Hub and Spoke Cartels: Incentives, Mechanisms and Stability

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Abstract

A hub and spoke cartel entails both horizontal collusive behaviour and the involvement of at least one member operating at a different level of the supply chain. The blend of vertical and horizontal restraints raises both economic and legal questions. This article explores the main determinants for the existence of hub and spoke cartels. Based on twelve cases, we first build a typology and analyse three types of hub and spoke cartels. We focus on the structure of the cartel, the collusive mechanism and the economic incentives of participants. For each type, we thus discuss the elements that are necessary to fix the anticompetitive cooperation. In a second phase, we present descriptive statistics on the number of players, on cartel duration and on the length of investigations. Finally, we present a brief generalised summary for two main H&S cartel types. The purpose is to gain a better understanding of the hub and spoke cartel phenomenon.

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I. Introduction

Antitrust enforcement aims to prevent and detect illegal anticompetitive behaviour between independent competitors. A common practice is to distinguish between horizontal and vertical restraints. While anticompetitive horizontal agreements or practices are imposed to reduce competition, vertical restraints may be imposed to reduce inefficiencies within the vertical structure. Although this distinction facilitates cartel prosecution, competition authorities increasingly encounter cartels that cannot easily be classified as operating purely horizontal, nor as purely vertical.

A hub and spoke (H&S) cartel entails horizontal collusive behaviour[1] between the competitors as well as vertical 'agreements' between a firm operating at a different level of the supply chain and each competitor. For reasons of simplicity, let us consider a market composed of two manufacturers (M1 and M2) and two distributors (D1 and D2). In that case, the H&S cartel is composed by three members of the market, either one manufacturer and both distributors or both manufacturers and one distributor. Falls and Saravia (2015)[2] distinguish three types of H&S cartels in function of their members' primary intention:

- Type 1: the collusive behaviour primarily reduces competition between the manufacturers, e.g. D1 wishes to foreclose the market by persuading M1 and M2 not to deal with D2;
- Type 2: the collusive behaviour primarily reduces competition between the distributors, e.g. D1 and D2 wish to coordinate their conduct and persuade M1 or M2 to help coordinate the anticompetitive conduct; and
- Type 3: the collusive behaviour reduces competition at both levels, e.g. M1 facilitates the coordination between D1 and D2, and in exchange, D1 and D2 do not deal with M2.

[1] Multiple terms are used to describe anticompetitive behaviour. Recently Gonzalez (2018) describes collusion as referring to both agreements and concerted practices (following Article 101TFEU). Collusion is considered a broad term to refer to potential anticompetitive behaviour in the EU as well as in the US. Hay (2006) uses the term 'conspiracy' to refer either to a contract or a concerted action. A conspiracy can refer broadly to parallel conduct that can be either lawful or unlawful. Throughout the remainder of this article terms will be used interchangeably. While terminology is key in competition authorities' analysis of anticompetitive behaviour, it is the effect that is important for our typology of hub and spoke cartels, rather than the terms used to describe it.
Catalina Gonzalez Verdugo, Horizontal Restraint Regulations in the EU and the US in the Era of Algorithmic Tacit Collusion (2018) 7 UCLJLJ 114; George A Hay, 'Horizontal agreements: Concept and Proof' (2006) Cornell Law Faculty Publications.

[2] Craig G Falls and Celeste Savaria, 'Analyzing Incentives and Liabilities in "Hub-and-Spoke" Conspiracies' (2015) Cornerstone Research.

The involvement of a cartel member from outside the horizontal collusion is not unique to H&S cartels. Indeed, we observe multiple horizontal anticompetitive practices involving a third party.[3] The specificity of a H&S cartel stems from the fact that the third party is either a common distributor or a common manufacturer to the members of the horizontal collusion. This common player is called 'the hub'. This particularity then coincides with several vertical restraints[4] through the hub's relationships with the 'spokes'. Three forms of vertical restraints are observed in H&S cartels, i.e. i) resale price maintenance[5] (RPM), ii) exclusive dealings, and iii) most favoured nation clauses[6] (MFN). The vertical restraints between the hub and the spokes facilitate horizontal collusion without direct communication between the spokes. While horizontal and vertical elements are jointly present in these H&S cases, competition authorities normally take a different approach when assessing them. These aspects of H&S cartels hence trigger both economic and legal complexities.

Regarding the legal framework, the basic EU rules on anticompetitive behaviour and its illegality can be found in Article 101TFEU[7]. Additional guidance can, among others, be found in the horizontal guidelines.[8] Two elements are especially important regarding the assessment of H&S cartels. First, concerted practices can be illegal without the clear presence of an agreement (parallel conduct that by object or effect restricts competition). Second, the guidelines refer to the potential involvement of a third party for an indirect exchange of information. This means that the exchange of pricing information amongst competitors via a third party is likely to infringe Article 101TFEU even if the facts do not support the finding of an agreement.[9] In the US, conspiracies in restraint of trade are made illegal under Section 1 of the Sherman Act.[10] When there is no clear agreement, plaintiffs must provide evidence that a

[3] Parallel to the OECD Competition Committee, we define a third party as any entity outside the horizontal collusion, e.g. a common business partner (purchaser or provider), a government agency, a health care consultant, an academic institution, or a trade association. OECD, 'Information Exchanges between Competitors under Competition Law' (2010) DAF/COMP(2010)37.

