Bookshop, blockbusters and readers' tastes: a new appraisal of the fixed book price

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Abstract

This paper models the book retail market as a dual market. Consumers choose between competitively retailed, well-identified blockbusters and going to a monopoly bookshop to find the best match for their tastes. I show that uncertainty about the status on a given title (will it be a blockbuster or not?) places publishers in front of a trade-off between low prices (valuable if they get a blockbuster) and high prices (in the other case). The main effect of this trade-off is that the presence of blockbusters almost never lead to bookshop foreclosure by blockbusters and that a higher number of blockbusters leads to lower price for all books and increased consumer surplus. A fixed book price mitigates the effects of blockbuster, transferring suplus from blockbuster byuers towards publishers, and leads to perfect matching between readers and tastes. When the number of titles and of blockbusters becomes largers however, the situations with and without FBP converge.

Keywords: books, fixed book price

JEL: L11, L42, Z11

1 Introduction

A Fixed Book Price agreement (FBP) amounts to no more than a resale price management of books prices by publishers. However, the FBP has been endowed with such cultural merits that, as Canoy, van der Ploeg, and van Ours (2006) put it, its alleged importance "have reached almost mythical proportions"[1], and is part to any debate in Europe about the cultural properties of books.

The main rationale for FBP is that retailers need fairly large retail margins in order to stock a great number of titles, many of whom will make few or no sales. With blockbusters making up a disproportionately large part of sales, price competition on successful titles eats up retailers profits, and make them unable to bear the cost of a large inventory. This, the argument goes, would lead bookshops to close down, thus dramaticallty reducing publishing diversity to the sole blockbusters. By maintaining a dense network of well-stocked bookshops, the FBP is said to preserve a wide array of available titles, without which potential readers would turn away form reading. This policy tool has gained a wide acceptance in the book industry in most countries it concerns (see Rouet (2007)), and even the cartel-wary European Commission allows it as long as

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[1]Canoy, van der Ploeg, and van Ours (2006), p. 743.

it does not cross borders of members States. Form the policymaker point of view, the FBP also has the tremendous advantage of incurring no direct public spending, thus seemingly costless.

Opponents of the FPB argue that in countries without FBP, the book market functions well enough, both in terms of publishing diversity and of reading behaviors. Thus, without a clear market failure, public intervention in the book market is unwarranted, except in funding the production of high-brown titles of exceptional cultural value but few readers.As any RPM device, RPM is suspected to entail a higher price for books, which means poorer readers may be excluded and on average a regressive subsidy from average blockbuster readers towards arguably richer high-brown, low-sales readers. International comparisons[2] show that the FBP does not appear to have a lagre impact on the average price of books. It does, however, increase the price of blockbusters and decrease that of all other books.

Surprisingly enough, both sides have made little use of the theoretical literature about RPM. The most common reference is to Telser (1960) and its tangible presale services notion: information about a book being a public good, discounters could free-ride on information provided by regular bookshop, who could not recoup the cost of acquiring this information. This insight is more fully developed by Perry and Porter (1990) in a setup of monopolistic competition, and provides some solid ground for the FBP if the informational externality is large enough. More support can also be found on Deneckere, Marvel, and Peck (1996) and Deneckere, Marvel, and Peck (1997), who demonstrate that a RPM, by mitigating price competition, increases equilibrium inventories of goods whose demands is learned after inventory decisions have been made.

On the other side of the arguments, critic of the FBP point to the already high number of available books, which hints to the possibility of excessive diversity, as decribed by Dixit and Stiglitz (1977). Rey and Tirole (1986) also demonstrated that as a tool to align retailer and producer incentives, RPM was dominated by other, more accepted, forms of vertical restraints. Critics also underline the fact that RPM gives the publisher full monopoly power, with the corresponding welfare loss.

While all those contributions help shed some light on the effect of the RMP, the relative weight to give to each insight is unclear. Few papers have tried to delineate how each effect interacts with the specificities of the book market: great product diversity but monopolistic competition, product and consumer uncertainty to give only the prominent points. To this day, the main contribution of this kind is van der Ploeg (2004), which deals with the optimal number of varieties problem.[3] In his paper, Ploeg compares a perfectly competitive equilibrium, where all titles are priced at marginal cost, to a monopolistically competitive equilibrium (allowed by FBP), where each publisher monopoly power is characrerized by the price and substitutions elasticities of demand for his title. In this setup, the FBP increases publishing profitability, and hence the number of books that are profitable enough to be published. However, the FBP also entails a net welfare loss due to higher prices and inframarginal books (low-demand books) being published, at a fixed cost. This loss is greater when elasticities of substitution beteween books are low and price elasticity is low. The former are in general quite high, except for blockbusters (see Bittlingmayer (1992)). The latter is not empirically known with precision (evaluations range from -0.6 to -1.4[4]), but Ploeg argues that list price is only a small fraction of the actual price of reading a book, which inclues the opportunity cost of the time spent reading. Since this opportunity cost does not vary with the introduction of a FBP, the list price elasticity will be small, and the welfare loss large.

The present papers aims to show how diversity considerations interact with product uncer-

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[2]See Fishwick (2005) and Ringstad (2004) for such reviews.

[3]The essential features of the model are also presented in Canoy, van der Ploeg, and van Ours (2006).

[4] see Ecalle (1988), de Grauwe and Gielens (1993), van Ours (1990), Appelman and van der Broek (2002), Hjorth-Andersen (2000) and Ringstad and Løyland (2006)

tainty. Because books are pure experience goods, one learns her valuation of a given title only with the act of reading it, and information about the match between one's tastes and a given book is hard to come by. Symmetrically, many titles have the ability to cater to a very large audience, but only a few end up doing so.[5] The reader thus needs knowledgeable advice in order to find a book that suits her tastes, and the publishers need someone to provide that intermediation service. Because they are supposed to know the books they sell, traditional booksellers are able to do that match between any given reader and the book that will suit her tastes. On the other hand, discount bookstores, department stores and so on, who only put books on shelves, do not provide much in the way of useful information. For some books, the blockbusters, press exceprts and word-of-mouth allow to overcome the uncertainty problems.

