

## Pricing information goods

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### Abstract

**Purpose** – The purpose of this paper is to show that information goods allow new forms of second degree price discrimination because of their economic special features. In addition, it shall be explained why it makes economical sense for information providers to make offers free of charge, and how price discrimination can assist them thereby.

**Design/methodology/approach** – This paper is a literature-based and practical/analytical depiction, showing in which context the three price discrimination forms have developed and how they are effectively applied.

**Findings** – Windowing, versioning, and bundling are very effective strategies of price discrimination for information goods. This can be illustrated through various application examples. With the division of information content and media carriers a clear distinction between windowing, versioning, and bundling is achieved.

**Practical implications** – Information providers receive support for the design of their pricing policy. It is obvious, that with the aid of the depicted price discrimination variants, both market penetration with cost free offers and the generation of revenues from product sales can be aimed for.

**Originality/value** – What is new about the paper is the first time comparative portrayal of three recent second degree price discrimination forms and their application to information goods.

**Keywords** Pricing policy, Information media, Product mix

**Paper type** General review

### Introduction: significance and special features of information goods

Information plays an ever more important role in our modern economic life. Its share of the economic output has been increasing for many years. If one wants to trade information on markets, one speaks about information goods, which is understood as “a definable quantity of data, which the economic subjects attach a benefit to” (Linde, 2008, p. 7). Such information goods, which are in the meantime predominantly dealt with digitally, are, e.g. news, music, pictures or any kind of software.

Information goods exhibit some economic special features. As a first point they are liable to distinctive unit cost reduction. Whereas the initial creation of the content for a master copy, e.g. a film, might cost many millions, the additional costs for duplication and distribution are extremely low, particularly on the internet. With information goods it is often not possible to accurately appraise the quality of the product. This means there is an information asymmetry: Whether the film is really as exciting as it is described on the back of the DVD, can only really be judged by viewing. And ultimately one must always ask oneself the question with information goods, whether one decides in favor of an offer

that many already use, or for one which most likely fulfils ones own particular requirements. Is it better to install Windows or Linux, purchase Fifa or Pro Evolution Soccer, watch “Desperate housewives...?” or Shreck, chat with friends via MSN, ICQ or Skype. The economist is speaking about network effects which lead to goods becoming more valuable for the user, the more widespread they are.

It is to be noted that as a customer one is frequently offered these goods very favorably or even free of charge. Among these information goods are, e.g. the e-mail account at GMX, the ubiquitous PDF-Software Adobe Acrobat or series on the new internet TV RTLnow. From an economic point of view you would think the corporations would “cut the ground from under their own feet” with such offers. The reason why these low priced offers are being made is that information providers usually have a special interest in a wide circulation of their products. Wide circulation benefits the development of network effects. This means that the users gain advantages during communication of a product (e.g. tips and tricks) and the possibilities of reciprocal exchange (e.g., music data). Another reason for offering low prices lies in the cost structure. The extremely low variable costs produce a deeply marked cost depression and permit price setting which generates high sales volumes. Also, information asymmetries can be successfully negotiated when the price presents no obstacle to the purchase. Everything points in the same direction: Prices should not be cost-oriented but must be market-oriented. Thereto must either the customers willingness to pay be ascertained via (online) market research or the customers must at least partially, on purchasing, be given the opportunity to disclose how their asking prices turn out. The instrument of price discrimination

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offers, particularly for information providers, a whole arsenal of possibilities.

To address this objective the paper is organized as follows. We begin by presenting the different types of price discrimination. We then focus on 2nd degree price discrimination with information goods: Windowing, versioning, and bundling are introduced as the three most important types. Starting with a brief literature review the field of application of the respective price discrimination form will be depicted. To conclude, a comparison of the three price discrimination forms will be made, the similarities and differences explained.

## Types of price discrimination

The basic idea of price discrimination is, in principle, to sell the same product to every customer at a different price (see, e.g. Monroe 2003, p. 522). With the help of differentiated prices, customers (groups) with a different willingness to pay can be appealed to. In comparison with an offer with a standard price the sales can thereby be increased. Of course, price discrimination only makes sense when on the customers' side there are actual existing different user values and therewith also a different willingness to pay for the goods on offer.

There are three basic forms of price discrimination (Pigou, 1929). They differ subsequently, by who sets the price and how the purchasing groups are separated.

To evaluate the various types of price discrimination Adams and Yellen (1976, p. 481) have compiled three optimality conditions:

- 1 Customers whose willingness to pay lies below the marginal costs should remain excluded from a purchase (exclusion).
- 2 Customers whose willingness to pay is above the marginal costs should purchase (inclusion).
- 3 On purchasing no consumer surplus (willingness to pay minus price) should result (for complete extraction).