[4] Vertical restraints refer to vertical agreements that restrict in some way the commercial freedom for one or both parties of the agreement. For more details see Verouden (2008). Vincent Verouden, 'Vertical agreements: Motivation and impact' (2008) 3 Competition Law and Policy 1813.

[5] Or recommended resale price including threat in case of non-compliance.

[6] Only in the *e-books* (2015) case. Cases 13-3741-cv, 13-3748-cv, 13-3783-cv, 13-3857-cv, 13-3864-cv, 13-3867-cv *United States v Apple Inc.* [2014] US 2d Cir.

[7] Consolidated Version of the Treaty on the Functioning of the European Union [2012] OJC326 of 26.10.2012, Art 101.

[8] European Commission Communication, Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements [2011] OJC11/01 of 14.01.2011.

[9] Elizabeth Prewitt and Greta Fails, 'Indirect information exchanges to hub and spoke cartels: enforcement and litigation trends in the United-States and Europe' (2015) 1(2) Competition Law and Policy Debate.

[10] US Code text, Title 15, Chapter 1, §1, 'The Sherman Antitrust Act' <http://www.law.cornell.edu/uscode/text/15/1> accessed 20 October 2018.

'meeting of the minds' has occurred. While the EU and the US clearly voice concerns regarding indirect information exchange, no detailed guidance is provided as to how this flow of information should be assessed.[11] Indirect forms of information exchange make it more difficult to assess whether competition is distorted, and therefore whether the legal provisions apply. The Federal Trade Commission explains the difficulty of distinguishing between vertical and horizontal agreements in the following way:

> *"The antitrust laws, which aim to preserve and protect competition in economically sensible markets, have long drawn a sharp distinction between contractual restrictions that occur up and down a distribution chain - so-called vertical restraints - and restrictions that come about as a result of agreements among competitors, or horizontal restraints. Sometimes, however, it can be hard as a matter of fact to be sure what kind of agreement is at issue."*[12]

An exception in European legislation can be found in the UK guidelines on market restraints. Aiming to expand antitrust laws to H&S cartels, the British Court of Appeal explains that undertakings in a H&S situation may be considered as member of a single illicit agreement, in contrast to a multitude of separate vertical agreements[13]. Despite a growing number of studies on liability in H&S cartels[14], the legal test established by the Office of Fair Trading (renamed Competition and Markets Authority since 2014) and the British Court of Appeal remains the major legislative advance for the prosecution of this type of unlawful indirect information exchange.

Also from an economic point of view, the incentives to form a H&S cartel are not straightforward. While the incentive of cartel members in horizontal collusion is to reduce competition, we cannot draw the same conclusion for the members of a H&S cartel. At first sight, in a Type 1 H&S cartel, M1 and M2 would a priori never benefit from the exclusion of a second channel of distribution (D2). The spokes both lose an outside option (their bargaining power decreases) as well as the opportunity to sell more units.[15] In a Type 2 H&S cartel, M1 would a priori never benefit from a decrease of competition between D1 and D2. Fierce

[11] Okeoghene Odudu, 'Indirect information exchange: The constituent elements of hub and spoke collusion' (2011) 7(2) European Competition Journal 205.
[12] Case 98-4107 *Toys R Us v FTC* [2000] US 7th Cir.
[13] See fn (n 11).
[14] Barak Orbach, 'Hub and spoke conspiracies' (2016) 15(3) Antitrust Source; Roberto Amore 'Three (or more) is a magic number: hub & spoke collusion as a way to reduce downstream competition' (2016) 12(1) European Competition Journal 28.
[15] In the next sections, we explain that the benefit from higher sales depends on the wholesale price per unit which in turn directly depends on the bargaining power between a manufacturer and a distributor.

competition at the retail level would increase sales. When the wholesale price remains the same, the profit of M1 would be higher. The complexity that incentives may not be aligned for all members generates multiple interesting questions[16]: How do the incentives of a hub differ from those of the spokes?; Why does horizontal collusion appear?; Under which conditions can we expect the formation of a H&S cartel?; Can we explain the relatively short duration of these cartels?; and Can we explain the relatively long duration of H&S cartel investigations?

This article aims to answer these questions based on the analysis of twelve cases. Section 2 briefly reviews the relevant literature regarding H&S cartels. In Section 3, we describe each type of H&S cartel, present a visualisation, and discuss the economic intuition regarding the behaviour of the companies involved. Section 4 focuses on the structure of these cartels. Based on descriptive statistics, we report and discuss the relatively short duration of H&S cartels, the number of cartel members as well as the relatively long length of procedures by competition authorities. In Section 5, we present generalised summaries of Type 1 and Type 2 H&S cartels. Finally, Section 6 concludes and proposes paths for future research.