To address this situation, I model the retail book market as a dual, horizontally differenciated one. From retailers' and consumers' point of view, the book market is broken down into two interdependent market, represented as two Salop circle. On the first one stand the blockbusters, whose location is knows, and on the other one all other titles at locations unknown to consumers. Consistently with the argument above, blockbusters are sold by competitive retailers (department stores, newagents,...) that carry books as one among many commodities, pick only well-known books, and cannot provide information reliable information about their conformity to anyone's tastes. Non-blockbuster books are sold by monopoly bookshop, which is able to match a consumer with the closest book. In order to stay as close as possible to the argument above, I assume that the bookshop does not try to cheat consumers away from their best match. From the publishers' point of view, the picture is rather different. Upon publishing a books, a publisher does not know if it will end on the blockbuster or on the non-blockbuster market (again, see Caves (2002)) and must set his wolesale price before this uncertainted is resolved.

This setup leads to three main findings. Firstly, proponents of the FBP underline the fear that the prominent share of blockbuster and blockbuster-oriented policy (e. g. pricing titles betting on the idea they will be blockbusters) will squeeze bookshops' profit margin to the point of driving him out of business. Exit from the blockbuster would lead to an average bad matching between titles and tastes, and to a dramatic reduction of the number of titles actually read. We show that even the combination of a large price advantage and perfect information about blockbusters do not lead to foreclose the bookshop except for very low utilities of reading. The key idea behind this result is that as long as the same wholesale price is charged to all retailers, the bookshop can always cut his price to attract consumers further away from the blockbuster and earn positive profits.

Secondly, I show that the core trade-off for the publisher is between setting a low price in order to capture more demand when a blockbuster and setting a high price, since demand for non-blockbuster do not respond much to individual price variations. Comparative statics show that an increase of the number of blockbuster gives a stronger incentive for publishers to reduce wholesale pricing. Such reduction benefits the publishers who end up with a blockbuster, the bookshop (who gets a larger margin) and consumers closer to the blockbusters. At some point, all publishers gain from the phenomenon, through lower bookshop prices, while the bookshop and consumers loose some of the previous benefits. When the number of blockbusters is large enough however, competition between publishers drive prices down and consumer surplus up. When both the total number of titles and the number of blockbuster is large, consumers get all available surplus. Here again, the *ex ante* ignorance of the final status of their title leads the publishers to this trade off between the two (full-information) pricing policies, balancing towards lower prices whent the odds of getting a blockbuster get higher. Variation of profits and surplus are driven by the fact that when blockbusters are few, the odds of getting one are low, and the optimal pricing policy for the publishers and the bookshop is to price up to consumers'

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[5]Caves (2002) uses the phrase "Nobody knows" to label this property, which is common to most cultural goods.

reserve price. Lower wholesale prices and competition from blockbuster progressiveley nudge the bookshop away from this high price, leading to an higher consumer surplus.

Thirdly, a fixed book price do not significantly change market outcomes. Its overall effect is to slow down (but not stop) the general price decrease as the number of blockbuster grows. The FBP leads to the documented increase of blockbuster prices and decrease of non-blockbusters, while the bookshop's margins are reduced to zero. In terms of profits and surplus, the FBP lowers consumer surplus and increases publishers profits, but when the number of titles and of blockbusters is large, consumers still get all available surplus. On the bottom line, this model hints that the FBP can be a good transitionnal response to fears of destabilization of the retail book market by blockbusters. In the long run, assuming that the number of titles and the number of blockbuster increase, the effects of the FBP become less interesting. Therefore, the FBP may not be worth any more its prominent place in the debate about cultural policy.

2 The model

2.1 Outline

The market for books is a dual one. On one side, some titles stand out. Everyone knows them and has an idea of how well they fit one's tastes. On the other side stand a vast number of titles on which precious little information ca be found. I model this dualism by two circles of unit circonference, which represent consumers' tastes. The first one is the "blockbuster" circle. On this circle stand m well-known titles, uniformly distributed, whose location is common knowledge. On the other circle stand $n - m$ titles, also uniformly distributed, whose location is unknown. Titles are published by n different publishers, at a cost normalized to zero.

The two markets also correspond to two types of retailers. Blockbusters are competitively retailed, while the other books can only be found in a monopoly bookshop.

Explanations of the blockbuster phenomenon[6] usually involves a mix of vertical differenciation (where "quality" is the capacity if a title to attract many readers) and of informational cascades. In this setup, I abstract from "quality" issues to focus on how availability of information about one or several titles interact with market structure to skew sales in favor of exposed titles. In what follows, "blockbuster" is used as a shorthand to speak of titles which, for some exogeneous reason, got media (radio, television, internet,...) exposure, and about which enough information is available. This information allows the prospective reader to know of far each of those titles lie from her personal taste.

Readers There is a unit mass of risk-neutral readers represented by a common utility u from reading a book, and by a couple of by a taste (location) parameter (x_1, x_2), denoting their location on each circle. These two parameters are assumed to be independent and uniformly distributed. This hypothesis hinges on the idea that the blockbuster do not cover all genres and subgenres of books. Assume that a reader likes history books and latin american litterature. Her favorite book on the blockbuster circle may be an essay on history, while there may be a latin american book in an historical setting perfectly suiting her tastes on the second circle. Arguably, demands for the two books are not directly correlated in general and this trade-off is idiosyncratic.

Readers' utility is linear with the price charged, and subject to linear transportation cost from their tastes to the location of the book they buy on the circle. Hence, the utility of reader

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[6]Blockbusters are to books what stars are to movie players and the litterature stemming from Rosen (1981) applies.

x eventually buying book i located at x_i for a price p is :

$$u(x, x_i, p) = u - p - t|x - x_i| \qquad (2.1)$$

Readers have a unit demand, that is they buy at most one book. It should be noted that I do not restrict to the case where u is large enough to ensure full consumer participation. I assume, however, that u is such that one title is not enough to cover the whole market at any price, which leads to the restriction of the parameter space $u \in \left[\frac{t}{4n}, \frac{t}{2}\right]$.

