Output commitment through product bundling: Experimental evidence ☆

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ARTICLE INFO

ABSTRACT

We analyze the impact of product bundling in experimental markets. One firm has mono-poly power in a first market but competes with another firm à la Cournot in a second market. We compare treatments where the multi-product firm (i) always bundles, (ii) never bundles, and (iii) chooses whether to bundle or not. We also contrast the simultaneous and the sequential order of moves in the duopoly market. Our data indicate support for the theory of product bundling: with bundling and simultaneous moves, the multi-product firm offers the predicted number of units. When the multi-product firm is the Stackelberg leader, the predicted equilibrium is better attained with bundling, especially when it chooses to bundle, even though in theory bundling should not make a difference here. In sum, bundling works as a commitment device that enables the transfer of market power from one market to another.

1. Introduction

In its 2004 landmark decision, the European Commission (EC) found Microsoft guilty of abusing its dominant market position. Microsoft had bundled its operating system Microsoft Windows with its Windows Media Player, thereby abusing its dominant position in the operating systems market (European Commision, 2007). The EC fined the company €497 million, the largest fine ever handed out by the EC at that time, and gave Microsoft 90 days to produce a version of Microsoft Windows without Windows Media Player. In 2006, and again in 2008, the EC fined Microsoft an additional €280.5 million and €899 million respectively for not complying with the 2004 ruling. In the meantime, Microsoft offered an operating system without Windows Media Player and has paid all fines (reduced to €860 million) in full.[1] To date, Microsoft has been

[1] In January 2009, Microsoft was once again convicted for product bundling when the EC ordered the company to unbundle its internet browser from Microsoft Windows, stating that "…Microsoft's tying of Internet Explorer to the Windows operating system harms competition between web browsers, undermines product innovation and ultimately reduces consumer choice". (European Commission, 2009). It was agreed that Microsoft would offer

fined nearly €2.2 billion for its bundling practices, €561 million of which are currently being challenged by Microsoft in the General Court.[2]

Product bundling is a business strategy that can be harmful to competitors and, ultimately, to consumers. The leverage theory of product bundling states that a firm which enjoys market power in one market can transfer this power to another possibly unrelated market by selling the goods involved as a single bundle (Martin, 1999; Nalebuff, 2004). The Microsoft case illustrates that product bundling can qualify as an abuse of market dominance also in practice. Moreover, the importance of bundling as a business strategy is reflected in the fact that it is covered in virtually every textbook on industrial organization and business economics.

In this paper, we report on a series of experiments which test the leverage theory of product bundling. In spite of its importance as a business practice, it is difficult to perform field studies on the effects of product bundling. Firms would not be willing to (randomly) experiment with this business strategy as it might significantly affect sales (possibly for the worse), and because it could qualify as an abuse of a dominant position. Moreover, instances of product bundling that significantly affect sales volumes are rare, making it difficult to draw general conclusions from the various case studies on the wider impact of product bundling on market performance.

Damme et al. (2009, p. 107) review the experimental literature on abusive practices and conclude that "little experimental work has been done in this area". Indeed, our paper is part of this small but growing experimental literature on abusive market practices. Isaac and Smith's (1985) experimental work on predatory pricing (see also Goeree et al., 2004) is a pioneer of abuses of dominant positions. Recent work in this area includes experimental analyses of vertical foreclosure (Martin et al., 2001), price discrimination (Normann et al., 2007), and exclusive dealing (Landeo and Spier, 2009; Smith, 2011; Boone et al., in press). These papers have in common that they provide experimental tests of business practices that may constitute abuses of market power.

As is common in the literature, we analyze the scenario where one firm (the multi-product firm) has monopoly power in one market but faces competition by a second firm (the single-product firm) in another unrelated market.[3] For this second market we employ a Cournot quantity-setting framework. Our first treatment variable is "bundling" versus "no bundling." When bundling, the multi-product firm bundles its products for the two markets. We consider both the situation where bundling/not bundling are exogenous to the multi-product firm and the situation where it can choose whether to bundle. The treatments where bundling is a choice allow us to examine whether the multi-product firm deliberately influences market performance by adopting a bundling strategy.

Our second treatment variable is the order of moves in the duopoly market: simultaneous versus sequential. We introduce this second treatment variable to examine the commitment effect of product bundling (as highlighted by Whinston, 1990; Martin, 1999; Nalebuff, 2004). With simultaneous-move Cournot competition, the bundling firm trades off reduced sales in its monopoly market to increased output in the duopoly market, possibly at the expense of losing some customers in the monopoly market (even if demand is independent across the two markets). The bundling strategy works as a commitment to sell more in the competitive segment: ex post, the multi-product firm would prefer to deviate from this outcome and would want to best respond against the second firm (and at the same time, earn monopoly profits in the market where it does not face a rival). In the Stackelberg setting, when both markets have identical demand and cost structures, bundling does not imply additional commitment because the multi-product firm is a first mover anyhow. That is, in theory, bundling does not affect optimal quantities. This feature allows us to test whether bundling gives the Stackelberg leader additional leverage because, as is known from previous experiments, Stackelberg leaders find it difficult to gain from their first-mover advantage without bundling (Huck et al., 2001, 2002; Fonseca et al., 2005; Müller, 2006).[4]

Our results are as follows. For the duopoly markets with and without exogenous bundling, we find that firms roughly play the predicted Cournot-Nash outputs. These market outcomes do not change significantly when the multi-product firm is allowed to bundle endogenously. The data of our Stackelberg markets, where bundling is not an option for the multi-product firm, reject the predictions; followers produce more and leaders produce less than predicted—an observation which is in line with earlier experimental results. However, the discrepancy between observations and prediction is greatly reduced in the Stackelberg markets with exogenous product bundling. Finally, in the Stackelberg markets with endogenous bundling, we note a surprising bifurcation of outcomes: while results resemble a symmetric Cournot solution when the multi-product firm chooses not to bundle, they almost perfectly match the Stackelberg prediction when the multi-product firm does decide to bundle.

In sum, we find that bundling successfully works as a commitment device to sustain increased production (and therefore larger market shares), an observation that is robust with respect to the order of moves (simultaneous or sequential) and to

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(*footnote continued*)
customers of Microsoft Windows a choice of 12 internet browsers. Microsoft dropped this feature however in the Windows 7 Service Pack 1 in February 2011 for 14 months onwards, inducing the EC to fine Microsoft €561 million in March 2013.

[2] Other notable antitrust bundling cases include U.S. vs. Microsoft (2001) and *LePage's Inc. v. 3M* (2003) in the U.S.; and *Hilti* (1987), and *Tetra Pak II* (1991) in the E.U.

[3] If markets are related, the multi-product firm has an incentive to bundle in order to price discriminate (Adams and Yellen, 1976; McAfee et al., 1989). To focus exclusively on the exclusionary effect of bundling, in our design the two markets are not related.

[4] In line with the theoretical literature to date (see Chung et al., 2013, for a recent overview), we do not consider the situation where firms interact repeatedly. In that sense our paper is more an experimental test of conceived theories, and less an experimental test of the workings of real markets.