II. A Brief Review of the Literature

As H&S cartels constitute a rather recent phenomenon for competition authorities, literature on the topic is rather scanty. We currently find two main lines of research, i.e. *economic models and descriptive studies.*

A first *economic model* is presented by Van Cayseele and Miegielsen (2013)[17] who develop a H&S model with one manufacturer and two distributors that includes the option for the manufacturer to threaten distributors with an embargo. Their results suggest that a credible embargo threat makes the cartel more stable. The manufacturer has incentives to stabilise the cartel when distributers have substantial bargaining power and when product differentiation is limited. Sahuguet and Walckiers (2016)[18] use a similar market structure without the embargo threat. When demand increases, horizontal collusion becomes harder to sustain as the resulting payoff from deviation is higher. In such a setting, distributors need the help of the manufacturer to avoid price competition. The manufacturer supports the stability of the horizontal collusion

[16] A Type 3 H&S cartel is a special case where the incentives of all members are aligned.

[17] Patrick Van Cayseele and Simon Miegielsen, 'Hub and spoke collusion by embargo' (2013) CES13.24 Discussion paper.

[18] Nicolas Sahuguet and Alexis Walckiers, 'A theory of hub and spoke collusion' (2017) 53 International Journal of Industrial Organization, 353.

in exchange for information regarding demand variation. Subsequently, the wholesale price is increased when demand is high. This reduces the incentives to deviate and allows the manufacturer to capture an additional rent. H&S cartels can thus avoid double marginalisation but distort competition at the retail level.

Concerning *descriptive studies*, Odudu (2011)[19] describes how the British Office of Fair Trading assesses H&S cartels. Emphasis is given to the indirect (third party) exchange of information[20] that facilitates the horizontal collusive behaviour. Cartel members' incentives, however, are not analysed and only Type 2 H&S cartels are considered.[21] Similarly, Bolecki (2011)[22] and Orbach (2016)[23] provide a descriptive analysis on Polish and US cases, respectively. Sahuguet and Walckiers (2013)[24] briefly explore both the manufacturer's incentives to foster horizontal collusion and the distributors' incentives to initiate the cartel. Van Cayseele (2014)[25] indicates that the major issue when analysing H&S cartels is understanding how the hub can contribute to cartel stability. This is potentially explained by enabling a faster and potentially safer exchange of credible information. However, it remains difficult to fully understand why the competitors could not establish the cartel without the hub, especially as different incentives are added when including the hub in such negotiations. Falls and Saravia (2015)[26] study US H&S cartels and establish a three-type taxonomy based on the primary intention of cartel members as presented in the previous section. This taxonomy sheds light on both the complexity and diversity of H&S cartels in terms of incentives and liabilities. They clarify that avoiding punishment and rent sharing are the two main incentives to participate in a H&S cartel (more specifically for the spokes in a Type 1 H&S cartel and for the hub in a Type 2 H&S cartel). Therefore, the threat of the hub must be credible and, especially for a Type 2 H&S cartel, competition at the level of the hub is needed. Finally, Harrington and Harker

[19] See fn (n 11).

[20] Odudu (2011) refers to sensitive market information, such as for instance information related to future pricing, promotional plans or advertising campaigns. See fn (n11).

[21] Incentives constitute a key issue regarding the legal treatment of H&S cartels. To show a competition law infringement, the British Office of Fair Trading needs to prove that (i) distributors pass information to the manufacturer anticipating that it will relay it to the other distributors, and (ii) distributors that receive the information know in which circumstance it was transmitted.

[22] Antoni Bolecki, ‘Polish antitrust experience with hub-and-spoke conspiracies’ (2011) 4(5) Yearbook for Antitrust and Regulatory Studies 26.

[23] See fn (n 14).

[24] Nicolas Sahuguet and Alexis Walckiers, ‘Selling to a cartel of distributors: A model of hub-and-spoke collusion’ (2013) DP9385 CEPR Discussion paper.

[25] Patrick Van Cayseele, ‘Hub-and-spoke collusion: Some nagging questions raised by economists’ (2014) 5(3) Journal of European Competition Law & Practice, 164.

[26] See fn (n 2).

(2018)[27] provide an extensive review of nine H&S cartels leading to a better understanding of their modes of operation. Mostly the hub will act as ringleader. While communication to organise the cartel seems more complicated for H&S cartels compared to traditional collusion, the hub has the advantage of normal interaction with the spokes through which it can collect additional information and monitor compliance.

Building on the extant literature and especially on the taxonomy of Falls and Saravia (2015)[28], we study the structure of H&S cartels, discussing incentives and mechanisms. In addition, we discuss the stability of these cartels as well as the length of competition authorities' investigations.

III. Economic Incentives and Cartel Mechanisms

This section analyses three types of H&S cartels. After presenting a visual representation for each cartel type, the following points are assessed:

- For Type 1: (i) Why do spokes agree to help the hub foreclose the market?; and (ii) Why does a horizontal collusion appear?
- For Type 2: (i) Why does the hub help spokes to establish horizontal collusion?; And (ii) How can the hub achieve what horizontal competitors alone cannot?
- For a Type 3: H&S cartel incentives are aligned for all members. We briefly discuss its structure.