Consumers also face an information problem. While they know their location on each circle, they have no information about the location of non-blockbuster circle, and are at a loss when it comes to evaluate the distance between a given title and their tastes.

Books A publisher produces only one book. All books are *ex ante* identical. By a process over which the publisher has no control, $m \ll n$ books get elevated to a "blockbuster" status. Their location becomes common knowledge, and they are stocked by competitive retailers. Other books are uniformly distributed on the other circle. Until late in the game, the publisher ignores which book will be the blockbuster and where any given title will lie. The publisher thus has little information when he sets his wholesale prices w. I thereby model what Caves (2002) calls the *nobody knows* property of cultural goods[7]. The main consequence of this property in this model is to rule out complex pricing strategies where the publisher nedds to know precisely which book is neighbour to which one.

Outlets Books are sold by two types of retailers. The first type is the regular, brick-and-mortar, local bookshop. It carries a wide array of books, has a knowledgeable staff and enjoys a (local) monopoly position. The second, which I label "discounters" are non-specialized retailers. Unlike the regular bookshops, they have no territorial advantage, and hence compete in price with each other.

The bookshop The first type of retailer is represented by a single, monopoly bookshop. This bookshop chooses which books go to his shelves and the final price for each book. He has access to a technology that allows to match any given reader to the book closest to his or her tastes. Access to this matching technology entails no marginal cost. Notice that this technology does not allow to know the exact distance between a reader and her closest match: the bookseller only know in which half of a $\left[\frac{i}{n-m}, \frac{i+1}{n-m}\right]$ interval the reader is (that is, he learns i and in which half the reader is). Thus, the bookshop cannot use this information to price-discriminate between readers of a same title. Books being an experience good, the reader will hence know the exact distance between her tastes and the book only after purchasing and reading the book. I assume that the bookshop to always truthfully reveal the information he has about the location of any reader and title.

Discounters Discounters are stores for which selling book is only a marginal part of their activity. Supermarkets, department stores and newsagents spring to mind. Those stores provide only a handful of titles, often those which have been subject to significant media exposure, easy-selling books by well-known writers. They cannot provide the prospective reader with more than what is already common knowledge about those titles. On the price side however, it has been

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[7]Namely, the success (in terms if sales) of a given book is very difficult to forecast before the book is printed and effectively hits the shelves, and being the author or the publisher does not help much to relieve this uncertainty. This goes much further than a simple experience good property, since the publisher himself must act under this uncertainty, and has no informational advantage over the prospective reader.

observed that those retailers commonly use books as advertisement goods or loss-leaders in order to attract customers who will buy other products at the same time. Altough I abstract from this behaviour, I assume that those discounters are price *à la Bertrand* over the titles they carry.

Market organization and timing Publishers first choose simultaneously their wholesale prices $w_1, \ldots, w_n$. Nature then picks up m titles uniformly distributed to be "blockbusters", the identity and location of those titles becoming common knowledge. With this information, the bookshop chooses which title he takes and sets the final price of each of these titles. Consumers then choose either to buy a book or not, and the outlet they will go to.

Equilibirum definition Due the intristic symmetry of the model, I focus on symmetric equilibra. An equilibrium is then given by a uniform wholesale price w, the number of titles carried by the bookshop l and a uniform final price p.

2.2 A Bookshop Business

First assume that $m = 0$: there are no blockbusters and no discounters are active. All books are then sold by a monopoly bookshop. In this situation, the only symmetric equilibirum saturates reader's participation constraint and leaves no profit for the bookshop.

Proposition 2.1 (Bookshop business)**.** *When there are no blockbusters, the only symmetric equilibrium is:*

$$p = w = u - \frac{t}{4n}$$

Proof. This proof follows three steps. First I show that the bookshop is willing to take all n titles. Then I show that the bookshop will not exclude a publisher who sets his price slightly above other publishers'. The possibility of this upwards price deviation drives all prices up to consumers' participation contraint.

Assume that the bookshop takes $l \leqslant n$ titles. Since all consumers are *ex ante* identical, their participation decisions are of an all-or-nothing kind. They either all go buy a book, if $p \leqslant u - \frac{t}{4l}$) or all abstain. Hence, a bookshop featuring l titles maximises his profit by setting a price $p = u - \frac{t}{4l}$ saturating consumers' participation constraint. Thus, the price he can charge is increasing in the number of books, providing him whith an incentive to take all available books.

Now, consider a unilateral deviation w_i of publisher i from a uniform wholesale price w. As long as $w \leqslant u - \frac{t}{4(n-1)}$, the bookshop finds profitable to stock all titles priced w. Because of the truthful matching assumption, market share are identical for all titles. A change in w_i thus does not impact i's market share as long as he does not get excluded by the bookshop: i has no incentive to lower his price, but can try to set an higher price than other publishers. More specifically i can set w_i high enough that he captures the marginal benefit for the bookshop to take his title, that is $\frac{t}{4(n-1)}$.

Each publisher can thus safely increase slightly his price as long as the bookshop benefits from having one more title. This benefit exists as long as $w < u - \frac{t}{4n}$, since the bookshop either makes some profit by taking i, or cannot profitably face positive demand. Consumers' participation constraint gives a bound to the possible price increase and leads to the only symmetric equilibrium. $\qquad \square$

At equilibrium, the bookshop makes zero profit, the consumers have zero expected surplus, and the publishers share all available profits.

2.3 Market with blockbusters

Now assume that Nature picks up $m > 1$ blockbusters among the available titles.[8] Each publisher has a chance m/N of getting a blockbuster status for his title. The fact that blockbusters' locations are common knowledge and them being competitively retailed alters publisher's incentives. Competitive retailing means that the publisher of a blockbuster can gain market share by lowering its wholesale price below the price charged by the bookshop. This strategy, however, reduces his profits in the event he does not get a blockbuster.

This section delineates the main features of this trade-off, and shows that depending of the values of u and m, different equilibrium situation can occur.

