

Summary of the literature on price guarantees

Morten Hviid

ESRC Centre for Competition Policy and UEA Law School

July 2010.

Abstract: This report provides a non-technical summary of the literature on price guarantees. The theoretical literature demonstrates how price guarantees can harm consumers through reducing the incentive of firms to compete by making better offers and reducing the incentive for consumers to search for better offers. The theoretical literature also identifies situations where the guarantees can benefit consumers either by enabling them to identify low-price firms or enabling firms to price discriminate. The empirical literature demonstrates that there are different motivations for adopting the guarantees and that much can be learned by studying how the guarantees, and in particular the restrictions to the guarantees, are worded.

1 What are price guarantees?

When thinking about price guarantees, it is useful to distinguish between two different forms of purchasing. In one, each purchase is essentially a free-standing action (buying a pint of milk, buying a newspaper, buying a cooker) which may well be done repeatedly and from the same seller but each involves an individual transaction. In the other, the purchasing decision is about an ongoing supply of goods or services (mobile phone services; newspaper subscription) based on a contract. In a slight abuse of language, I will refer to the former type as 'non-contract purchase' and the latter as 'contract purchase'. As we shall see below, this distinction primarily makes a difference to the assessment of the effects of price guarantees.

1.1 *Non-contract purchases*

The majority of the existing theoretical and empirical academic work focuses on *non-contract purchases*. Price guarantees aimed at non-contract purchases come in a number of formats. A generic example is the following:

We will match any price of our main rivals. If you find a lower price elsewhere, provide us with evidence and we will match the price or, if you have already purchased, refund you the difference. Certain conditions apply.

There are however a large number of variants and as we shall discuss below, some of the differences in wordings can matter greatly for the potential effects of guarantees on price.

Key variants:

- Matching vs. beating: does the guarantee only promise to match or does it offer to do more?
- Advertised vs. selling price: does the guarantee refer to the advertised price (the stated price at the point of sale) or the actual price offered by a rival? Does the guarantee include price reductions due to coupons or special offers? For example the advertised price at a rival outlet might be £100 with a £5 coupon but the consumer negotiated the price down to £85. Which of the three prices (£100, £95 or £85) does the guarantee refer to?
- Now vs. later: does the guarantee specify the number of days after purchase for which it is valid? For example, the customer may have 30 days to find a lower price elsewhere.
- Rivals vs. own price: where the guarantee remains valid for a period of time, does the guarantee extend to cover a firm's own future price during that period?
- The restrictions imposed: does the guarantee specify particular types of rivals (e.g. "excluding internet offers"), the distance between outlets (e.g. valid for stores within 10 miles), in store (e.g. the product has to be available at the rival store), in stock (e.g. the rival must be able to supply the product)?

In the literature, various terms are used to describe these guarantees, with the term "low price guarantee" the most generic. Other terms are "best price guarantee", "price matching guarantee", and "price beating guarantee".

1.2 Contract purchases

For *contract purchases*, the guarantee is phrased a little differently and the guarantees are often referred to by other names such as "meet-the-competition" guarantees or even "meet-or-release guarantees". A generic example would be:

If during any period a similar service is offered at a lower price, we will either match this lower price for that period or else release you from our agreement without any penalty.

The literature related to these types of purchases often focuses on business-to-business (BtB) contracts, but at least some of the results are also relevant for a narrow set of products, such as utilities, where the contract is business-to-consumer (BtC). One important caveat is that in a BtB contract, the buyer is often more concerned with rivals not being able to purchase an input at better terms because this distorts competition, than it is concerned with the level of the price, since if all rivals face the same costs these can to a large extent be passed on to their customers. In a BtC contract we normally assume that consumers are more

concerned about the absolute level of the price they pay rather than the price they pay relative to other consumers¹.

1.3 Terminology

The terminology used in the remainder of this survey is as follows.

Competitive price:	The price that would emerge where several firms compete to supply customers.
Monopoly price:	The price charged by a single firm facing no rivals.
Price matching:	Either (pre-purchase) the firm promises to match a rival's price or (post-purchase) they promise to refund the difference between what the customer paid and a rival's lower price. In many cases the guarantee combine the two to be valid both pre- and post-purchase.
Price beating:	As above, except the reduction or refund will be <i>more</i> than the difference. This can either be specified as a percentage of the difference (e.g. 150% of the difference), the difference plus an absolute amount ² (e.g. difference plus £1), or the difference plus a percentage of the rival's price (e.g. difference plus 3% of the rival's lower price)
Meet the competition:	A promise that for the period in which a rival offers better terms of a contract, these better terms will apply.
Meet-or-release:	The firm promises either to match better terms offered by a rival or to release the customer to take up the better offer without penalties.
Most favoured customer:	A promise by the firm to match its own future price for a specified period after purchase

2 The effects of price guarantees

Price guarantees can affect the behaviour of consumers or of rival suppliers, or both. Moreover, they can do so in different ways. This section discusses the positive and negative effects of price matching guarantees on the prices consumers eventually pay as identified in the theoretical literature. The empirical and experimental support for these findings will be presented in the following section.

A key to understanding the findings in the literature is to ask: *Who is the firm talking to when it issues a price guarantee?* Is the promise addressed to the consumer in the form of "don't worry, you can safely shop here. We will make sure that you can do at least as well with us than with other sellers"? Or is the promise addressed to a rival: "Don't even bother to cut your price. We will do the same

¹ Only where consumers value paying similar prices to their 'neighbour' would the trade-off, found in BtB contracts, be a relevant issue to consider.

² This amount does not have to be money; for example, in one observed case, the promise involved the price difference plus a slice of pizza.

immediately so you will gain no advantage”? As we shall see in the next subsection, the answer might be the latter.

Key messages from this section:

- Price guarantees can stifle competition either by removing the incentives for rivals to compete on prices or removing the incentive of consumers to seek out lower prices. This will lead to higher prices and consumer detriment
- Price guarantees can help consumers identify genuinely lower priced firms and they can lead to price discrimination both of which will benefit some, but generally not all, consumers.

2.1 Incentives to cut prices

The first effect identified in the literature was the effect on rivals' pricing behaviour. If consumers really make use of price guarantees and hence respond even to the smallest price difference either by demanding a matched lower price or a refund, then the incentive for a rival to cut its price to gain customers is much reduced. When a rival offers a price matching guarantee, any price reduction is automatically matched so that no advantage in sales can be gained through lowering prices.

If all firms have a guarantee, no firm has an incentive to lower its price.³ The implication is that prices can be stuck at very high levels, even at the level which a single dominant firm or a group of colluding firms would have set.⁴ Imagine that a single firm would have set the price of £100 (which is equal to the monopoly price in this case) and that all the firms in the industry set this price and adopt a price matching guarantee. If the firms split the sales equally between them, they will get an equal share of what in total would amount to the monopoly profit. Imagine that one firm reduces its price to £99. Without the guarantee, it would have the lowest price in the market and if consumers are sufficiently price sensitive, it would attract a lot of sales from rivals making this a profitable price cut. However, the guarantee ensures that all the rival firms will sell at £99 rather than their advertised price of £100. With the price guarantees in place, all the price-cut achieves is to lower the price of all firms which is in the interest of none of the firms, the price-cutter included.