The better these conditions are met, the closer one comes to the ideal complete price discrimination for the vendor (see Figure 1).

## 2nd degree price discrimination with information goods

In connection with information goods three different types of 2nd degree price discrimination play a special role. All three are based on the fact that the supplier does not make a fixed offer to the different customer groups (segmentation), but instead, offers corporation services so differentiated, that the customer can choose which price he/she wants to pay (self-selection). Thereby, it is up to him/her to decide in which price performance combination he/she wants to purchase the product.

### Windowing

The windowing concept stems from media economics and was described in detail in the 1990s by Owen and Wildman (1992, pp. 26-37) with relation to films and TV programs. To our knowledge windowing has as yet not found its way into general pricing literature.

Applied to information goods in general so-called windowing is, to bring a finished information good like a

film or a book in different forms, at varying times on to the market. Based on one and the same first-copy, the master, customers are offered various conveyance forms or media carriers over a specific period of time. Films like *Star Wars* are not only offered at the movies, but also – delayed – as purchasable or rentable video, on pay-TV and on free-TV. The offers satisfy different needs, therefore, customers are prepared to pay on different price levels. Customers who want to watch the film at the movie theatre are willing to pay more than those who want to watch the film later as a rentable video or on free-TV. The temporal aspect is in the foreground of this type of price discrimination. The information providers attempt to create various “profit Windows” (see Zerdick *et al.*, 2001, p. 70 et sequation ) or utilization windows (therefore: Windowing) to tap the full potential as optimally as possible. If the providers did not graduate their offers, cannibalization effects would occur. Many customers would no longer go to the movies, but would rent a DVD forthwith. However, if the customer has to wait a long time for the attractively priced DVD, then he/she will also be prepared to pay the admission charge for a movie showing. Therefore, a considerable interval lies between the individual windows. This can be recognized well in Figure 2. The free-TV offers are ordered right at the end of the exploitation chain, because here are the customers with the least willingness to pay. They must however, wait the longest for the cost-free broadcasting which is financed by advertising. The higher the risk of cannibalization, the more distinctly the utilization windows have to be separated from each other and must be planned without temporal overlapping.

### Versioning

Product offers with different combinations of price and product features already go way back (Pigou, 1929). Only in recent times was this 2nd degree price discrimination form from Varian (1997) referred to more descriptively as versioning and for information goods extensively discussed. As with windowing, versioning is until now, still not recognized in general pricing literature and remains reserved for special literature about information goods (e.g. Shapiro and Varian, 1999; Buxmann *et al.*, 2008).

With versioning the corporation offers its product in various versions and leaves it up to the customer to select the suitable one for him/herself (see Shapiro and Varian, 1999, p. 61). The aim for the corporation is to design its offers incurring as little expense as possible, so that on the one hand, the customer requirements are fulfilled as precisely as possible and on the other hand that the requested price matches the customers willingness to pay.

What is the best way to proceed for a supplier of information goods? For information providers, producing various versions is fundamentally very simple, when the product, e.g. a mail program, a company data base or a communications portal, is established, it is very easy to produce “slimmed down” versions at low cost.

How many versions should one's customers be offered? Theoretically, one could produce an individual version at a negligible versioning cost for each customer, with which one would achieve the price strategic ideal case for complete price discrimination. Too many product versions only lead to confusion for the customers and are therefore not advisable. The market must be able to clearly recognize the performance differences in order to make their purchasing decisions. If the

Figure 1 Types of price discrimination

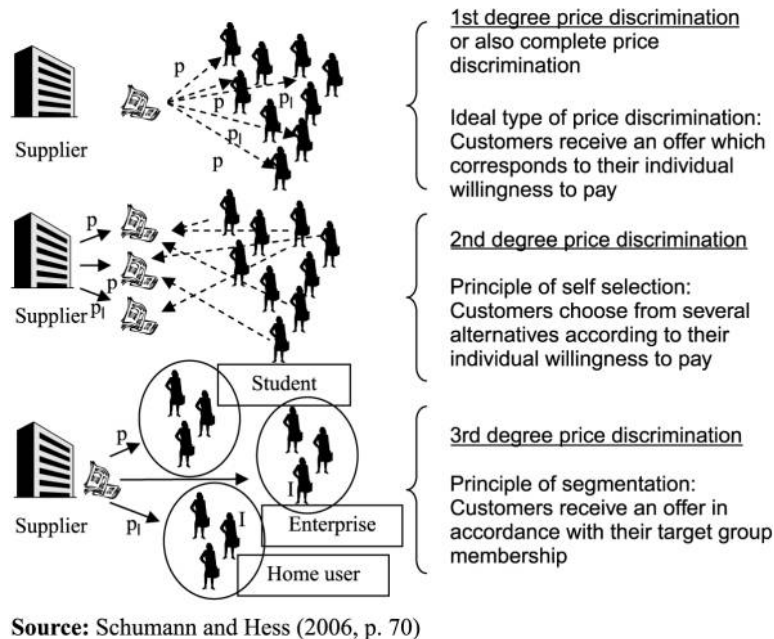
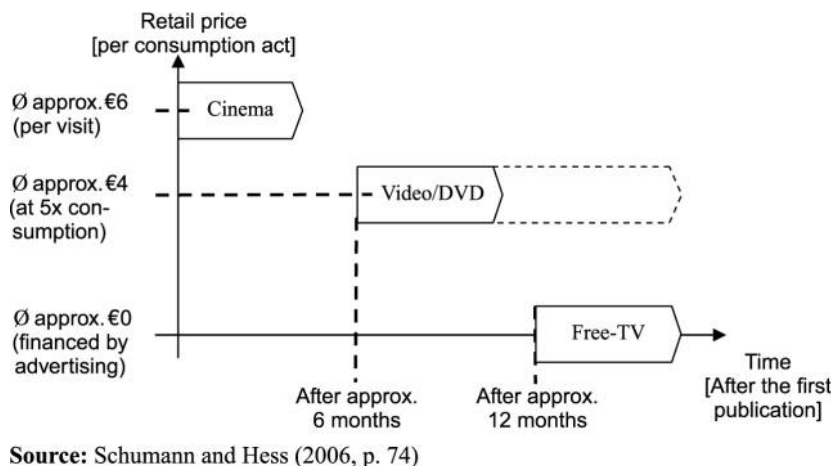


Figure 2 Willingness to pay for different types of offers for a film



difference is not sufficiently perceptible, the hazards are that the higher-value offers are not recognized as such by the customer and are thus not purchased. There are several empirical studies, according to which at least three versions should generally be offered (see Stahl, 2005, p. 190). At least three versions, as customers tend towards the middle, avoiding extremes. If customers only have a choice of two offers, they frequently decide in favor of the more reasonably priced one. On the other hand, if there is an extra High-end-, Gold-, Maxi- or Premium-Version this promotes the purchase of the middle one – erstwhile the most expensive version. With the introduction of a third, high-quality version it is not necessarily about selling these in large quantities, this however, changes the perception of the customers regarding the more favorable versions and encourages low-end buyers to decide in favor of the higher-value (medium) product. Thereby, the products in the middle attain acceptability.

Indeed, many information offers are found in exactly three versions, e.g. with tax programs, such as, Lexware with Basis, deluxe and Home&Business or, also with Adobe-products with the differentiation of Standard, Professional and 3D.

Versioning can be performed in various cost-effective ways which are depicted in Table I.

### Bundling

An additional type of price discrimination is Bundling. Two or more goods are combined to create one single offer and are sold as a package or set for an all round price (see, e.g. Monroe, 2003, p. 409). Among economists it is well known that a multi-product monopolist can use bundling as an effective way to increase his/her profits when limited information about individual consumer preferences is available. Adams and Yellen (1976) comprehensively examined this strategy of pricing for the first time. Later

Table I Types of versioning

Possible types of versioning	Characteristics of versioning	Practical examples
Up-to-dateness	Immediate access or delayed	Onvista: Stock exchange information real-time or with time delay (www.onvista.de) Eco-Test: Price according to age of test (www.oekotest.de)
Availability of the information	Unimedial or multimedial access options	Falk: Routes and maps as a printout or as an e-mail (www.falk.de) Lexis-Nexis Databases: On-Screen or also as a download (www.lexisnexis.de) Database access On-campus or also Off-campus
Scope of work	Few or many functionalities Information content	Adobe Photo Shop CS3 or CS3 extended with many additional functionalities (www.adobe.de) OpenBC/Xing: Comprehensive research possibilities in the Premium-Version (www.Xing.com) Dialogue web vs DataStar with a different content of background information (www.dialog.com) Abstract. vs. Fulltext of market research
Perception-friendliness	Low or high resolution	Fotolia: Price grading depending on the pixel size (de.fotolia.com)
Processing speed	Low or high speed	Mathematica: Design of the symbolic, graphic and numerical operations in different calculation speeds (www.wolfram.com)

works stem from among others, Schmalensee (1984), McAfee *et al.* (1989) and Armstrong (1999).

The central concern of bundling is to reduce the valuation and thus reduce the consumers' willingness to pay for an item in comparison with the retail sale. Bundling is a worthwhile variant of price discrimination, especially for digital information goods, as the marginal costs for the addition of further goods to a bundle are of negligible value. On the other hand, it has been empirically shown, that with increasing marginal costs, e.g. with information offers via data carriers such as video cassettes or DVDs, but also for physical goods, bundling becomes less attractive (see Bakos and Brynjolfsson, 1999, p. 1626). Various kinds of bundling can be differentiated (e.g. Schmalensee, 1984):

- With "pure bundling" there are only product packages with several components. This is, e.g. the usual procedure with newspapers and magazines, as it is not possible to purchase individual articles but only the entire issue.
- The counter example is "unbundling", which is, strictly speaking, not bundling at all. Here, the goods are only sold individually. This approach is however interesting because in the meantime individual goods are frequently offered, which were formerly, solely available in a package. The download offers for individual music titles (formerly only entire cassettes, LPs, CDs) or individual press articles should be particularly mentioned here.
- With "mixed bundling" both variants are at the customers' disposal. It is possible to purchase both the package and the individual offer. Mixed bundling can frequently be found by software when, as in the case of Microsoft Office, the individual programs are offered separately and also, as sets for private customers, professional users or corporations.

By means of an example it is well demonstrated just how bundling is able to benefit from the consumers' willingness to pay. This works the better, the closer one gets to the complete price discrimination (1st degree). In order to evaluate this, the optimality conditions, presented above from Adams and Yellen should be consulted.

#### *Bundling without marginal costs*

Lets take two software programs Word and Excel and look at a customer whose willingness to pay is €40 for Excel and €140 for Word. Let us further assume that for the sale of both products each the price charged is €110. With purely unit prices, the customer would only purchase Word, because, for example, he/she is a journalist. However, he/she would not purchase Excel, as he/she could carry on invoicing at the said price by text processing. Without variable costs the supplier achieves a contribution (to fix costs) of €110. Two of the above mentioned conditions are thereby breached, as the customer does not buy Excel, although his/her willingness to pay lies above the marginal costs (Inclusion) and he/she realizes €30 consumer surplus with the purchase of Word (Extraction), as he/she is prepared to spend €140.

What would happen if the corporation changes its pricing strategy and offers a package for €180? It has to be said that the bundle price is not simply the result of the addition of the unit prices, but from an independent optimizing process based on the willingness to pay (see Olderog and Skiera, 2000, p. 140 *et seq.*). In our case the sum of the customer's willingness to pay corresponds exactly to the price for the bundle and the optimality conditions are completely fulfilled. It is easy to recognize how, due to the package offer, the transfer of consumer surplus comes into being (see Wirtz and Olderog, 2001, p. 203 *et seq.*): The customer intellectually transfers the consumer surplus existing for Word in comparison with the unit price to the lower estimated Excel. For the supplier there are contributions of €180 and there is no existing consumer surplus remaining.

If the supplier does not exactly meet the sum of the willingness to pay with his/her price, as in this example, the customer either will not buy (sum of the willingness to pay < package price) or he/she realizes a consumer surplus (sum of the willingness to pay > package price). Even if the latter is not ideal from the supplier's point of view, because the extraction condition is not satisfied, he/she can at least acquire the customers' consumer surplus transferred from one product to the other and only has to abstain from the excess part.



*Bundling with marginal costs*

What happens now, when variable costs occur, both products, for example, are offered in lavish packaging with a user guide, and the price offered cannot be increased due to the market? Recurrent variable costs immediately reduce the supplier's contributions. This becomes problematic with bundling when the marginal costs are higher than the customer's willingness to pay for one of the products in the package (Figure 3). The exclusion condition is then violated, i.e. there are customers who buy products although their willingness to pay is lower than the marginal costs. For this reason, the supplier makes losses related to the individual product. He/she can only acquire the excess consumer surplus for the higher valued product when the marginal costs for the lower valued product are lower than the accompanying willingness to pay. Otherwise, he/she must use them for the "cross-subsidization" of the exclusion infringement, in order to compensate for the difference between the willingness to pay and the marginal costs. He/she can stay the course as long as there is sufficient excess consumer surplus. If this difference by the lower valued product is larger than the compensated consumer surplus, then the contributions are affected. This is the case in Figure 3: The excess consumer surplus for Word does not suffice to compensate for the missing willingness to pay for Excel.

It can nevertheless make sense to offer with a loss, e.g. when it concerns the establishing of a network. When Sony offers its PlayStation 3 below marginal costs, the positive contributions

from the offered games would be used for cross-subsidization. The same applies to cell phone companies who mainly offer cell phones low priced only in a package with a two year contract period. The suppliers aim is to compensate for actual losses with future profits. However, it becomes obvious, that the higher the marginal costs, the more limitation for the supplier's margin. This applies to the cross-subsidization within the bundle but also for possible bundle discounts.

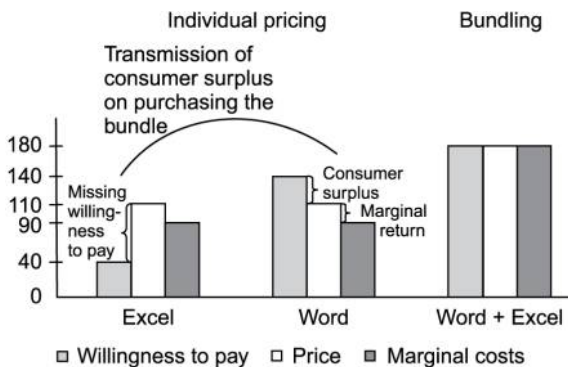
*Alternative bundling strategies*

So, which price strategy is the most advantageous: Unbundling, pure bundling or mixed bundling as a combination of the two? It can generally be assumed that mixed bundling depicts the optimum price strategy.

If we once again look at Figure 3, this statement can easily be understood. For the sake of clearness, let's assume that the marginal costs for each product are very high – €90. The supplier sets unit prices at €110 each and only sells Word to the customers (willingness to pay €140). With marginal costs of €90 each he/she then realizes a contribution of €20. With pure bundling at a package price of €180 the customer receives both products, but there are no contributions for the supplier. He/she has to expend both, the transferred consumer surplus (€30) – compared to unit prices – as well as his/her contributions (€40), in order to compensate for the lack of willingness to pay for Excel (€70). He/she turns out to be worse off than when he/she had only sold one product. If the supplier takes the mixed bundling and offers in addition to the unit price, e.g. a package price of €200, then due to the self selection possibilities he/she can increase his/her profits further. The implied customer would now decide against the bundle and only choose Word. Other customers with a willingness to pay of over €200 would purchase the bundle.

The three researched types of price discrimination are depicted and summarized in Table II.

**Figure 3** Transfer of consumer surplus



Source: Wirtz and Olderoeg (2001, p. 204)

**Summary**

Due to their special characteristics the various types of 2nd degree price discrimination can be applied particularly well to information goods. First and foremost on account of having very low marginal costs. This makes it attractive to offer them individually or in a package in the context of mixed bundling. It benefits windowing that the information contents can be very easily transferred to different formats. Also, versioning can be easily executed, as the cost of changing the original version is also low in comparison with the development costs.

**Table II** Types of 2nd degree price discrimination with information goods

Type of price discrimination (pd)	Information content (Master-copy)		Object	
	Identical	Varying	Identical	Media carrier Changing
<i>pd 2nd degree</i>				
Windowing	Unchanged original product		Changing between the different profit windows if necessary	
Versioning		Different versions of the same original product	Choice of media carrier as a type of versioning (availability of information)	
Bundling	Package offer with unchanged original products		Unchanged	

Vital here is the self-selection mechanism with the help of which the consumer discloses his/her willingness to pay through his/her product choice. Versioning like bundling supports the speedy circulation of information goods and therewith the emergence of network effects. Low priced or free introduction versions (individual or in a package with additional offers) make it easy for the customers to at least decide for a trial. At the same time, information asymmetries vanish and the user can gather his/her experience with the product.

It now becomes obvious why information providers frequently offer, in context with price discrimination, low price and often free goods. With very low priced offers they are trying to persuade customers with a low willingness to pay to make a purchase. However, completely free offers which should appeal to customers without willingness to pay, work on a slightly different logic. They are an inherent part of windowing and also frequently versioning. If, by windowing, films are broadcasted in the last profit window, e.g. films shown on free TV, then the customers' consumer surplus is entirely forgone and is replaced by revenues from advertisements in combination with the film. Also with versioning, the offer of free information goods goes hand in hand with forgoing consumer surplus. The supplier then also connects these with advertising or assumes that the user will get used to the product expecting that he/she will purchase a high quality version at a later date.

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