Consumer choice   A consumer has three options: buying a blockbuster, going to the bookstore or not buying a book altogether. Let $x \in [0, \frac{1}{2m}]$ denote the distance between a consumer and the nearest blockbuster. This consumer buys the blockbuster if the blockbuster provides him with a surplus greater than his expected surplus from buying a book at the bookshop, that is:

$$x \leqslant \frac{1}{t}(p - w) + \frac{1}{4(n - m)}$$

which gives half the market share of each blockbuster. In what follows, $d(w, p) = \frac{1}{t}(p - w) + \frac{1}{4(n-m)}$ will denote this half market share. On the other hand, if $x \geqslant \frac{1}{t}(p - w) + \frac{1}{4(n-m}$ and $u - p - \frac{t}{4(n-m)} \geqslant 0$, the consumers buys a book at the bookshop.

2.3.1 Can publishers profitably foreclose bookshops ?

As I said before, one of the main motivations for the fixed book price was the fear that the presence of blockbusters would automatically foreclose the booshop. This would be true if pricing strategies remained identical to the $m = 0$ case. Here, I show that complete bookshop foreclusion in fact almost never occurs in this setup.

Proposition 2.2 (Bookshop foreclusion). *Bookshop foreclusion occurs at equilibrium only if* $u \in \left[\frac{t}{2n}, \frac{t}{2(n-m)} \right]$. *When the bookshop is foreclosed, only a fraction of the market is served.*

Proof. As long as w is lower than consumers' participation constraint, the bookshop can sell his titles at the same price as the blockbusters. At such price levels, bookshop foreclosure is therefore impossible, consumers further away from the blockbuster being better off going to the bookshop because of transportation costs. Hence, $w > u - \frac{t}{4(n-m)}$ is a necessary condition for bookshop foreclosure.

When $w > u - \frac{t}{4(n-m)}$, two scenarios can occur, depending on the value of u. When u is low, demands for blockbuster may not meet each other, making each blockbuster publisher a local monopoly. When u is large enough, demands will meet each other at the equilibrium price, leading to a usual symmetric Salop competition.

In the first case, all publisher set the local monopoly price $w = \frac{u}{2}$. That price is consistent with separate demands and bookshop exclusion when $u \leqslant \frac{t}{2(n-m)}$. Bookshop exclusion this occurs when $u \in \left[\frac{t}{2n}, \frac{t}{2(n-m)} \right]$.

In the second case, blockbusters capture the whole demand. Consider $(n - 1)$ publishers setting price w and publisher i setting w_i. The latter besst response to w is given by:

$$\max_{w_i} \left\{ w_i \frac{m}{n} \left(\frac{1}{t}(w - w_i) + \frac{1}{m} \right) \right\}$$

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[8]The case $m = 1$ will be dealt with later.

which leads to an equilibrium symmetric price $w = t/m$. This price forecloses the bookshop if $u \leqslant \frac{t}{m} + \frac{t}{2(n-m)}$ and is consistent with market coverage if $u \geqslant \frac{3t}{2m}$. These two conditions can never be simultaneously statisfied for $n \geqslant m$. □

The rationale of the proof is fairly simple: in order to extract more profit from a blockbuster position, a publisher would like to decrease his price relative to the non-blockbuster situation, since he can thus expand his market share. By doing so however, he relaxes the constraint set upon the bookshop' price, enabling the latter to cut his own price enough to capture some of the demand farther away from the blockbusters. The following paragraphs demonstrate how this leads very strict conditions for such an equilibrium to exist.

Proposition 2.2 shows that for $u \geqslant \frac{t}{2(n-m)}$, the publishers will never find profitable to set a wholesale price higher than consumers' participation constraint. As a result, the bookshop can always set a price such that he faces a positive demand.

2.3.2 Bookshop price and market share

In this section, I consider how the bookshop reacts to a deviation by publisher i from a uniform w proposed by all other publishers. Since the bookshop sets his price after the identity of the blockbusters are known, his reaction will differ depending on i getting a blockbuster or not. Since I focus on symmetric equilibria, I consider in what follows small deviation of w_i around a price w charged by all $(n - 1)$ other publishers. Specifically, this means i does not set w_i low enough to capture all consumers between i's location and the two neighbouring bockbuster.

When i is a blockbuster When i is a blockbuster the choice of w_i has an impact on the bookshop's market share. Since the bookshop cannot exclude i, his only choice is to set his profit-maximizing price with respect to consumers' participation constraint.

Lemma 2.1. *When i is a blockbuster, the bookshop charges price p_1:*

$$p_1 = \min \left\{ w - \frac{w - w_i}{2m} + t \frac{2n - 3m}{8m(n-m)}, u - \frac{t}{4(n-m)} \right\} \tag{2.2}$$

Proof. The bookshop's program is:

$$\max_p \left\{ (p - w) \left(1 - 2 \left((m-1)d(w,p) + d(w_i,p) \right) \right) \right\} \tag{2.3}$$

It leads to the unconstrained profit-maximizing price:

$$p = w - \frac{w - w_i}{2m} + t \frac{2n - 3m}{8m(n-m)}. \tag{2.4}$$

And the constraint is $p \leqslant u - \frac{t}{4(n-m)}$. The bookshop can set this price without violating readers' participation constraint if w and w_i are low enough, that is

$$w - \frac{w - w_i}{2m} + t \frac{2n - 3m}{8m(n-m)} \leqslant u - \frac{t}{4(n-m)} \tag{2.5}$$

□

This equation fully characterize the bookshop response to a unilateral deviation and the conditions upon which such reaction is possible.

i **is not a blockbuster**   When i's title is not a blockbuster, the bookshop has two decision variables: whether or not to propose i's title, and the final price of the books he sells.

Lemma 2.2. *For small variations of w_i, the bookshop never finds profitable not to carry publisher i's title.*

Proof. See Appendix A.1.   □

The intution of the proof is identical to the case without blockbusters (proposition 2.1): as long as consumers' participation constraint is not biting for the publishers, there exists a small increase of w_i over w that is smaller than the marginal increase of bookshop's benefit of carrying i's title.

