complementary and priced uniformly and separately. Think of amusement parks where visitors have to pay separately for entry, food and beverages, and rides. Another example are firms that offer durable and consumable goods, for example, razors and blades. A common feature of these two examples is that all products are sold to the same group of customers. This does not need to be the case. Think of night clubs who may charge different access fees to men and women, and editors who sell newspapers and advertisements to readers and firms, respectively. Another example is airports, where passengers and airlines pay per-passenger and per-flight based infrastructure charges and, in addition, airports earn revenue from car parking, car rentals, duty free and the selling of food and beverages. In such environments one may wonder when it can be optimal to charge a negative markup on one product to boost the sales of the other complementary products.

Some relevant results can be found in the literature. Oi (1971) considers the example of a monopoly amusement park and shows that it is optimal to charge a zero markup for rides and thus earn only from positive entrance fees when there is one consumer or all consumers are identical. This is because the monopoly can use the entrance fee to fully internalize total surplus in these cases. Schmalensee (1981) considers the example of razors and blades and shows that the sign of the optimal markup for razors is fully determined by the difference between average consumption of blades over all consumers and the blade consumption of the marginal consumer. This implies that identical individuals are not required for the optimality of zero markups on blades (or rides). Schmalensee (2015) considers an example with linear functional forms to show that for some parameter values it can be optimal to charge razors below marginal costs.

The present paper develops a basic model of a monopoly firm that offers complementary products. This model is used to show that the signs of both core and side markups can each be explained by a single statistic. Extensions of the basic model are developed and analyzed subsequently. They cover the cases of an arbitrary number of symmetric side goods as well as the case of two asymmetric side goods. An airport example is used in order to numerically illustrate that it can be optimal to charge core goods below costs.