[27] Joseph E Harrington and Patrick T Harker, 'How Do Hub-and-Spoke Cartels Operate? Lessons from Nine Case Studies' (2018) <https://joeharrington5201922.github.io/pdf/Harrington_Hub%20and%20Spoke%20Collusion_18.08.24.pdf.> accessed 23 November 2018.

[28] See fn (n 2).

Our analysis is based on twelve cases, divided among the three types of H&S cartels as presented in Table 1.[29] We directly observe that Type 2 H&S cartels are more common.[30] We illustrate each type by means of one case and then extend to other cases when relevant.

Table 1: Classification of Cases within the Three H&S Cartel Types

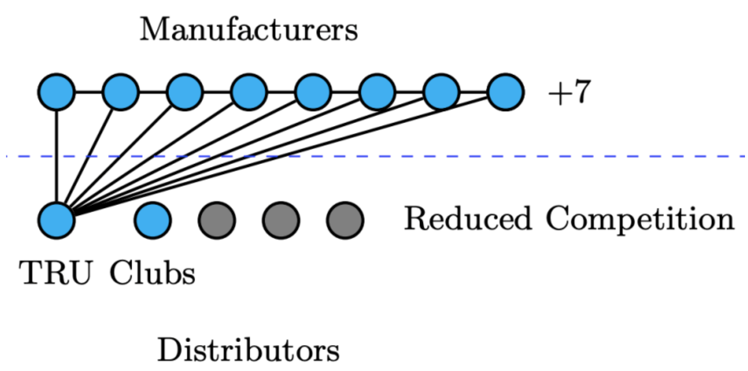
Type 1	**Type 2**	**Type 3**
Interstate Circuit (1939) Toys US (1988) Tobacco (2010)	Replica Football Kit (2003) Toys UK (2003) Double Glazing (2004) Paint and Varnishes (2006) Paint and Varnishes (2010) Paint and Varnishes (2010) Dairy (2011) Hygiene Products (2015)	E-books (2015)

Source: Own creation based on case analysis and literature review

1. Type 1 H&S Cartel

We illustrate a Type 1 H&S cartel by means of the *toys US* (1998) case where the agreement primarily reduces competition at the level of the manufactures. Figure 1 presents a schematic visualisation of this type of H&S cartel.

Figure 1: Type 1 H&S Cartel - Toys US (1988)



Source: Own creation based on case analysis

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[29] *Interstate Circuit Inc, et al v United States; Paramount Pictures Distributing Co Inc, et al v Same* [1939] US 306; Case 98-4107 *Toys R Us v FTC* [2000] US 7th Cir; Case CE/2596-03 *Tobacco* [2010] CA98/01/2010.
Case CP/0871/01 *Price-Fixing of Replica Football Kit* [2003] CA98/06/2003; Case CP/0480–01 *Agreements between Hasbro UK Ltd, Argos Ltd and Littlewoods Ltd Fixing the Price of Hasbro Toys and Games* [2003] CA/98/8/2003; Case CE/2464-03 *Agreement between UOP Limited, UKae Limited, Thermoseal Supplies Ltd, Double Quick Supplyline Ltd and Double Glazing Supplies Ltd to fix and/or maintain prices for desiccant* [2004] CA/98/08/2004; Case DOK-107/06 *Polifarb Cieszyn Wrocław* [2006] DOK-1-4000/7/05/MB/AS; Case DOK-4/2010 *Tikkurila* [2010] DOK-1-410/2/06/AS; Case DOK-12/2010 *Akzo Nobel* [2010] DOK-1-410/1/06/AS; Case CE/3094-03 *Dairy retail price initiatives* [2011] CA/98/03/2011; Case CONC-I/O-06/0038 *Hausses coordonnées des prix de vente des produits de produits de parfumerie, d'hygiène et de droguerie* [2015] ABC-2015-I/O-19-AUD.
Cases 13-3741-cv, 13-3748-cv, 13-3783-cv, 13-3857-cv, 13-3864-cv, 13-3867-cv *United States v Apple Inc.* [2014] US 2d Cir.
[30] Also explained by Harrington and Harker (2018). See fn (n 27).

a. Cartel Description

Toys US (1988) involves over fifteen manufacturers and a very strong retailer, Toys R Us (TRU) in the low price segment of the toys market. Other distributors do not directly compete with TRU. However, the entry of warehouse Clubs initiates direct competition with TRU. As a result, TRU starts bilateral negotiations with the manufacturers that agree to supply only highly differentiated products to Clubs, under the condition that all manufacturers cooperate. Hence, TRU orchestrates a horizontal collusion among its key manufacturers to boycott Clubs.

b. The Spokes' Incentive to Facilitate Foreclosure by the Hub

While TRU benefits directly from the elimination of price competition with the new entrant, it is less clear how the manufacturers benefit from this cartel. Complying with this agreement means losing the opportunity of a potentially profitable new channel of distribution. We expect the manufacturer only to follow this agreement if it somehow benefits from lower competition at the retail level. This can be the case when TRU maintains high retail prices and accepts relatively high wholesale prices. The alternative scenario would mean a downward pressure on wholesale prices that outweighs the additional revenue from an increase in units sold. However, the case does not present evidence to support this scenario. The reality is more bargaining power for TRU. There is even evidence that the manufacturers tried to reduce their dependence on TRU. As a result, TRU plays the embargo threat, meaning that the non-compliance of one manufacturer would mean its delisting. This scenario is in accordance with the rent and punishment theories of Falls and Saravia (2015)[31].

c. Why is a Horizontal Collusion Beneficial?

Two potential reasons come to mind when trying to explain horizontal collusion instead of multiple vertical restraints. The *first* one concerns TRU's interests, whose main challenge is to convince the manufacturers to give up a new distribution channel. By using an embargo threat, TRU convinces the major manufacturers to comply with horizontal collusion. The participation of all main manufacturers is necessary for this threat to be credible. Deviation by multiple manufacturers would mean high losses for TRU. The *second* reason is more intuitive and concerns the manufacturers. The manufacturers fear that when competitors deviate from the agreement, they would increase sales at their expense.

[31] See fn (n 2).

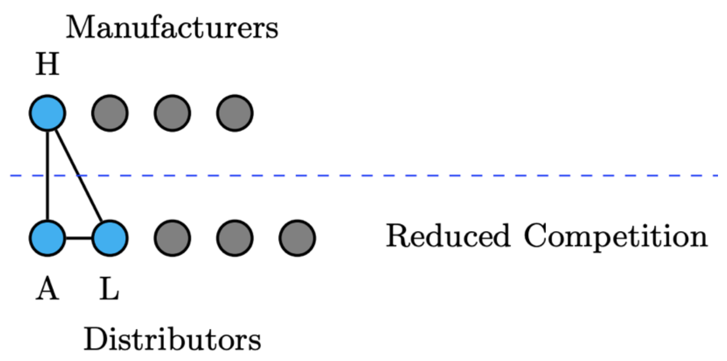
d. Lessons from Other Cases

Interstate Circuit (1939) shares commonalities with *toys US* (1988). A hub with a relatively high market share initiates a cartel upstream to reduce competition at its own level. The horizontal collusion consists of vertical restraints and an embargo threat, compliance being monitored by the hub. Monitoring and punishment are essential constituents of any cartel.[32] *Tobacco* (2010) has similarities as well as differences compared to the two previous cases. The situation is somewhat reversed with two hubs at the supply level and multiple spokes at the retail level. In addition, the reduction of competition vertically is characterised by horizontal collusion rather than by exclusive dealings. This situation has already been examined in the economic literature. Manufacturers in an oligopolistic market may support vertical restraints (e.g. RPM) when they face a competitive market at the retail level.[33] Substantial competition at the level of distribution[34] results in retail prices that are close to marginal cost. By imposing an RPM, manufacturers fix the number of units sold, which renders deviation less profitable. The result is reduced competition at the vertical level of the cartel and a fixed price (under embargo threat) at the horizontal level.

2. Type 2 H&S Cartel

We illustrate a Type 2 H&S cartel by means of the *toys UK* (2003) case where collusive behaviour primarily reduces competition at the level of the distributors. A schematic visualisation is provided in Figure 2.

Figure 2: Type 2 H&S Cartel - Toys UK (2003)



Source: Own creation based on case analysis

[32] Joseph E Harrington, 'How do cartels operate?' (2006) 2(1) Foundations and Trends in Microeconomics 1.
[33] Lester G Telser, 'Why should manufacturers want fair trade?' (1960) 3 The Journal of Law and Economics 86.
[34] In *tobacco* (2010), one of the major distributors, Sainsbury, had a market share of only 4.36%. This indicates that the retail level was not a typical oligopoly.

a. Cartel Description

In *toys UK* (2003), four manufacturers and five distributors are active in the relevant market. Hasbro clearly constitutes the largest manufacturer. Two distributors are in fierce competition, i.e. Argos and Littlewoods. Argos is the largest distributor and acts as price setting leader. The cartel is sparked by complaints concerning very low retail margins. Hasbro faces the risk that some of its products may be delisted in favour of other toy manufacturers or private brands. In response, Hasbro puts together a 'listing initiative' and a 'pricing initiative'. The listing initiative offers rebates for keeping the threatened products in the offer. The pricing initiative involves maintaining retail margins on Hasbro's toys and games by using recommended retail prices (RRP). Involvement of Argos in the pricing initiative was essential. Argos however committed only if it had the guarantee that Littlewoods would not undercut. Furthermore, the two major distributors know that the smaller players will align their prices to the RRP.

b. The Hub's Incentive to Facilitate Horizontal Collusion

Should the manufacturer be a monopolist, its profits are maximised in case of perfect retail competition. Each distributor will then sell at the marginal cost, which corresponds to the wholesale price imposed by the monopolist manufacturer, in turn allowing the manufacturer to extract a monopoly profit. In a such a situation, the manufacturer will never have incentives to facilitate horizontal collusion at retail level. Nevertheless, O'Brien and Shaffer (1992)[35] indicate that a monopolist manufacturer is not able to exert its monopoly power when facing a price competition oligopoly at the distribution level. Any secret (non-observable by other distributors) vertical contract generates incentives for both players to reduce the retail price and increase combined profits. This behaviour creates negative externalities for the other distributors, which can be internalised by means of vertical restraints, e.g. the manufacturer imposes a RPM (or an RRP). However, we find no evidence of such incentives. On the contrary, in *toys UK* (2003), the cartel is initiated by a delisting threat stemming from Argos. For this threat to be credible, the distributor should have at least one outside option. This means that for this type of H&S cartels, we need at least one other manufacturer and cannot assume a monopolistic manufacturing level.

When we then continue with a hub that is not a monopoly, three potential scenarios unfold. *First*, economic theory informs us that Hasbro may support vertical restraints for service or

[35] Daniel P O'Brien and Greg Shaffer, 'Vertical control with bilateral contracts' (1992) 23(3) RAND Journal of Economics 299.

promotional reasons.[36] When multiple distributors are present without any vertical rules, some can freeride on the service and promotional efforts of their competitors. Such opportunistic behaviour will in the longer run disincentivise all distributors to provide service or promote the manufacturers' products. RPM, or imposed RRP in the case of Hasbro, can reduce such externalities. We find however no indication for this kind of strategy. *Second*, next to control over promotional efforts, we must wonder how the hub benefits from a reduction of competition at the retail level. If the cartel results in higher profits, the manufacturer may find it optimal to help the distributors eliminate competition and subsequently achieve a monopoly profit. The bargaining power of the manufacturer versus the distributors will determine the division of this monopoly profit. There is however no evidence explaining how the profit resulting from an increase in retail price was shared between the hub and the spokes. The Office of Fair Trading only mentions that, without collusion, it is possible that Hasbro may have had to reduce list prices even further. *Third*, we observe that Hasbro engages in the cartel with downward pressures on the wholesale price (and delisting threat). This may indicate that Hasbro does not directly benefit from collusion, but just avoids delisting by Argos. This only works if the delisting threat of Argos is credible as well as sizeable such that it will create harm for Hasbro. This is only true when the distributor has substantial market power as well as alternative options at the manufacturing level so that it can still meet demand. This seems to be the case as Argos is clearly the main distributor and Hasbro is not the only manufacturer, meaning that the Argos' delisting threat was credible and harmful. The two latter scenarios are again in accordance with the rent and punishment theory of Falls and Saravia (2015).[37]

c. Why is the Hub Essential for the Horizontal Collusion?

Next to striving for efficiencies, vertical restraints can also be the result of anticompetitive motives.[38] For instance, RPM can be imposed to undermine competition between oligopolistic distributors. If distributors sell at a single price, detection of deviation from horizontal collusion is straightforward.[39] In the H&S cartel scenario, the manufacturer takes on the role of monitor. R*eplica football kit* (2003) shows many similarities with *toys UK* (2003). The hub (Umbro) however goes a step further by imposing an embargo threat in case of non-compliance.

[36] See fn (n 4).
[37] See fn (n 2).
[38] Emanuele Giovannetti and David Stallibrass, 'Three cases in search for a theory: Resale price maintenance in the UK' (2009) 5(3) European Competition Journal 641.
[39] Jean Tirole, *The Theory of Industrial Organization* (MIT Press 1988).

Such punishment mechanism decreases the incentives for a distributor to deviate from the cartel. For this punishment to be credible, the involvement of all major distributors is essential. If a large distributor deviates from the collusion, the embargo threat becomes impossible to enforce as it will invoke too high losses for the manufacturer. In *toys UK* (2003), the involvement of Argos in the pricing initiative was therefore essential.

d. Lessons from Other Cases

All other Type 2 H&S cartels share multiple similarities with the *toys UK* (2003) case, namely that the horizontal collusion is at the distribution level, that the manufacturer plays the role of hub, that the latter is never a monopolist, and that the cartel is difficult to enforce at the distribution level only. The collusion is triggered by downward pressures on the manufacturers' margin[40], initiating a cartel at the level of the distributors. The hub coordinates and monitors behaviour and can punish members that do not comply.

Several cases have additional interesting characteristics. In *replica football kit* (2003), two distributors (Sports Soccer and Sportsetail) do not want to be part of the collusion, but only participate because of the embargo threat from Umbro. As the major distributors are already involved, the threat is credible. Nevertheless, we see that such players render the cartel instable and that Sportsetail discloses the cartel. Similar dynamics are observed in the *double glazing* (2004) case. Not all distributors are happy about the increase in retail prices and one of them discloses the cartel.

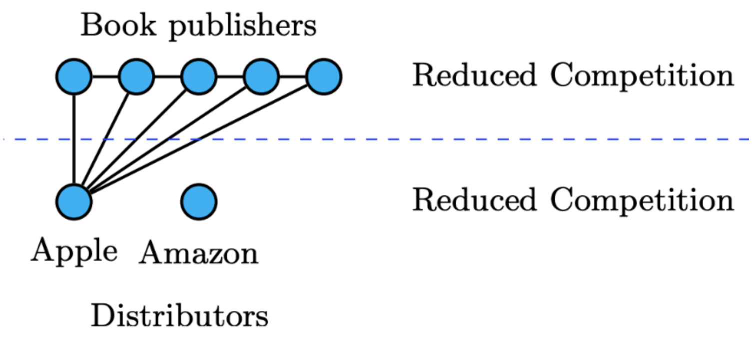
While dominant distributors may benefit from a Type 2 H&S cartel, we observe that this is not always beneficial for smaller distributors. Furthermore, *dairy* (2011) and *paint and varnishes* (2006, 2010, 2010) indicate that the manufacturer equally benefits directly as the increase in retail price is aligned with an increase in wholesale price. Hence, the strategy of the hub can differ or even be mixed between avoiding delisting and rent-sharing.

3. *Type 3 H&S Cartel*

We illustrate a Type 3 H&S cartel by means of the *e-books* (2015) case where collusion reduces competition at both levels of the supply chain. This type is schematically presented in Figure 3.

[40] Concerning *hygiene products* (2015), there is no indication regarding the reasons for starting the cartel, nor on who initiated it. Concerning the *dairy* (2011) case, the complaints about low margins originate from the level of raw materials.

Figure 3: Type 3 H&S Cartel – e-books (2015)



Source: Own creation based on case analysis

The e-books market is composed of two main distributors, Apple and Amazon, and five main books publishers. The five publishers wish to increase retail prices of e-books because the low prices have a negative impact on the sales of paper books. Amazon does not agree and continues to set low prices pursuing an expansion of the e-books market. When Apple enters the market of tablets, publishers see the opportunity to increase the prices of e-books. Apple agrees to switch from a wholesale price model to an agency model. In the former model, price control is at the distribution level, whereas in the latter model price control is with the publisher. In addition, Apple obtains a MFN clause from the publishers. The clause stipulates that a decrease in e-book prices for a distributor (e.g. Amazon), automatically decreases the price for Apple. Consequently, publishers have a strong incentive to cooperate, also forcing Amazon to adopt the agency model. Once Amazon accepts, it has no interest to deviate as the competition with Apple disappears. The multiple vertical restraints and coordination between Apple and the publishers result in a reduction of competition in both the upstream and the downstream market. This type of H&S cartel is very special as the interests of all cartel members (Apple and the publishers) are aligned and a second market (paper books) is additionally affected.[41] The agency model as such was lawful, but the agreement that all publishers would likewise adopt it for the competing distributor was not.[42] As a result, the entire agreement was prohibited to remedy the situation.

[41] More information on the case can be found in: Richard J Gilbert, 'E-books: a tale of digital disruption' (2015) 29(3) Journal of Economics Perspectives 165; Justin P Johnson, 'The agency model and MFN clauses' (2017) 84(3) The Review of Economics Studies 1151 and Benjamin Klein, 'The Apple e-books case: When is a vertical contract a hub in a hub and spoke conspiracy?' (2017) Journal of Competition Law and Economics (Forthcoming).
[42] See fn (n 27).

IV. Descriptive Statistics

In the previous section, we analyse three types of H&S cartels and answer key questions about collusive mechanisms and economic incentives of cartel members. This section presents descriptive statistics about the duration of the cartels, the number of cartel members, and the duration of the competition authorities' investigations.[43] Our sample contains twelve H&S cartel decisions from national and supranational competition authorities. For each case we collect data from the decision text and information available on the website of the relevant competition authority. Based on both these descriptive statistics and the case analysis from the previous section, we analyse the following questions: i) Can we explain the relatively short duration of H&S cartels?; and ii) Can we explain the relatively long investigation of a H&S cartel?

Table 2 provides an overview of the descriptive statistics on H&S cartels, starting with the *case name* and the related *jurisdiction*. Next, the variable *infringement* characterises the duration of the cartel. This information is often an underestimate as competition authorities base the duration on the available evidence. We observe that H&S cartels on average last 2,86 years. This is relatively low compared to the average duration of 'typical' horizontal cartels[44] sanctioned by the EU Commission, i.e. 8,76 years (105,13 months) from 2000 until 2014.[45]
In addition, we observe that H&S cartels involve on average 8,75 *cartel members*. Combe and Monnier (2012)[46] find close indications for EU horizontal cartels with an average of 7,7 participants.
Finally, the variable *procedure* represents the duration between the sending of the statement of objection (or the sending of the administrative complaint in the US) and the final decision.[47]

[43] We compare several descriptive statistics on H&S cartels to typical horizontal cartels. This is a purely descriptive exercise. Clearly differences between the two sets of variables may be the result of factors that are not discussed in this article. Nevertheless, the comparison provides interesting first insights.
[44] The term 'horizontal cartel' refers in this comparison each time to classical cartels that are composed of competitors (and/or third parties) at the same level of the vertical supply chain.
[45] This observation comes from our own collection of data based on EU Commission cartel decisions from 2002 to 2014 (71 EU cases). Our findings are confirmed by other empirical studies on cartels. For instance, using a larger sample (111 cases), Combe and Monnier (2012) find an average duration of 7,4 years. It would have been interesting to make a jurisdiction by jurisdiction comparison. Nevertheless, we do not have enough H&S cases to clearly isolate specific country effects. The comparison is purely descriptive and can potentially in the future be extended both regarding amount of cases and geographical scope. The limited number of cases currently renders sound econometric analysis impossible.
Emmanuel Combe and Constance Monnier, 'Les cartels en Europe: Une analyse empirique' (2012) 27(2) Revue Francaise d'économie 1.
[46] Combe and Monnier (2012), See fn (n 45).
[47] Parallel to Bross et al. (2016), we consider the sending of the statement of objection to constitute the beginning of the competition authorities' procedures. When a first investigation confirms the concerns regarding a competition infringement, a statement of objection is sent to the firms explaining these concerns.

We observe that H&S cartel procedures last on average 3,14 years (37,73 months). This is relatively long compared to the average procedure length for typical horizontal cartels, which is 1,2 years (14,41 months) for EU horizontal cartels between 2000 to 2014.[48]

Table 2: Descriptive Statistics on H&S Cartels[49]

Case	Jurisdiction	Infringement (months)	Players	Procedure (months)
Interstate Circuit (1939)	US	24	10	NA
Toys US (1988)	US	81	16	32
Replica Football Kit (2003)	UK	16	10	26
Toys UK (2003)	UK	28	3	27
Double Glazing (2004)	UK	45	5	18
Paint and Varnishes (2006)	PL	36	8	16
Paint and Varnishes (2010)	PL	48	3	41
Paint and Varnishes (2010)	PL	24	5	48
Tobacco (2010)	UK	30	12	24
Dairy (2011)	UK	12	9	46
E-books (2015)	US/EU	33	6	32
Hygiene Products (2015)	BE	36	18	105
Mean		34,42	8,75	37,73
Max		81	18	105
Min		12	3	16

Source: Own creation based on case analysis

Intriguingly, all cases contain cartel members that are active at the distribution level of the vertical supply chain. This observation is even more prominent for Type 2 H&S cartels, where the majority is at the distribution level, as is the horizontal collusion. This contrasts with 'normal' horizontal cartels where the majority is at the manufacturing level.[50]

Sébastien Bross et al., 'Analyse statistique des affaires d'ententes dans l'UE (2004-2014)' (2016) 67 Revue Économique 79.

[48] Data directly retrieved from the European Commission's cartel decisions.

[49] It is possible to find several cartel episodes for the same 'case'. If this occurs, we decide to take the longest episode that involves the highest number of players.
The variable infringement is estimated by competition authorities and often constitutes an underestimate. In addition, it may not be the same for all firms involved. We report the largest infringement period available.
The variable procedure is calculated as follows. For EU cases: from the adoption of the statement of objection to the final decision. For US cases: from sending the administrative complaint to the final decision.

[50] Connor (2007) analyses cartel cases from various countries from 1990 to 2005. He finds that 71% of the cartels are in manufacturing. John M Connor, 'Price-fixing overcharges: Legal and economic evidence' (2007) 22 Research in Law and Economics 59.

1. Can We Explain the Relatively Short Duration of H&S Cartels?

While vertical links could be expected to improve the duration of the cartel[51], H&S cartels are relatively short compared to typical horizontal cartels. In contrast to horizontal cartels, the intervention of the hub is necessary for all the members of the horizontal part of a H&S cartel to comply with the collusion. We believe that structural elements are among the principal causes of this instability at the horizontal level.[52] It is well recognised that market characteristics may affect the ability of firms to enforce a cartel. The literature on the economics of collusion indicates that collusion is likely to be more stable in markets where there are few firms, products are homogeneous, demand is predictable, the market is mature (no innovation), the market is transparent, barriers to entry are high, spare production capacity is maintained and buyers are dispersed (no buyer power).[53] Even if these determinants are not equally relevant for all industries, empirical studies find that manufacturing is more prone to these factors.[54] For the twelve cases included in our analysis, 52% of the firms operate at the distribution level of the industry and 44% at the manufacturing level (the other 4% are trade associations). In contrast with manufacturing, the retail sector involves multidimensional competition (e.g. prices, promotions, loyalty cards or display of the products), lower entry barriers, less homogeneity and more outside options (specialised distributors).[55] Having more firms at the distribution level thus makes collusion more difficult. This is the case for H&S cartels and especially for those in Type 2.

The presence of cost asymmetries between the spokes makes it harder for them to agree on a common pricing strategy. A firm with a lower marginal cost will prefer lower prices than the firms with a higher marginal cost.[56] R*eplica football kit* (2003) constitutes an excellent example. Sportsetail is a small entrant distributor with a low pricing strategy to obtain a higher market share. This small distributor is forced by the hub to join the cartel and subsequently discloses it to the competition authorities. The presence of new entrants also indicates that entry barriers

[51] The use of a third party is meant to eliminate obstacles to horizontal agreements. For instance, information on prices may remain hidden for some time. In that case, retaliation for deviation from the agreement is delayed and therefore less costly for the price-cutting firm. To avoid this problem, a third party collects data on transactions and/or prices and shares this information with the cartel members. See fn (n 38).

[52] We use the term stability and duration interchangeably. Cartel stability or duration is the absence of price wars or other competitive conduct.

[53] OECD Global Forum on Competition, 'Why some industries seem prone to endemic collusion?' (2015) DAF/COMP/GF(2015)4.

[54] Ibid.

[55] For instance the *hygiene products* (2015) case. