

# Insights From Recent Economic Analysis of Bundling

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# 1 Introduction

In this note, I describe some recent theoretical work on the incentives and consequences of bundling. The discussion is organized by market structure: first, monopoly bundling incentives; then bundling in imperfectly competitive markets. The connections to bundling in video markets will be drawn by focusing mostly on retail bundling, such as MVPD bundling of channels. However, many of the features mentioned apply to bundling by content providers as well.

The theoretical literature on motivations for bundling generally follows two major streams: strategic incentives, focussing on affecting rival's payoffs and, often, entry or exit decisions; price discrimination incentives, focussing on 'rent' extraction usually via nonlinear pricing. Since my research is primarily in the second stream, (I study multi-object selling schemes) I will discuss mainly this motivation. While the theoretical literature on bundling is quite technical and stylized, I will attempt to demonstrate in this note that it still yields important insights.

## 2 A Simple Underlying Model

Throughout, this note assumes that consumer preferences come from the following environment:

- Consumers demand one or both of two 'programs', (E)ntertainment and (S)ports.
  - Consumers know their willingness to pay for each program.
  - A video distributor (often but not exclusively an MVPD) only knows broad distribution of consumer preferences.
  - The distributor would like to find a pricing scheme to maximize revenues.

The distributor could just price each program separately (independent pricing). It could sell only the bundle of E and S together (pure bundling). Or, it could choose a hybrid of the two (mixed bundling). In fact, there are other even more arcane options including offering one program for sure and only a probability of receiving the second program.

### 3 Monopoly Bundling

Like many utility infrastructures, video distributors may enjoy some monopoly-like power over price due to natural monopoly technology factors or legal rights such as local franchise rules. Even in the absence of such explicit reasons for monopoly-like power, though, many firms enjoy some protection from competition for other industry-specific reasons. For example, ‘meta-bundling’ of products creates monopoly power over subsets of the bundle. A firm that induces its consumers to purchase, say, a triple-play bundle of telephone, broadband and video services, now enjoys some (constrained) monopoly power over the pricing of the components of the bundle, such as the video component. This localized pricing power can most evidently arise when the meta-bundle pricing is such that no or very few consumers ever buy video on a stand-alone basis but it might also arise for consumers who merely wish to simplify billing by utilizing one-stop shopping.

Even if these features do not result in an actual single-firm market, understanding monopoly incentives for bundling is useful simply because monopoly incentives persist in imperfectly competitive markets. Firms with some incomplete power over price will face similar motives and this includes incentives for bundling.

#### 3.1 Some Qualitative Results

Although this is a very simple model of preferences, computing the revenue-maximizing pricing scheme for a monopolist video distributor is a very difficult mathematical problem. However, some robust conclusions are available.

- Even if the values for the different packages are completely unrelated, mixed bundling generally dominates independent pricing.
- In this solution, stand-alone prices rise relative to independent pricing, and bundle prices are (usually) ‘subadditive’, it costs less to buy the bundle than making up the bundle oneself.
- For some environments, it is best for the monopolist not to offer stand-alone options at all (pure bundling dominates).
- Unlike single product models, the monopolist always prefers to exclude some consumers.

- Curiously, there are even better, complex, pricing schemes where the monopolist offers random packages.

The first result stems from an early analysis by McAfee, McMillan and Whinston (1989) and is surprisingly general. Stated differently, ‘independent goods pricing’ is almost never revenue maximizing when mixed bundling is also feasible.

The second bullet is important to note because of its implications for the *full* pricing impact of bundling. While it is true that consumers who end up purchasing the full bundle will generally be better off compared to when bundling is not allowed, however, consumers who buy only the stand-alone offering are worse off as the monopolist tends to raise these prices in an effort to force consumers into the bundle. Additionally, although optimal bundle prices are typically less than the sum of independent goods prices (the ‘normal’ cases) there exist some distributions of consumer preferences where the optimal bundle price could actually be superadditive, that is, more than the sum of the independent program prices. In many circumstances where purchasers are anonymous, this option is viewed as infeasible for the monopolist since consumers may have the ability to ‘self-bundle’ by purchasing the programs independently. However, in the case of MVPDs which can monitor directly program purchases by its customers, such pricing patterns do seem to be feasible (though, it is not known when they are optimal).

The final three bullets are drawn from recent research. Deskalakis et. al. (2015) show that as consumer preferences over programming becomes stronger (the lowest consumer value for individual programs rise) the optimal pricing pattern for a monopoly MVPD is to offer prices such that consumers only choose bundles and never select individual programs. In the case of single product firms, as this lowest value rises, it is known from Myerson (1979) that the monopolist will typically prefer to price so as not to exclude any consumers, so monopoly pricing is not socially inefficient in that sense. However, Armstrong (1996) shows that this conclusion does not hold for multi-product monopolists (which includes the multi-channel MVPD). In this case, the optimal pricing patterns always involve some exclusion of consumers from the market. Finally, Manelli and Vincent (2006,2007) demonstrate that fully optimal pricing patterns actually can involve very complex product schemes including offering lotteries over programming. Whether or not this is a realistic pattern of behavior for MVPDs is debatable.