Saying that prices above the competitive level can be supported by all firms adopting price matching guarantees does not tell us anything about how such prices are arrived at in the first place. However, note that if, starting from the competitive price level, one firm was to adopt a guarantee and raise its price, this

³ To be precise, as long as the price is below the monopoly level, no firm has an incentive to lower price. If the price was absurdly high, then a price reduction, even if matched by all would still be in the interest of each individual firm.

⁴ In the extreme, monopoly prices can be a stable equilibrium even in an industry with a large number of firms. This result can be attributed to the seminal works of Hay (1982) and Salop (1986). A number of papers have extended the result that the guarantees can lead to monopoly prices by relaxing the assumptions of the original analysis in different directions. See for example Baye and Kovenock (1994), Belton (1987), Chen (1995) Doyle (1988) and Zhang (1995) for early contributions.

might send a strong message to other firms to do the same. At the same time, unless consumers refuse to request a refund, the strategy is without risk.⁵ If the other firms do not follow, the firm simply delivers on the guarantee to match competitors' prices in the short run and reduces the price to the original level in the long run.

Based on this simple story, price guarantees appear very anti-competitive with strong adverse effects on consumers. However, the story does rest on a number of simplifying assumptions and these have been challenged in the literature.

On the face of it, nothing much should happen to our conclusions if the guarantee offers to *beat* rather than to *match* a rival's lower price. If monopoly prices can be obtained with price matching, then price beating cannot do better in terms of outcome. Moreover, one might think that with price beating there is even less incentive to cut price. At some level this is correct: no firm would want to cut its price. However, the literature⁶ has identified a more subtle strategy, namely that a firm might adopt a price beating guarantee and *increase* its price. By responding to the guarantee and asking for a refund, the consumer in effect lowers the price. To see this, assume that current advertised prices charged by firms in the industry are £100 per unit and that one of the firms would like to offer a price of £95, but is prevented from achieving this directly through price cutting due to the rivals' price matching guarantees. This firm could adopt a price beating guarantee offering a 150% refund and raise its price to £110. Rational consumers would demand that they are refunded 150% of the £10 difference, in effect bringing the price down to the desired level of £95. But if the strategy can be used in this way then the guarantee cannot stop anyone from cutting the actual prices faced by consumers, undermining the key effect of price matching identified above.

This insight leads to a further insight: it matters whether the guarantee relates to advertised prices or selling prices.⁷ To see this, let us extend the example above. If all other firms had guarantees based on *advertised* price, since the lower (*selling*) price of £95 resulted from the use of a guarantee, the advertised price is still £110 and hence no other guarantee can be activated. Matters are different where some rivals have guarantees related to the *selling* price. For those guarantees, the relevant price would be the lowest selling price of £95 resulting from the active use of another firm's guarantee and as the firms all had advertised prices of £100, consumers could claim on their guarantee. To see how extending the guarantee to actual selling prices would restore the ability of price guarantees to discourage price cutting, note that if all other firms than the one who raised its advertised price to £110 had a price matching guarantee extended to selling prices, all firms would end up with a selling price of £95.⁸ Thus all that would have been achieved from raising the advertised price from the common price of £100

⁵ If consumers simply ignore the guarantees, then the firm would be stuck with the higher price and resultant fall in sales.

⁶ See Corts (1995) and Hviid and Shaffer (1994)

⁷ See Edlin (1997) and Kaplan (2000).

⁸ One has to imagine the consumer going to a firm with an advertised price of £100 and arguing as follows: "I could use your rival's price beating guarantee together with its price of £110 to pay effectively £95. Since your price matching guarantee extends to this selling price, please match it."

would be to lower the selling price to another common level of £95. This would not normally be worthwhile for any of the firms. This logic identifies the first testable prediction:

Testable prediction: Price beating guarantees explicitly restricted to advertised prices cannot be aimed at reducing the incentives to compete.

The literature so far has implicitly assumed that consumers are fully active when it comes to requesting that a low price guarantee is acted upon. In reality, they might not be. This could either be because of lack of information, to which we turn in subsections 2.4 and 2.5, or because making use of a guarantee is not costless to them.

Realistically one would expect there to be some - possibly small - costs for a consumer to invoke a guarantee.⁹ Hviid and Shaffer (1999) refer to such costs as 'hassle costs'. If the firms are relatively similar in terms of products and costs, small hassle costs can negate the putative effect of a guarantee to discourage price cutting. If there are even very small costs of activating or invoking the guarantee, then each firm could lower its price by slightly less than these costs and the consumer would go to the cheaper firm rather than activate the guarantee. Where firms are very similar, each firm has an equally strong desire to have the lowest price and, hence, hassle costs - even if very small - will undermine the effects of price matching guarantees. Hviid and Shaffer (1999) show that where firms are less similar so that they differ in the strength of the preference for offering the lowest price, price guarantees combined with hassle costs can lead to a reduction in competition and hence prices above the competitive level. Thus, if firms differ (for example, due to location), hassle costs do not completely destroy the effect of price guarantees, although the anti-competitive effect is much reduced.¹⁰

It is sometimes argued (see, for example, Moorthy and Winter (2006) and Winter (2008)) that for the aim of the price guarantees to be to counter rivals' incentives to cut prices, it must be true that all firms in the industry adopt the guarantee. If this was the case, we would have a very strong test of whether the guarantee was aimed at reducing competition by reducing the incentive to cut prices. Although the majority of models investigating this effect do require universal adoption, this is not true of all models. For example, Hviid and Shaffer (1999) show that with positive hassle costs, if the guarantee is used in order to reduce the incentive to cut prices, we would never see universal adoption in their model. Logan and Lutter (1989) also identify cases where adoption may be asymmetric.¹¹ Finally,

⁹ These costs could be caused by the restrictions imposed in the small print of the guarantees or by the time it takes to obtain the refund or match. For example, it may be that the customer has to speak to authorised personnel in order to obtain the refund.

¹⁰ In that case, one might wonder whether it would be possible for firms to reduce or remove these hassle costs, possibly by promising to do the price checking themselves and to refund anyone who is due compensation under the guarantee. However, even where the firm promises to do all the checking and automatically send a refund check directly to the customer, unless the firm will do so even for a one penny price difference, a rival could always cut its price by whatever the smallest amount a refund could be. Thus completely removing the cost of hassle to the consumer may be prohibitively costly.

¹¹ Coughlan and Shaffer (2009) show that retailers may prefer product differentiation to adopting price guarantees.