Lemma 2.3. *When i is not a blockbuster, the bookshop charges price p_2:*

$$p_2 = \min \left\{ w - \frac{w - w_i}{2(n - m)} + t\frac{2n - 3m}{8m(n - m)}, u - \frac{t}{4(n - m)} \right\} \tag{2.6}$$

Proof. When i is not a blockbuster, the bookshop profit-maximisation program is:

$$\max_p \left\{ (1 - 2md(w, p)) \left(p - \frac{1}{n - m}w_i + \frac{n - m - 1}{n - m}w \right) \right\}$$

subject to the constraint:

$$p \leqslant u - \frac{t}{4(n - m)}$$

Now, the unconstrainded profit-maximizing price in this case is:

$$p_2 = w - \frac{w - w_i}{2(n - m)} + t\frac{2n - 3m}{8m(n - m)}$$

The bookshop can set this price without hitting consumers' participation constraint if:

$$w - \frac{w - w_i}{2(n - m)} + t\frac{2n - 3m}{8m(n - m)} \leqslant u - \frac{t}{4(n - m)} \tag{2.7}$$

□

Prices and constraint   Before going any further, a few things shoul be noted. First, when $w_i = w$, prices p_1 and p_2 are equal, which means constraints (2.5) and (2.7) are equivalent. At a symmetric equilibrium, then, either both are biting or both are not. Second, at a symmetric equilibrium candidate, those prices are greater than w when $m < \frac{2}{3}m$. Since my baseline is $n \gg m$, I assume that this condition is satisfied.

When $w_i \neq w$, a wedge opens between the two constraints. If $m < \frac{1}{2}n$, p_1 reacts more to a change in w_i than p_2. When i gets a blockbuster (p_1 case), a variation in w_i affects bookshop's profits through i's market share. When i does not get a blockbuster (p_2 case), a variation in w_i impacts a fraction $\frac{1}{n-m}$ of the bookshop's market share. If m is small relative to n, the latter fraction is small relative to the variation of total market share caused by i.

As w_i increases, p_1 increases more than p_2, and constraint (2.5) bites quicker than constraint (2.7). This leads to three possible situations:

1. The bookshop can fix his unconstrained profit-maximizing price when i gets a blockbuster as well as when he does not: (2.5) is not biting (which implies (2.7) is also not biting).

2. The bookshop is constrained when i gets a blockbuster, but not when i gets a regular title: (2.5) is biting and (2.7) is not.

3. The bookshop is constrained is both cases: (2.7) is biting (which implies (2.5) also does).

Because the second situation occurs only when a w_i is different from w, it will never arise at a symmetric equilibrium. Depending on other publishers' prices, publisher i can thus be confronted with those two outcomes: setting an w_i such that the bookshop is constrained in both his prices or such that no constraint is relevant. In what follows, I deal with these three case in turn and show that for a given couple (u, m), there is only one equilibrium price.

2.3.3 Publishers' strategy

In what follows, I first consider the case where the bookshop is price-constrained, then the case where no constraint bites.

Price-constrained bookshop   Assume for this section that w is such that constraints (2.7) and (2.5) are both biting, and consider a small variation of w_i that do not affect that. Then, if u is low enough, there exists a symmetric equilibrium to the wholesale pricing game.

Proposition 2.3. *When $u \leqslant \frac{t(6n-5m)}{8m(n-m)}$, there exists a symmetric equilibrium where the bookshop pricing decision is constrained by consumers' participation decision. Bookshop price is then $p_c = u - \frac{t}{4(n-m)}$ and equilibrium wholesale pricing is:*

- $w_{cc} = u - \frac{t}{4(n-m)}$ *if* $u \in \left[\frac{t}{4n}, \frac{t(2n-m)}{4m(n-m)} \right]$

- $w_c = \frac{t}{2m}$ *if* $u \in \left[\frac{t(2n-m)}{4m(n-m)}, \frac{t(6n-5m)}{8m(n-m)} \right]$

Proof. By definition, a price-constrained bookshop must set a price $p_c = u - \frac{t}{4(n-m)}$. Publisher i's profit maximization program is then:

$$\max_{w_i} \left\{ w_i \left(\frac{n-m}{n} \frac{1}{n-m} \left(1 - 2md(w, p_c) \right) + \frac{m}{n} 2d(w_i, p_c) \right) \right\}$$

The profit maximizing w_i is then $w_i = \frac{w}{2} + \frac{t}{4m}$, which corresponds to a symmetric equilibrium candidate w_c:

$$w_c = \frac{t}{2m}$$

This candidate is consistent with a price constrained-bookshop if constraint (2.7) is biting, that is:

$$u \leqslant \frac{t(6n-5m)}{8m(n-m)}$$

Moreover, for low values of u, consumers' participation constraint becomes biting also for publishers, as $u - w_c - \frac{t}{4(n-m)}$ becomes negative. This happens when:

$$u \leqslant \frac{t(2n-m)}{4m(n-m)}$$

It is worth noticing that the case $m = 0$ fully falls into this case. $\qquad\square$

The main intuition behind this type of equilbria is that the main incentive for a publisher to lower his price is to reap more benefits from getting a blockbuster. When a given title is not a blockbuster, its share of the blockbuster demand is fixed, and its wholesale price impacts its demand only through its effect on the bookshop price. This provides incentives for high wholesale prices. On the other hand, when a title is a blockbuster, a price cut relative to the non-blockbuster level translates directly into an increase in market share and of profits. An increase in m means a higher probability of getting a blockbuster and hence more powerful incentive to reducing the wholesale price.

Price-unconstrained bookshop Now assume that w is low enough that small variations off w_i do not increase final prices enough to reach consumers' participation constraint ((2.5) is satisfied). For u high enough, there exists a wholesale price equilibrium in this case.

Proposition 2.4. *When* $u \in \left[\frac{t(8m-3)}{4m(2m-1)}, \frac{t}{4}\right]$, *there exists a symmetric equilibrium where the bookshop pricing decision is not constrained by consumers' participation decision. Bookshop price is then* $p_{nc} = w_{nc} + t\frac{2n-3m}{8m(n-m)}$ *and equilibrium wholesale pricing is* $w_{nc} \approx \frac{t(3m-1)}{2m(2m-1)}$.

Proof. When the bookshop can set his profit-maximizing price without being hit by the consumers participation constraint, publisher i profit maximization program writes:

$$\max_{w_i} \left\{ w_i \left(\frac{n-m}{n} \frac{1}{n-m} \left(1 - 2md(w, p_2)\right) + \frac{m}{n} \left(2d(w_i, p_1)\right) \right) \right\}$$

This program leads to a unique profit-maximizing w_i and a corresponding symmetric equilibrium candidate w_{nc}:

$$w_{nc} = t\frac{2n - m(6n - 7m + 3)}{4m(n - m(2(n-m)+1) - 1)}$$

This value of w_{nc} characterize an equilibrium as long as it is consistent with constraint (2.5), that is:

$$u \geqslant \frac{t(2n^2(8m-3) - n(32m^2 - 13m - 2) + m(16m^2 - 7m - 1))}{8m(n-m)(1 - n + m - 2n - 2m + 1)}$$

For the sake of simplicity, I consider n large enough to take the limit of the two above values when $n \to +\infty$, which give the values stated in the proposition. $\square$

The intuition of the proof is the same as before: a larger number of blockbuster induces a lower wholesale place in order to capture a larger market share when a publisher gets a blockbuster. Larger values of u sustain both a higher wholesale price and an unconstrained bookshop price.

Corner equilibrium Propositions 2.3 and 2.4 show that fot $u \in \left[\frac{t}{4n}, \frac{t(6n-5m)}{4m(n-m)}\right] \cup \left[\frac{t(8m-3)}{4m(2m-1)}, \frac{t}{4}\right]$, only one symmetric equilibrium exist. This interval being disjoint, I now show that for $u \in \left[\frac{t(6n-5m)}{4m(n-m)}, \frac{t(8m-3)}{4m(2m-1)}\right]$, the same result holds.

Proposition 2.5. *When* $u \in \left[\frac{t(6n-5m)}{4m(n-m)}, \frac{t(8m-3)}{4m(2m-1)}\right]$, *there exists an unique equilibrium to the wholesale pricing game:*

$$\overline{w} = u - t\frac{2n-m}{8m(n-m)} \tag{2.8}$$

At that equilibrium, the bookshop optimally set a price that saturates consumers' participation constraint: $p = u - \frac{t}{4(n-m)}$.
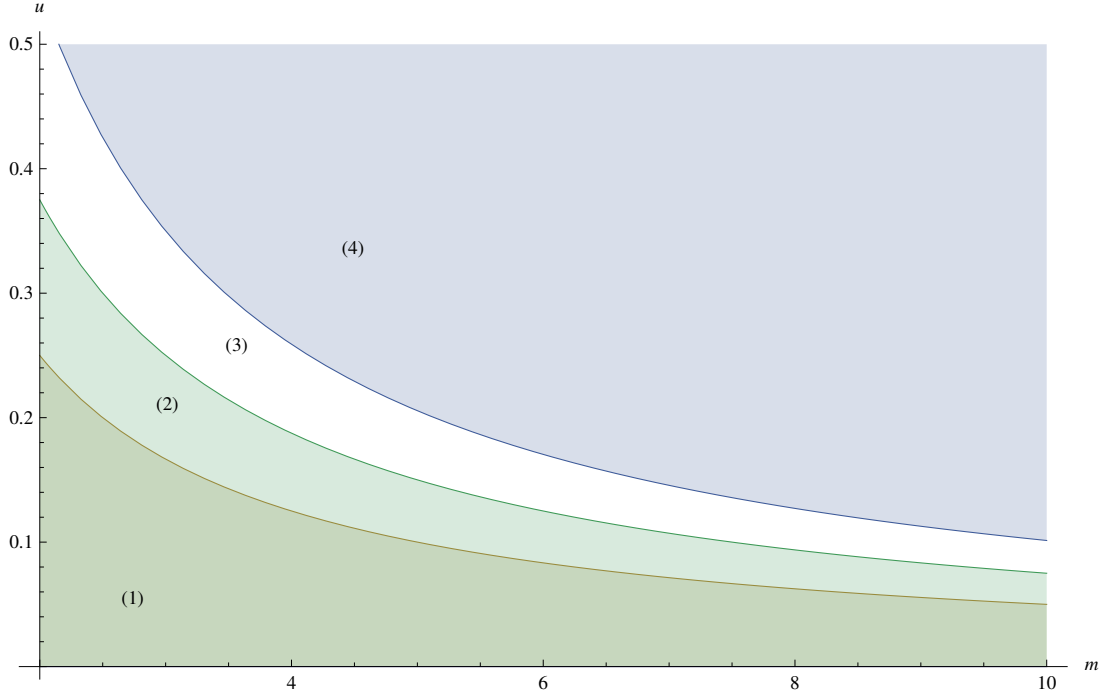
11

Figure 1: Equilibria in the (m, u) space, n large, $t = 1$.

Proof. The value $\overline{w}$ is the symmetric wholesale price such that the bookshop unconstrained profit-maximizing price reaches consumers' participation constraint: for $w < \overline{w}$, the bookshop is not price-constrained, and for $w > \overline{w}$, he is. Now, consider w_c and w_{nc}. For all $m > 1$, $w_c < w_{nc}$. Proposition 2.3 corresponds to the case $\overline{w} < w_c < w_{nc}$: for any value of $w < \overline{w}$, there exists a profitable upwards deviation. When $\overline{w}$ os reached, the profitable deviation still exits, until the equilibrium w_c is reached. Conversely, proposition 2.4 corresponds to $w_c < w_{nc} < \overline{w}$, and the same logic applies.

The case at hand is when $w_c < \overline{w} < w_{nc}$. For any $w > \overline{w}$, the bookshop is price-constrained, and the profitable deviation is downwards, towards w_c. Symmetrically, for any $w < \overline{w}$, the bookshop is not price constrained, and the deviation is upwards. Only at $w = \overline{w}$ do these two effects cancel out, thus delineating and equilibrium. □

The four types of equilibria   The three propositions above define four types of mutually exclusive equilibria, each equilibria occurring on a segment of values of u. Figure 1 sums up the four situations for n large and for $t = 1$. It should be noted that all boundaries are linear in t, so t affects this partition as a pure scale factor.

The area (1) is where consumers' participation constraint is binding for publishers as well as the bookshop. In the area (2), publishers set their equilibrium price at $w = \frac{t}{2m}$, lower than the participation constraint, and the bookshop maximizes its profit by saturating the constraint. In the area (3), the symmetric equilibrium is just on the bookshop's pricing constraint. In the area (4), equilibrium prices both correspond to the unconstrained profit-maximizing ones.

This being done, I am now able to compare the profits and surplus level in the four cases, and to assess the impact of a fixed book price.

	Area 1	Area 2	Area 3	Area 4
m	$\left[0, \frac{t}{2u}\right]$	$\left[\frac{t}{2u}, \frac{3t}{4u}\right]$	$\left[\frac{3t}{4u}, \frac{\gamma}{4u}\right]$	$\left[\frac{\gamma}{4u}, +\infty\right]$
Bookshop	0	$\nearrow \frac{u}{6}$	$\searrow \frac{tu}{2\gamma}$	$\searrow 0$
Publishers	$u \searrow$	$\searrow \frac{2u}{3}$	$\nearrow \frac{\gamma+4(u-t)}{6}$	$\searrow_* 0$
Blockbusters	$0 \rightarrow_*$	$\nearrow \frac{u}{3}$	$\nearrow_* \frac{\gamma+4(u-t)}{12}$	$\searrow_* 0$
Non-Blockbusters	$u \rightarrow_*$	$\searrow \frac{u}{3}$	$\nearrow_* \frac{\gamma+4(u-t)}{12}$	$\searrow_* 0$
Consumer surplus	$0 \nearrow$	$\nearrow \frac{u}{12}$	$\searrow \frac{\gamma+4(u-t)}{12}$	$\nearrow_* u$
Welfare	$u \searrow_*$	$\searrow_* \frac{11u}{12}$	$\nearrow_* \frac{11u}{12} + \frac{\gamma-4t}{24}$	$\nearrow_* u$

Table 1: Profits, surplus and welfare under competition

3 Profits, welfare and policy

Intuition wants that u is stable over time, whereas change in information and retailing technologies increase m. This section makes a comparative statics analysis of the evolution of the market outcome for a given u.

3.1 Profits and welfare

Case 0: no blockbusters As seen in section 2.3, in the absence of blockbusters ($m = 0$), publishers are able to extract all available surplus, and make a joint profit $u - \frac{t}{4n}$.

Market with blockbusters The variations of profits, surplus and welfare with respect to m for a given u are stated in table 1, along with the limit values. For some variations, I needed to take the limit when $n \to +\infty$ in order to get a tractable result. These case are marked with an asterisk. In propositions 2.3, 2.4, and 2.5, the results are expressed as interval in u. For some value of (u, m), those intervals do not exist. For readability, I re-define the bounds of the intervals with respect to m and at the limit when n is large, and give the values under the same assumptions. Let also $\gamma = u + 2t - \sqrt{4t^2 - 2tu + u^2}$.

Without loss of generality (*i.e.* without resorting to reasoning onf limits), table 1 shows that the introduction of the first blockbusters is neutral for the bookshop, and a slight loss for publisher. This loss decreases as n increases, becoming null at the limit. In area (2), more blockbusters means less market share, but also lower wholesale prices. For n reasonably large, the latter effect dominates, leading to an increase of bookshop's profits. This effect reverses in areas (3) and (4), where the decrease in market share takes over the higher margin. On the other hand, publishers' aggregate profits decrease in area (2), since they are not able to extract all surplus any more, with non-blockbusters loosing a large share of their profits. This loss is not compensated by the increase in blockbusters' profits. In area (3), all profits increase again since wholesale prices and the odds of getting a blockbuster increase with m. Lastly, consumer surplus first responds positively to avaibility of lower-priced titles, and suffers in area (3) where blockbuster prices increase.

Reasoning at the limit moreover shows that increased title competition logically drives publishers' profits down to 0 as m and n grow and increase consumers surplus. The introduction of blockbuster first decrease total welfare, since that consumers inefficiently travel towards more distant (but slightly cheaper) blockbusters instead of getting the book that best matches their tastes. When price cuts start kicking in, first among blockbusters (area (3)) and then on all books (area (4)), consumer surplus and welfare increase with m.

3.2 Fixed Book Price

The French debate over the Fixed book price in 1981 documents how publishers' support for the measure was initially lukewarm. This lack of enthusiasm for a vertical restraint is at first blush puzzling. This model and the effects underlined in the previous section, shed some light on the conjonction of interests that eventually supported the fixed book price. At first, the bookshop is rather unconcerned by the bookshop phenomenon, since it does not notably erode their market share while reducing wholesale prices charges by publishers. However, when area (3) is reached, the bookshop sees his profits decrease, while publishers start benefiting from better odds of getting a blockbuster. It is at that point that boobkshop will start asking for a measure that reduces blockbusters' price advantage on the final market. It is only whith enough blockbusters that the publishers join in supporting this tool.

With a fixed book price, publishers set simultaneously a couple (w, p) of a wholesale price and a final price that stand for all retailers.

Proposition 3.1 (Fixed Book Price). *With a fixed book price, the equilibrium of the pricing game always features $p = w$, with*

- *$p = w = u - \frac{t}{4(n-m)}$ when $u < \frac{t(2n-m)}{m(n-m)}$*

- *$p = w = \frac{t}{2m}$ otherwise*

Proof. Consider a common (w, p) and publisher i setting (w_i, p_i). Conditionnal to being accepted by the bookshop, publisher i' profits are:

$$\max_{w_i, p_i} \left\{ w_i \left[\frac{m}{n} 2d(p_i, p) + \frac{1}{n} \left(1 - \frac{m}{2(n-m)} \right) \right] \right\}$$

This profit is strictly increasing in w_i and decreasing in p_i. As long as the bookshop cannot profitably excluyde i, the latter has an incentive to sqeeze the bookshop's profit margin by decreasing p_i or increasing w_i. For the same reasons as before, the bookshop will never exclude i for small deviation because of the benefits of having one more title. Hence, any symmetric equilibrium features $p = w$. Now consider $p_i = w_i$ and a marginal increase of ε of both. The increase in w_i yields a profit increase of $\frac{t-2m\varepsilon}{nt}$ an the increase in p_i decreases profit by $\frac{2m(w+\varepsilon)}{nt}$. The former is larger than the latter if:

$$w \leqslant \frac{t}{2m} - 2\varepsilon$$

Thus, when $w < \frac{t}{2}$, the profitable deviation is upwards, and downwards when $w > \frac{t}{2}$. this define a unique equilibrium at $p = w = \frac{t}{2m}$.

This price is consistent with consumers' participation constraint if $u < \frac{t(2n-m)}{m(n-m)}$. When this conditionis not met, the reasoning of the proof of proposition 2.3 applies. $\square$

In the presence of a FBP, profits, surplus and welfare are those given in table 2. The FBP leads to a zero profit for the bookshop. On the publisher's side, it does not reverse the decrease in profits with m, but helps mitigating it: as long as $m < \sqrt{n-3}$, agregate publishers' profit is higher under FBP. It also lead to a decrease in welfare as m increases. At the limit where $n \to \infty$ however, the FBP allows a constant total welfare of u, with a progressive tranfert from publishers towards consumers as m increases.

The main effect of the imposition of a FBP is thus to slow the progressive transfert from publishers to consumers. The best matching between readers and titles enabled by the FBP do not offset the higher level of equilibrium prices.

m	$\left[0, \frac{t}{2u}\right]$	$\left[\frac{t}{2u}, +\infty\right]$	Profit
Bookshop	0	0	0
Publishers	$u \searrow$	$\searrow$	$\frac{t}{2m}$
Blockbusters	0	$\nearrow$	$\frac{t}{4(n-m)}$
Non-Blockbusters	$u - \frac{t}{4(n-m)} \searrow$	$\searrow$	$\frac{t(2n-3m)}{4m(n-m)}$
Consumer surplus	0	$\nearrow^*$	$u - \frac{(3m^2 - 12mn + 8n^2)t}{16m(n-m)^2}$
Welfare	$u - \frac{t}{4(n-m)} \searrow$	$\searrow$	$u - \frac{t(4n-5m)}{16(n-m)^2}$

Table 2: Profits, surplus and welfare under FBP

4   Conclusion and further research

The main contribution of this paper is to show how the blockbuster phenomenon affects the book retail market. Contrary to an opposition between a mass market (blockbusters) and a niche market (non-blockbusters), the uncertainty about type and location of a given titles leads to a decrease in both prices as the number of blockbusters grow. A fixed book price mitigates the effects of this evolution, but ultimately leads to the same situation than in its absence. In this light, I wish to claim that the debate about the effects of blockbusters and the FBP on bookshops has steadily overlooked the fact that there is no such thing as a sure blockbusters. Predictable huge successes are scarce, and only a small fraction of each year's blockbusters. Therefore, the idea that "sure" books may crowd off other, better ones is not consistent with the description of the industry. Under uncertainty, blockbusters do decrease the average match between consumers and tastes, but the decrease of prices more than offsets that fact. The matching role of traditionnal bookshops thus retains much of his value to both consumers and publishers without the need for a FBP.

Fo further research, I suggest that going beyond the assumption of perfect matching by the bookshop may be worthwhile to understand the current evolutions of the sector. By taking at face value the argument that the bookshop acts as a benevolent matchmaker between titles and tastes, I followed the descriptive litterature, but assumed away a wealth of strategical relations between publishers and the bookshops. While the argument of systematic truthful matching was rather convincing with a large number of small publishers dealing with many bookshops, concentration in both layers of the market begs the question of a more thourough analysis of this particular issue.

Finally, neither the dual nature of the market nor the product uncertainty that drive the results of this model are unique to the book market. Other experience goods features the same properties, recorded music and movies (big theater chain *versus* small screens) standing out as large examples. The main insights about the role of knoledgeable intermediaries and their ability to face the concentration of consumption on a handful of varieties should thus carry on to those markets.

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A   Appendix

A.1   Publisher exclusion

As stated in the text, it is enough for me to show that the bookshop will tolerate small increases of w_i over w.

The bookshop excludes i When the bookshop excludes i's title from his array, this affect both consumers' participation constraint and their trade-off between buying a blockbuster and going to the bookshop. Because of the risk aversion, the bookshop has to grarantee a positive surplus to the worse-off consumer, that is the one whose tastes exactly correspond to i's book. The participation constraint thus becomes:

$$u - p - \frac{t}{n-m} \geqslant 0 \tag{A.1}$$

When this constraint is fullfilled, consumer rationally compute their expected transportation costs to:

$$\left(1 - \frac{1}{n-m}\right) \frac{t}{4(n-m)} + \frac{1}{n-m} \frac{t}{2(n-m)} = t \frac{n-m+1}{4(n-m)^2}$$

A consumer located at a distance z from the nearest blockbuster thus buys it rather than going to the bookshop if :

$$z \leqslant \frac{1}{t}(p-w) + \frac{n-m+1}{4(n-m)^2} \tag{A.2}$$

The bookshop's profit without i's title is then

$$\arg \max_p \left\{ \left(1 - \frac{2}{t}(p-w) - \frac{n-m+1}{2(n-m)^2} \right)(p-w) \right\} \tag{A.3}$$

subject to constraint (A.1)

It is straightforward that the constraint with exclusion of i (A.1) is tighter than without, setting a cap on the bookshop price. Even without such cap, the profit (A.3) is higher than the profit with i's title (see equation (2.3.2)) if the following condition holds:

$$wi \in \left[w + \frac{t}{4(n-m)}, w + \frac{t\left(4n^2 - 10nm + 6m^2 - m\right)}{4m(n-m)} \right] \tag{A.4}$$

It can be easily checked that for $m \ll n$, the second bound is indeed greater than the first, and it is obvious that the latter is strictly greater than w. This means that i can increase slightly his price without being excluded by the bookshop as long as readers' participation constraint (with all $n - m$ titles) is not met.