Nevertheless, the result indicates a further incentive towards inefficiency by such monopolists and that a continued pursuit of varied and complex pricing schemes may offer significant opportunities to such firms.

## 4 Imperfect Competition

In this section, I maintain the underlying assumptions about consumer preferences with two programs, E and S. However, the market structure is modified to a situation with, say, duopoly MVPDs. Consumers may have an intrinsic bias for the type of program offered by one firm, rather than the other, and this bias may or may not be the same for the other program.

With competing multi-product MVPDs, it is important to distinguish two modes of consumer behavior; one-stop shopping mode (eg. Comcast vs. FIOS) versus pick and choose (MVPD vs. OTT video). In the one-stop shopping mode, consumers consider the product offering (including pricing) from each firm, determine its optimal choice conditional on selecting one firm or the other, and, in the end, chooses to go with only one of the two competing offerings. This may be due to fixed costs of connecting to firms, or perhaps because of ease of billing or other interface with a single provider. This is likely a more accurate model of competition between two traditional MVPDS, say, FIOS versus Comcast. In the pick and choose mode, a consumer has the additional flexibility (if it chooses) to select one channel from one firm and the other channel from the other. This mode more accurately captures the case where a consumer, say, elects to view its sports package from FIOS but chooses Netflix for its entertainment options.

The relevant market structure can vary in either mode. A base case could be simply four independent providers, one for each ‘product’. In this case, the analysis collapses to looking at two independent imperfectly competitive markets and is well-known (eg. a Hotelling competitive market between two differentiated E providers and a similar market between differentiated S providers.) I do not focus on this case, but it is useful to keep in mind as a default market structure against which to compare other structures. Also, it serves as a natural environment in which independent goods pricing is (unilaterally) optimal

The most obvious market structure to examine in this context is with two multi-channel firms engaging in price competition with a variety of pricing formats – independent goods pricing, pure bundling and mixed bundling. Another relevant structure

to consider, especially in the context of merger evaluation, is one with a single bundler and two independent providers,

## 4.1 One-stop Shopping

With one-stop shopping, in a Hotelling like duopoly framework with two part tariffs:

- Armstrong-Vickers (2001) show that firms choose not to distort consumer choices by inefficiently bundling.
- Instead, they offer their products at (efficient) prices equal to marginal costs.
- They compete with each other in terms of net utility offered to each consumer.

The above results are suggestive of a conclusion that, in this mode of imperfect bundling competition, distortions that often arise from firms exploiting power over price may be less of a concern. However, it is important to note that the results of this analysis rely on a somewhat specialized example. In particular, by assuming full market coverage (as is typical in the Hotelling-like framework used here, but is with significant loss of generality in this case) Armstrong and Vickers ignore the impact of this type of bundling on consumers who are on the margin between entering the market and staying out rather on the margin between one firm and the other. A more general model which incorporates this effect would likely result in monopoly-like distortions on this margin.

## 4.2 Pick and Choose – Duopoly

As before, consumers are interested in two different packages, but in this scenario, it is feasible and desirable for consumers to pick different packages from different providers. When two multi-channel firms offer both products and have the option to price as bundles as well as independently:

- In a duopoly framework, even if products are independent in demand, each firm has an incentive to bundle.
- Although bundling tends to lead to less efficient consumer choices compared to a la carte pricing, it also generates lower prices.
- Even if there is a strong consumer interest in ‘mix and match’ pricing, it is possible that firms only compete in bundles.

In this mode, the ability to bundle is much more likely to generate deviations from socially efficient outcomes. There is an interesting conflict demonstrated by the second bullet in that bundling behavior by firms tends to lead to less efficient mixes for consumers, it also leads to lower prices, a phenomenon first noted in related earlier work by Matutes and Regibeau (1988 and 1990). The final bullet also highlights an intriguing feature of these environments. Mix and match across firms requires both firms to offer products on a standalone basis. Thus, even if a firm might wish to offer consumers the opportunity to self bundle across firms, it cannot do this unilaterally and if the rival does not offer stand-alone products, there is no incentive for the other firm to do so either.

### **4.3 Pick and Choose – Mixed Market Structures**

Suppose one firm offers two packages and two independent firms provide single packages that compete with it (eg. Hulu and ESPN 360 competing with Comcast or FIOS for customers). Even if the two packages are independent in demand, if the multi-product firm bundles, the products from the two independent firms become complements – that is, sales by one single-product firm will typically increase when the price of the other single-product firm falls. This is because when the multi-product firm bundles, some consumers will compare its bundle with the consumer-created bundle of the two independent firms and that bundle will be evaluated on the basis of the sum of the firms' prices. A consequence of this observation is that independent firms competing against a bundling multi-product firm are at a disadvantage because of the negative externality each imposes on the other. One might expect this externality could create an incentive for counter-merger, however, the anticipation of strong price competition on bundles described in the previous section post-merger may discourage this incentive.

# 1 Suggested Readings

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