Hviid and Shaffer (2010) show that if the price matching guarantee is extended to cover a firm's own price as well as a rival's price, then unilateral adoption by one firm is sufficient to lead to higher prices.¹²

There is one robust prediction from this literature. Note that if a firm sets a lower price than its rivals, then if it also offers a guarantee, that guarantee would have no effect on its rival. Hence:

Testable prediction (Arbatskaya et al, 2006): Observing the low price firm adopting a price guarantee is not consistent with this guarantee being aimed at reducing the incentive for price cutting.¹³

Finally, the literature demonstrates that the restrictions placed on the applicability of the guarantee really matter for the anticompetitive effect identified in this section: advertising vs. selling prices, with or without own price, and the level of restrictions which affect the level of hassle costs. Thus, a great deal can, at least in principle, be learned from reading the small-print of price guarantees.

2.2 Supporting collusion through information revelation

Some authors have argued that price guarantees can strengthen an existing price-fixing cartel. They can do so in two very different ways. First, the mechanism guarantees an aggressive price response if a rival deviates from the agreed collusive price. This price response is automatic if consumers make use of the guarantee and hence the punishment is fully credible. While price matching is a less aggressive response than other feasible prices to someone cheating on a cartel, it still has the ability to support collusion.¹⁴ Moreover, if collusion works effectively, consumers will never have cause to use the guarantee.

The second effect is more subtle. One of the problems faced by price-fixers is knowing what their rivals are up to. In most real world cartels, demand and costs fluctuate and the information each member has about the prices and conditions of other cartel members is incomplete and asymmetric. Price guarantees, when invoked, provide a means for firms to learn about the actual prices set by rival firms. This way a price guarantee reduces the time firms need to spend monitoring the behaviour of cartel members. In this case, observing the active use of the guarantee hints at a cartel in crisis¹⁵.

More importantly, note that the benefit to cartels would not just be restricted to formal price fixing agreements which we have other means to deal with through

¹² It is worth pointing out the mechanism through which this result is obtained. A price matching guarantee relates solely to rival prices and removes the incentive of such rivals to cut price but imposes no constraint on the pricing strategy of the adopter of the guarantee. In contrast, a most-favoured-customer guarantee relates solely to the adopter's own price and penalises the adopter for any future price reductions. Combining the two types of guarantees to cover both rival and own prices ensures that even if only one firm adopts this extended guarantee, the incentive for firms to cut prices is reduced and prices above the competitive level can remain stable.

¹³ Arbatskaya et al. (2006) find support for this hypothesis in their data, see also section 3.1.

¹⁴ See Lu and Wright (2010) for a demonstration that collusion can be supported with price-matching punishments.

¹⁵ Note also that, as cartel members will be particularly interested in selling prices, that is, what the rival is really selling for, guarantees restricted to advertised prices are not really consistent with this motive for adopting the guarantee.

competition law enforcement. The effects would also benefit firms engaged in tacit collusion where there is no agreement to fix prices but where firms simply work out for themselves the benefit of not competing aggressively.

To be effective as a means for shoring up collusion, be it tacit or in the form of a formal agreement, it would appear important that all firms involved have adopted the guarantee. For the tacit collusion story, one might also conjecture that it would be important for the guarantees to have very similar wording to ensure that all firms understand the aims of the guarantees.

Note that both of the effects of price guarantees identified in this subsection harm consumers.

2.3 *Effects on potential competition*

The literature has identified two very different sources of inefficiencies from the effects of price guarantees on firms' entry decision. Edlin and Emch (1999) point out that if entry is relatively easy and if price guarantees are successfully adopted to discourage price cutting, then the high profits earned from successfully charging high prices should lead to over-entry yet without breaking down the effect on prices. This over-entry is inefficient in that prices remain high while profit is competed away through too many active firms. This result does require that all firms, including new entrants, adopt the guarantee.

Arbatskaya (2001) demonstrates how price matching guarantees can be used to deter entry. If an entrant, because it is less well known, has to price lower than existing firms, at least for a period of time, then a price matching guarantee would deprive an entrant of the ability to attract enough sales to make successful entry possible.

Note that both of these two theories point to harm to consumers by restricting competition.

2.4 *Abilities to price discriminate*

Where consumers differ in their degree of loyalty to a specific provider, in their information about prices and/or the existence of a guarantee, or in the level of hassle costs which they face, it may be possible for firms to use the guarantee to discriminate between the different groups.

If a firm can identify two groups of customers who (i) have different sensitivities to prices¹⁶ and (ii) to whom the firm can price differently, it will have an incentive to do so. The welfare effect of such price discrimination is ambiguous because, compared to a single price charged to all customers, typically some consumers gain through a lower price, while others lose through a higher price. An assessment of the welfare effects of price discrimination depends on both the elasticities, the size of the two groups and on the measure of welfare used.¹⁷

To see how price matching could be used by a firm to price discriminate when some consumers are poorly informed, consider the case with two firms, one of whom is currently setting a low price to attract the well-informed consumers. The

¹⁶ Formally the two groups must have different elasticities of demand.

¹⁷ For a general survey of the literature on price discrimination, see Stole (2007).

other firm could set a higher price aimed at the uninformed who visit their store and also offer a price guarantee so that the well informed who may have a slight preference for the otherwise high price store could use the guarantee to obtain the lower price. Thus the store with a price guarantee can price differently between uninformed, who will pay the advertised price, and informed consumers, who will pay the post-guarantee selling price.

The literature focusing on price discrimination is relatively small. The key insight from this literature is that price discrimination will often benefit some consumers and in some cases benefit all consumers. Building on and extending the previous literature,¹⁸ Corts (1996) shows both that price discrimination can benefit consumers and also that price beating offers lower prices than price matching.¹⁹ To understand the latter result, recall the mechanism at work. Firms set a high *advertised* price aimed at consumers who for various reasons²⁰ do not shop around (the unsophisticated). They then use the price guarantee in combination with the existence of a low price at some other outlet to offer a lower *selling* price to (sophisticated) consumers who are well informed and shop around. Note that price matching is always less flexible than price beating since this will only lower the price to the lowest advertised price. The price beating guarantee, through careful choice of the percentage by which it beats the competing offer, can select the selling price facing the sophisticated buyers at or below the lowest advertised price. The effect of price beating guarantees is to create very fierce competition for the sophisticated buyers. Hence they always do very well from price discrimination arising from price guarantees. Whether or not the unsophisticated consumers do better or worse with price guarantees depends on the relative elasticity of demand. If sophisticated buyers have relatively inelastic demand, all consumers benefit. However, the assumption that those consumers who are able and willing to shop around have relatively less elastic demand and hence relatively less price sensitivity does seem counterintuitive. It is also troubling for price discrimination theories that there must be a lower advertised price somewhere in the market and hence at least one firm which does not exploit the unsophisticated consumers through high prices.

An interesting recent model is provided by Nalca et al (2010) who consider the effect of the guarantee requiring verification of a lower-priced offer elsewhere. As identified in Arbatskaya et al (2004), many guarantees involve restrictions on the guarantee. Nalca et al (2010) are the first to model the effect of these and show that they have strategic effects in terms of allowing price discrimination. The idea is intuitive. By being able to refuse a refund because of well-drafted restrictions on the applicability of the guarantee, the firm may be able to restrict the refund to consumers who would in actual fact have taken their custom elsewhere and who are hence particularly price sensitive. This enables the firm to identify the consumers who are at the same time well informed and very price sensitive. Note that from the firm's point of view, this is a much more profitable division of the

¹⁸ See in particular Png and Hirsleifer (1987) and Belton (1987).

¹⁹ Focusing on price matching and dividing customers along two dimensions, loyalty and cost of information gathering, Chen et al (2001) show that price matching can lead to lower prices and lower profits.

²⁰ This could be due to loyalty, lack of information about prices, lack of information about price guarantees, or a combination of the high costs of using guarantee with high search costs.

consumers than the informed-uninformed division because this reserves the lower price for those consumers who are truly price-sensitive.

A key testable implication of price discrimination motive emerges from the literature:

Testable prediction: To be plausible, the price discrimination motive requires that guarantees are taken up by a non-trivial group of consumers.

If redemption rates were only say 1%, then price discrimination is very unlikely to be the main motive for the guarantee.

2.5 Signalling lower prices

A number of papers look at the possibility that the price guarantee is a credible signal of actually having low prices. The most advanced model capturing this possibility is by Moorthy and Winter (2006). Note that to be a credible signal, it must be the case that no high-price firm would want to adopt such a guarantee. To ensure this condition is satisfied, a number of assumptions would need to be met.

- There must be substantial cost differences among the firms. If not, then matching the lower prices of a low-cost firm will not lead a high-cost firm to suffer sufficient financial losses.
- There must be some consumers who are well informed about prices and who would activate a guarantee if the conditions for doing so were met. This ensures that if a high-cost firm were to offer a guarantee and the low cost firm to set a very low price, the high cost firm would be forced to match on a large number of sales, losing money on each of these.
- There must be consumers who have strong preferences for shopping at the high-cost firm. This is needed for two reasons:
 - If there are no non-price reasons for consumers to buy from the high-cost firm, then the smallest hassle cost of activating the guarantee would make consumers shop at the low-cost – low-price firm rather than incurring the cost of using the guarantee to obtain the lower price. This would enable the high-cost firm to adopt the guarantee without fear that it would be used extensively.
 - If the number of consumers who have strong preferences for the high cost firm is relatively small, then with substantial cost differences, the low-cost firm could simply compete the high-cost firm out of the market. Put differently, one needs to ensure that the realistic choice for a firm is not between sending a signal and closing. If the latter was the case, the signal would be uninformative.

While one might think that this set of assumptions is strong, nonetheless Moorthy and Winter (2006) show that for a particular class of oligopoly models with product differentiation, if cost differences are sufficiently high and there are sufficiently many well informed consumers, then the signalling equilibrium is credible. In such an equilibrium, compared to the no-price-matching case, prices charged by the low-cost firms are higher and prices charged by the high cost firms are lower, bringing prices closer together, thereby reducing price variability. The overall welfare effects are not clear-cut. More consumers will buy from the low-cost firm

because the uninformed with relatively weak preference for the high-cost firm switch to the former which is welfare increasing. The informed consumers buy from the low cost firm and hence face increased prices once guarantees have been adopted. Those consumers who either buy from the high-cost firm, or who would have done so but due to the signal switched to the low cost firm, face lower prices. Moorthy and Winter (2006, p.464) provide a numerical example in their appendix where consumers in aggregate are better off with price matching.

This need for a sufficient number of informed consumers is potentially troubling for the applicability of the theory. As Moorthy and Winter (2006) and Winter (2008) clearly state, they are making no assumptions about the incentive for a consumer to become well informed. Where the signal is credible, the uninformed are essentially free-riding on the informed consumers. In the long-run, the concern would be that the number of informed consumers would dwindle. As Moorthy and Winter's result requires a substantial number of informed consumers, a dwindling number of informed consumers would over time undermine the signal. It is hence unclear whether signalling remains credible in the longer run.

Moorthy and Winter (2006) point out that a firm adopting a price guarantee delegate the setting of its *selling* price to a rival. While this is not necessarily a concern for the firm if rivals know not to cut their price, where there is a rival firm who for cost or other reasons want to have a low price, a high-cost firm does face a problem. As shown in Hviid and Shaffer (1999), cost differences alone can lead to no firm adopting a guarantee. Thus, even without the signalling motive, with sufficient asymmetry it could be the case that no-one would want to offer a guarantee. Not having a guarantee is not necessarily the best way to avoid adverse effects of the guarantee. An alternative would be to include restrictions on the applicability of the guarantee. For example, where the differences in costs can be attributed to something observable, such as selling on the internet, a simple restriction on the applicability of the guarantee would make the high-cost firm safe from harm.²¹ In their model, Moorthy and Winter (2006) ignore the possibility, observed by Arbatskaya et al. (2004) that firms place restrictions on the applicability of their guarantees.

For signalling to offer a credible explanation for the adoption of price guarantees, it must be the case: (i) that only some firms adopt a price guarantee, (ii) that these must be the low price firms, and (iii) that higher priced firms cannot afford to mimic their guarantee. Thus, there must be a significant difference in the cost structure between adopters and non-adopters.

2.6 Incentives to search

Arguably, price discrimination and signalling are part of the broader reason for price guarantees, namely to affect the search behaviour of consumers. Beliefs about the message in a guarantee could clearly lead to some consumers either searching more or less. Search models are generally hard to solve, the literature is very sparse and authors have had to resort to very specific assumptions to get any results.

²¹ For example, one of the famous price guarantees, John Lewis' "never knowingly undersold", is restricted to brick-and-mortar shops.

Mao (2005) points out that where consumers face small costs of returning to the store which they visited first and did not buy from immediately, some consumers finding a lower price elsewhere may decide to buy at the lower price store rather than return to the store with the price guarantee. Because of this, the lower priced store may get some extra demand and the high price store with the price guarantee may not retain all its “normal” consumer base. Mao (2005) shows that with such search costs, price matching guarantees can still support prices above the competitive level, but not as high as the monopoly level.

Arbatskaya *et al* (2004) documents how many guarantees allow consumers to search for a lower price for up to 30 days after purchase. Such guarantees are, one would imagine, aimed at enticing the consumer to buy now and search later. Janssen and Parakhonyak (2010) point out that where guarantees offer a guarantee which allows for post-sale search, the guarantee is essentially an option to search later and, as this option is valuable, it should make consumers willing to pay more for the good with the guarantee in the first place.

McWilliam and Gerstner (2006) note that a number of firms combine price guarantees with money-back-guarantees. Although not their main objective, money-back-guarantees can have very similar effects as a price guarantee valid for a post-sale period. Upon finding a lower price elsewhere, the consumer could simply return the good and ask for the money back. A price guarantee ensures that inefficient returns (where people are not unhappy with the product, only with the price) do not take place. While the direct effect of this is to save selling costs which can be passed on to consumers, the paper does not look at the effect of competition among firms. It is hence unclear whether the consumer will actually benefit once the type of effects identified in Section 2.1 are allowed for,

This is an area where there is to date insufficient research to be confident that price guarantees reduce search and hence harm consumers through a resulting reduction in competition.

2.7 Unexplored explanations

While the literature on price guarantees is by now quite substantial, there are still areas which remain unexplored.

2.7.1 Agenda setting for a consumer-seller bargain?

Most consumers in the case of most goods accept the *advertised* prices as the prices they will have to pay to obtain the goods and hence their decision is whether or not to purchase and if so, the quantity. However, there are some consumers who are prepared to attempt to bargain for a lower price. For particular products this group may be relatively large. For such products a firm may find a price guarantee is a way to define what can be the reference point for a bargain. In other words, the price guarantee is essentially a message to the consumer: “unless you have found a lower price elsewhere, don’t even bother to try to negotiate a lower price”.

The effect of such agenda-setting is hard to conjecture. On the one hand it might lower the costs of retailing and these costs might be passed on to consumers. On the other hand it may reduce the price discrimination which occurs as a result of some consumers bargaining activities, in which case at least some prices might increase.

2.7.2 Protection against actions by rivals

Where a large rival uses strategies such as “loss-leader”²² or “bait-and-switch”²³ to induce customers into their stores, a price guarantee may protect a firm against loss of sales. One could interpret ESSO’s “price watch” campaign as a response to supermarkets selling petrol at low prices. For a specialist retailer, seeing its main product used by a large multi-product retailer presents a problem. If it does nothing, the specialist will lose market share. If it tries to compete by lowering its price, it does not have a big enough selection of other products from which it can recover its losses. A price guarantee may provide a solution by signalling to the bigger rival that it would be better off focusing its strategy on another product since a focus on this one will not be allowed to work. Note that this is a dangerous strategy since it does potentially force the smaller firm to offer loss making prices. This risk can be reduced by having clearly defined restrictions on when the guarantee applies.²⁴

2.8 Meet-the-competition and meet-or-release

Meet-the-competition guarantees have much the same effects that have been identified for price guarantees as discussed above. The key difference in how the literature has dealt with these guarantees is in the evaluation of the outcome of the guarantee. Consider the simple case of reducing the incentive of rivals to cut prices with the possible outcome that all buyers pay the monopoly price. While such an outcome would normally be seen as undesirable from the consumer's perspective, it might not be from the perspective of a retailer. The latter may be more concerned that it is now competing with rivals who were offered a lower price than it is with obtaining the lowest price. The latter is especially the case where much of the over-charge can be passed on to consumers. Unless one is prepared to assume that consumers are more concerned with having paid the same as all other consumers rather than with getting a good deal, the meet-the-competition guarantee literature does not add anything substantial to the present discussion.

Meet-or-release clauses are different because they do offer a better opportunity for the firm to price discriminate while at the same time protecting a firm from rivals controlling its prices entirely.²⁵ The clause is usually related to contracts where there is normally a penalty involved in switching contractual partner (supplier). The current supplier waives the penalty if it is unable or unwilling to match the better offer. This enables the firm to assess how much it is willing to pay to retain the consumer. Where the current supplier has better information about the customer than any other potential supplier, note that the clause imposes a “winner’s curse” on any supplier who is successful in gaining a new customer. The current supplier is only willing to release a customer who it finds too costly to

²² This refers to the practice of selling some products below costs in order to lure in customers who will also buy other products with positive profit margins.

²³ This refers to the practice of offering a low price on some (usually low quality) variants with the aim of enticing the consumer to switch to a more expensive variant once they are in the store.

²⁴ On the importance of restrictions, see Nalca et al (2010).

²⁵ They also have anti-competitive potential along the lines discussed in Sections 2.1-2.3, see Salop (1986) and Schnitzer (1994).

supply. Unless a rival would have lower costs of supplying the same customers, then a success in attracting a consumer from a rival firm would be a poisoned chalice. If lower prices only succeed in attracting consumers who it is relatively expensive to supply, such guarantees will clearly have a dampening effect on competition.

2.9 A missing part of the puzzle

The existing academic literature does not deal fully with the potential risks of price guarantees.²⁶ Note that price beating guarantees, and guarantees relating to selling rather than advertised prices, are particularly risky. If consumers are very active in the market, a rival firm could lower its price and trigger a very large price refund potentially taking the firm's selling price substantially below its avoidable costs. Depending on how quickly the firm can react, such losses could be sizeable. That firms are alive to these risks is evident from the data discussed in Arbatskaya et al (2004). Where payouts could be substantial, firms include carefully chosen restrictions on the validity of the guarantee.

2.10 How might consumers react to guarantees?

Where the communication embodied in a price guarantee is intended for (potential) consumers rather than to rivals, a key issue is how consumers view the guarantees. There are several options:

- Scepticism - consumers simply do not believe guarantees and hence ignore them [but if firms believed that consumers would not take up guarantees, why impose restrictions?]
- Consumers believe the message and stop searching/select the seller on the basis of guarantee [see section 2.5 above]
- Consumers buy but then search further post-purchase to find a good deal to combine with the refund [see section 2.6 above]
- Consumers respond to a lower price, not just by requesting a refund, but also by changing future purchasing decisions. [See section 3.2 below]

While to date there appear to be no economic models of price guarantees drawing on behavioural economics, various experimental work discussed in section 3.2 below have tried to address some of the issues arising.

2.11 The overall lessons from theoretical models

The theoretical literature offers a series of possible motives for, and effects of, price guarantees. While many of the effects are anti-competitive, we have seen that this is not the case for all. For example, both the signalling motive in Section 2.5 and the price discrimination motive in Section 2.4 can benefit at least some consumers through lower prices. The theoretical models have also provided us with some testable hypotheses and with some clues to how one might be able to distinguish between the various effects empirically.

²⁶ Morthy and Winter (2006) mentions the risk involved in delegating the control of one's price to a rival.

3 Empirical evidence

As pointed out in Winter's (2008) survey, the competing theories are at least theoretically plausible so that it becomes a matter for empirical research to try to separate out when each of them is credible. As Mago and Pate (2009) put it: "The empirical literature aimed at testing the effect of price matching policies is both scarce and inconclusive." While no strong conclusions may be drawn, the literature does offer some indications as to where regulators and competition authorities should look for guidance.

Key messages from this section:

- Each of the motives from Section 2 are empirically plausible.
- In individual cases it is possible to rule out some of the motives.
- The details of the guarantees are chosen with care and are important in understanding the possible motives of the firms adopting the guarantees.
- The experimental literature find price raising effects of guarantees.

Before turning to the evidence, it is important to highlight one of the difficulties in empirical research on price guarantees. It is important that the market which is being studied is defined appropriately. For example, if all guarantees offered by tyre retailers are restricted to be valid only for rivals within 10 miles, it may not be appropriate to look at the whole of London as one market. Similarly, if department stores only compete with other department stores, then including the guarantees or prices of other types of stores may not be appropriate. We return to this in our discussion of the empirical evidence.

3.1 Empirical evidence

Hess and Gertner (1991) provide early evidence from US supermarkets that price guarantees are consistent with higher prices and also that price differences are reduced after a guarantee was introduced. Like Hess and Gerstner (1991), Mañez (2006) shows that price guarantees reduce price variability, a result also found in Moorthy and Winter (2006). Mañez also demonstrates that for the case of UK supermarkets, it does appear that the firm adopting the guarantee did have the lower prices at the time. The data does, however, leave at least one puzzle. For the products covered by the guarantee, it does appear that rivals were able to match the lower price because they did so. If the signal implied in the guarantee really had a strong effect in terms of moving market share to the signalling firm, why did rival firms only match prices and not also offer their own price guarantees?

Looking at selected advertisements from the US tyre industry, Arbatskaya et al (1999) find weak support for guarantees being anti-competitive. Although a tyre retailer's own price guarantee has no significant effect on the retailer's advertised tyre price, an increase in the percentage of firms in the same market announcing low-price guarantees tends to raise the firm's advertised tyre price.

Arbatskaya et al (2004) looked at advertisements with price guarantees from a broad selection of US newspapers. The key result from their paper is that the guarantees appeared purposeful and that the details of the guarantees appeared

to be carefully drafted. They also found that the observed pattern of guarantees and restrictions on applicability did not appear consistent with any one specific theory from Section 2. They find instead that from their data none of the theories in Section 2 could be ruled out.

A similar conclusion, that observed guarantees were not used for a single purpose, was also found in Arbatskaya et al (2006) who looked at paired observations on tyre prices. Each observation was a pair of prices on the same tyre, with the same date and the same newspaper, where one firm had a price guarantee and the other did not. They showed that in observations involving price-matching guarantees, the firms with the price-matching guarantees tended to have weakly higher advertised prices than the firms with no guarantees, whereas in paired observations involving price-beating guarantees, the opposite was true. This suggests that price-matching and price-beating guarantees might be serving different purposes in practice. The data also suggests that there is a difference between low-price guarantees that apply to firms' selling prices and low-price guarantees that apply to firms' advertised prices. Guarantees that apply to firms' selling prices were more likely to be consistent with their use as a device to discourage price cutting than guarantees that apply only to advertised prices.

Moorthy and Zhang (2006) base the evidence to support their signalling story on data obtained from 46 retailers in the US and Canada in five categories: department stores; electronics stores, camera stores, sporting goods stores and office supply stores. First, and consistent with other empirical studies, they find that generally the frequency of redemption is not consistent with the price discrimination story in Section 2.4.²⁷ Second, they find that price guarantees are mostly associated with chain-stores, which they argue are also the low-cost stores. However, it may well be that the non-chain-store outlets compete on something different from prices. Thus, it may simply be a matter of market definition.²⁸ Arbatskaya *et al.* (2004) found examples where chain stores restricted their guarantees to other chain-stores, or their guarantees differentiated between chain and non-chain stores. A similar issue emerges in their evidence of the link between low prices and price guarantees. For toys and office equipment, the fraction with price guarantees is more or less the same for the cheapest and the second cheapest outlet. It may well be that the real competition is only among these stores, in which case one could not rule out the data being consistent with the collusive story in Section 2.1 as well as the signalling story in Section 2.5. The empirical work in Moorthy and Zhang (2006) is intriguing and offers some support for the signalling model although similar issues related to market definition can be raised. A second concern is the lack of information about the restrictions included in the guarantees and hassle costs involved. Moorthy and Zhang (2006) show that chains with price matching have fewer employees per square feet. Such outlets might plausibly involve higher hassle costs for consumers wanting to make use of the guarantee since it must, all else being equal, be harder to find an employee

²⁷ That said, they did find one store where 25% of customers had redeemed the guarantee. This fraction is not really consistent with any other equilibrium than the price discrimination equilibrium. It is, however, consistent with a temporary breakdown in several of the other equilibria discussed in Section 2 above.

²⁸ From the office chain-store merger case in the US involving Staples and Office Depot, we know that the court accepted a market definition such that the chain-stores were seen as different from other outlets selling office products.

who is able to authorise a payout on a price guarantee. Taken as a whole, their empirical evidence, rather than providing strong support for the signalling story, adds to the picture of everything being possible.

While other empirical studies have used the fact that not all firms offer price guarantees, Chen and Liu (2009) look at the case where all firms offer some form of guarantee, but the details of the guarantees differ. They find that stores offering price beating rather than price matching tend to have higher average prices. Higher prices are associated with the inclusion of one's own price²⁹, and guarantees offering a 14-day period in which to find a lower price were associated with higher prices than those offering either a 3- or 30-day period.

A criticism which would be valid for Arbatskaya *et al* (1999, 2004, 2006), Moorthy and Winter (2006), and Moorthy and Zhang (2006) is that the results are highly dependent on getting the market definition right. Even if two firms advertise in the same paper, they may still be located so far from each other that they are not really competing and, hence, firms may not be targeting their guarantees at each other. Chain stores and non-chain stores may not be in the same market so that observing most chain stores adopting a price guarantee may support the price raising motive in Section 2.1 on a narrow market definition or the signalling motive in Section 2.5 on a broad market definition.

3.2 Experimental literature.

“This lack of unequivocal conclusion regarding price guarantees is not surprising when we account for the difficulties encountered in the field data. ... Experimental methods, on the other hand, can provide direct empirical evidence. In the laboratory, basic underlying structural and informational conditions are induced and hence known.” Mago and Pate (2009).

The experimental literature falls into two different categories. One is testing the behaviour of firms, the other the behaviour of consumers.

3.2.1 Testing firm behaviour

This literature is essentially testing the theory discussed in Section 2.1 above. Findings³⁰ consistently support the prediction of theory that price matching guarantees lead to higher prices than no guarantees. This provides surprisingly strong support for the collusive motive and much stronger support than found in the empirical literature discussed above.

3.2.2 Testing consumer behaviour

There are a number of papers³¹ seeking to understand how consumers respond to firms who offer guarantees which are violated in practice. There are two types of violations considered in the literature. One is simply that despite the guarantee of low prices, there is a lower price elsewhere and hence the guarantee should be

²⁹ However, Chen and Liu appear to find the opposite result in another paper (Chen and Liu, 2010).

³⁰ See for example Deck and Wilson (2003), Fatas and Mañez (2007), Dugar (2007), Dugar and Sorensen (2006), Mago and Pate (2009).

³¹ See for example Dutta *et al* (2007), Biswas *et al* (2006), Dutta and Biswas (2005), Kukar-Kinney and Walters (2003), Kukar-Kinney and Grewal (2006, 2007), Kukar-Kinney *et al.* (2007) Lurie and Srivastava (2005) and Srivastava and Lurie (2001, 2004).

activated. The second violation is a refusal to pay out on a guarantee. The experiments follow a similar pattern in that the researchers conduct a series of experiments involving asking students to consider various hypothetical behaviours by firms. While the answers may give some indication of what might happen in a real market, without hard purchasing and refund decisions, there is a limit to how much value can be placed on such experiments. This is particularly the case as most of this research is trying to understand how consumers would react to disappointment.³²

4 Case law and regulatory decisions

There is very little case law to point to in this area. It is not clear whether or not price guarantees qualify as evidence of concerted practices under Article 101 TFEU; but, as an example, there is no obvious way for competition law to tackle the case described in Hviid and Shaffer (2010) where one firm unilaterally adopts a guarantee. Some guarantees can amount to an abuse of dominance and hence fall under Article 102 TFEU. Price guarantees have been more likely to attract attention from advertising standards regulators and consumer protection bodies.

4.1 Case law

The “meet-or-release clause” is so far the only clause to attract competition law attention at the EU level, where clauses of this kind are also referred to as the “English clause”. In *Hoffmann-La Roche*³³ the “meet-or-release clause” was found to aggravate the exploitation of the dominant position in an abusive way by allowing Hoffman-La Roche to identify its competitors more easily as a result of the clauses. The clauses are also mentioned in paragraph 129 of the new EC Commission guidelines on vertical restraints³⁴ :

“A so-called ‘English clause’, requiring the buyer to report any better offer and allowing him only to accept such an offer when the supplier does not match it, can be expected to have the same effect as a single branding obligation, especially when the buyer has to reveal who makes the better offer.”

An English contract case, *Esso v Niad*,³⁵ shed interesting light on the practicalities of price guarantees. *Esso* successfully sued a petrol retailer Niad for breach of a contract relating to its then price guarantee, known as the *Esso Pricewatch* scheme.³⁶ Although a contract rather than competition case, the details about the guarantee shed some light on how varied these can be.

Pricewatch used a computer system called Priceline to which each participant fed prices from identified rivals (marker sites) taken daily. In return they were told what price to charge. This enabled Esso to respond to price changes by key rivals within hours rather than days. Priceline did not necessarily tell a participating

³² This is not to say that punishment by consumers when they feel wronged by a retailers can not or does not happen, see Anderson and Simester (2008).

³³ Case 85/76 *Hoffmann-La Roche & Co AG v EC Commission* [1979] ECR 461 paras 107-108.

³⁴ EC Guidelines on Vertical Restraints OJ (2010/C 130/01)

³⁵ *Esso Petroleum Co Ltd v Niad Ltd* - [2001] All ER (D) 324 (Nov)

³⁶ This guarantee is no longer offered.

petrol station to match the lowest price that had been reported. For example, the pricing strategy in the case Esso vs NIAD implied that the Esso petrol station priced 1 penny per litre above its nearest rival, implying that if NIAD always accepted the proposed prices from Priceline, it would never have the lowest price.

From a competition perspective, the question one should ask is whether it is more likely that the guarantee was addressed to rivals or consumers. If the answer is the latter we need to explain why consumers believed the signal despite consistently seeing the Esso retailer having the highest price in the region.

4.2 Regulation

The Advertising Standards Authority (ASA) and the Committee of Advertising Practice (CAP) provide some regulation of guarantees. For example, to comply with the British Code of Advertising, Sales Promotion and Direct Marketing (the CAP code), firms who have adopted a price guarantee must take steps to monitor prices and to respond to lower prices elsewhere. The “Help Note on Lowest Price Claims and Price Promises”, paragraph 4.2, states:

“if they claim they always offer the lowest prices, marketers should develop a price monitoring and adjustment policy to ensure that that claim can be supported. Again, that might involve carrying out extensive monitoring of all relevant competitors’ prices and lowering their prices when those competitors publish or announce lower prices.”

The relevance here is that the Code itself makes the promise to rivals to match them credible. One valid criticism of some of the theoretical models presented in Section 2 above is that if consumers largely ignore the guarantees, they will have no effect. This critique would not be valid where a code requires the firm to respond to even a single request for a refund by immediately lowering its advertised price to that of a lower-priced rival. Indeed the Code, if taken literally would at the same time boost the credibility of guarantees to reduce the incentive of a rival to cut prices and remove the power of the guarantees to be used to price discriminate.

5 Conclusion

The overall picture of the effects of, and motives for, price guarantees is varied. Price guarantees can stifle competition either by removing the incentives for rivals to compete on prices or removing the incentive of consumers to seek out lower prices. They can also help consumers identify genuinely lower priced firms and they can lead to price discrimination which, while hurting some consumers, increases welfare overall. The empirical evidence is as mixed as the theoretical results.

The first conclusion to take from the literature is that none of the effects or motives can be ruled out globally on theoretical or empirical grounds but that some of the effects or motives can be ruled out for specific industries or countries. A second and arguably as important conclusion from the literature is that the details of the guarantees matter; that firms take care to get the details right and that much can be learned about the effects of the guarantees in a specific market by studying these details carefully.

6 Literature:

Anderson, E. and D. Simester, 2008, "Research Note: Does Demand Fall When Customers Perceive That Prices Are Unfair? The Case of Premium Pricing for Large Sizes", *Marketing Science* 27(3), 492–500.

Arbatskaya, M., 2001, "Can Low-Price Guarantees Deter Entry", *International Journal of Industrial Organization* 19, 1387-1406.

Arbatskaya, M., Hviid, M., and G. Shaffer, 1999, "Promises to Match or Beat the Competition: Evidence from Retail Tire Prices", *Advances in Applied Microeconomics* 8, 123-138.

Arbatskaya, M., Hviid, M., and G. Shaffer, 2004, "On the Incidence and Variety of Low-Price Guarantees", *Journal of Law and Economics* 47, 307-332.

Arbatskaya, M., M. Hviid and G. Shaffer, 2006, "On the Use of Low-Price Guarantees to Discourage Price-Cutting: A Test for Pairwise-Facilitation", *International Journal of Industrial Organization* 24, 1139-1156.

Baye, M. and D. Kovenock, 1994, "How to Sell a Pickup Truck: 'Beat-or-Pay' Advertisements as Facilitating Devices", *International Journal of Industrial Organization* 12, 21-33.

Belton, T., 1987. "A model of duopoly and meeting or beating competition", *International Journal of Industrial Organization* 5, 399–417.

Biswas A., Sujay D. and C. Pullig, 2006, "Low Price Guarantees as Signals of Lowest Price: The Moderating Role of Perceived Price Dispersion," *Journal of Retailing* 82, 245-257.

Chen, J. and Q. Liu ,2009, "Price Levels, Price Dynamics, and Low-Price Guarantees", mimeo.

Chen, J. and Q. Liu, 2010, "Most-Favored Customer Clauses Facilitate Competition", mimeo.

Chen, Z., 1995, "How Low is a Guaranteed-Lowest-Price?", *Canadian Journal of Economics* 28, 683-701.

Chen, Y., Narasimhan, C. and Z. J. Zhang, 2001, "Consumer Heterogeneity and Competitive Price-Matching Guarantees", *Marketing Science* 20, 300-314.

Corts, K., 1995, "On the Robustness of the Argument that Price-Matching is Anti-Competitive", *Economics Letters* 47, 417-421.

Corts, K., 1996, "On the Competitive Effects of Price-Matching Policies", *International Journal of Industrial Organization* 15, 283-299.

Coughlan A.T. and G. Shaffer, 2009, "Price-Matching Guarantees, Retail Competition, and Product-Line Assortment", *Marketing Science* 28, 580-588.

Deck, C. and B. Wilson, 2003, "Automated pricing rules in electronic posted offer markets", *Economic Inquiry* 41, 208–223.

Doyle, C., 1988, "Different Selling Strategies in Bertrand Oligopoly", *Economics Letters* 28, 387-390.

- Dugar, S., 2007, "Price-matching guarantees and equilibrium selection in a homogenous product market: an experimental study", *Review of Industrial Organization* 30, 107–119.
- Dugar, S. and T. Sorensen, 2006, "Hassle costs, price-matching guarantees and price competition: an experiment", *Review of Industrial Organization* 28, 359–378.
- Dutta, S. and A. Biswas, 2005, "Effects of Low Price Guarantees on Consumer Post-Purchase Search Intention: The Moderating Roles of Value Consciousness and Penalty Level", *Journal of Retailing* 81, 283-291.
- Dutta S., A. Biswas and D. Grewal, 2007, "Low Price Signal Default: An Empirical Investigation of its Consequences," *Journal of the Academy of Marketing Science* 35, 76-88.
- Edlin, A., 1997, "Do Guaranteed-Low-Price Policies Guarantee High Prices, and Can Antitrust Rise to the Challenge?", *Harvard Law Review* 111, 528-575.
- Edlin, A., and E. Emch, 1999, "The Welfare Losses from Price-Matching Policies", *Journal of Industrial Economics* 47, 145–68
- Fatás, E. and J. Mañez, 2007, "Are low-price compromises collusion guarantees? An experimental test of price matching policies", *Spanish Economic Review* 9, 59-77.
- Hay, G. 1982, "Oligopoly, Shared Monopoly, and Antitrust Law", *Cornell Law Review* 28: 439-481.
- Hess, J. and E. Gerstner, 1991, "Price Matching Policies: an Empirical Case", *Managerial Decision Economics* 12, 305-315.
- Hviid, M. and G. Shaffer, 1994, "Do Low-Price Guarantees Facilitate Tacit Collusion", University of Michigan working paper, 94-02.
- Hviid, M. and G. Shaffer, 1999, "Hassle-Costs, The Achilles Heel of Price-Matching Guarantees", *Journal of Economics and Management Strategy* 8, 489-521.
- Hviid, M. and G. Shaffer, 2010, "Matching Own Prices, Rivals' Prices, or Both", Forthcoming in *Journal of Industrial Economics*.
- Jain, S. and J. Srivastava, 2000, "An Experimental and Theoretical Analysis of Price-Matching Refund Policies", *Journal of Marketing Research* 37, 351-362.
- Janssen, M. and A. Parakhonyak, 2009, "Minimum Price Guarantees in a Consumer Search Model", Tinbergen Institute working Paper TI 2009-089/1
- Kaplan, T., 2000, "Effective Price Matching: A Comment", *International Journal of Industrial Organization* 18, 1291-1294.
- Kukar-Kinney, M. and R. G.Walters, 2003, "Consumer perceptions of refund depth and competitive scope in price-matching guarantees: effects on store patronage, *J Retail* 79 (2003), pp. 153–160.
- Kukar-Kinney, M. and D. Grewal, 2006, "Consumer Willingness to Claim a Price-Matching Refund: A Look into the Process", *Journal of Business Research* 59.
- Kukar-Kinney, M. and D. Grewal D, 2007, "Comparison of consumer reactions to price-matching guarantees in internet and bricks-and-mortar retail environments", *Journal of the Academy of Marketing Science* 35, 197-207.

- Kukar-Kinney, M. R. G. Walters and S. B. MacKenzie, 2007, "Consumer responses to characteristics of price-matching guarantees: The moderating role of price consciousness", *Journal of Retailing* 83, 211-221.
- Logan, J. and R. Lutter, 1989, *Guaranteed Lowest Prices: Do They Facilitate Collusion*, *Economics Letters* 31, 189-192.
- Lu, Y and J. Wright, 2010, "Tacit collusion with price-matching punishments", *International Journal of Industrial Organization* 28(3), 298-306
- Lurie, N. H. and J. Srivastava, 2005, "Price-Matching Guarantees and Consumer Evaluations of Price Information". *Journal of Consumer Psychology* 15, 149-158.
- McWilliams, B and E. Gerstner, 2006, "Offering low price guarantees to improve customer retention", *Journal of Retailing* 82, 105-113.
- Mañez, J., 2006, "Unbeatable value: Collusive mechanism or advertising strategy". *Journal of Economics and Management Strategy* 15, 143–166.
- Mao, W., 2005, "Price-Matching Policy with Imperfect Information," *Managerial and Decision Economics* 26, 367-372.
- Mago, S. D. and J. G. Pate, 2009, "An experimental examination of competitor-based price matching guarantees", *Journal of Economic Behavior & Organization* 70, 342-360.
- Moorthy, S. and R. A. Winter, 2006, "Price-matching guarantees", *The RAND Journal of Economics* 37, 449-465.
- Moorthy, S., & Zhang, X. 2006. "Price matching by vertically differentiated retailers: Theory and evidence". *Journal of Marketing Research* 43, 156–167.
- Nalca, A., T. Boyaci and S. Ray, 2010, "Competitive price-matching guarantees under imperfect store availability", *Quantitative Marketing and Economics*
- Png, I.P.L. and D. Hirshleifer, 1987, "Price Discrimination Through Offers to Match Price", *Journal of Business* 60, 365-383.
- Salop, S., 1986, "Practices that (Credibly) Facilitate Oligopoly Coordination", in: J. Stiglitz and F. Mathewson, eds., *New Developments in the Analysis of Market Structure*, MIT Press, Cambridge, MA.
- Schnitzer, M., 1994, "Dynamic Duopoly with Best-Price Clauses", *The RAND Journal of Economics* 25, 186-196
- Srivastava, J. and N. H. Lurie, 2001, "A consumer perspective on price-matching policies: Effect on price perceptions and search behavior". *Journal of Consumer Research* 28, 296–307.
- Srivastava, J. and N. H. Lurie, 2004, "Price-matching guarantees as signals of low prices". *Journal of Retailing* 80, 117–128.
- Stole, L., 2007, "Price Discrimination and Competition", in M. Armstrong and R. Porter (Eds.), *Handbook of Industrial Economics* vol. III, North-Holland.
- Winter, R. A., 2008, "Price-Matching and Meeting Competition Guarantees", in *2 Issues in Competition Law and Policy* 1269 (ABA Section of Antitrust Law)
- Zhang, J., 1995, "Price-matching Policy and the Principle of Minimum Differentiation", *Journal of Industrial Economics* 43, 287-299.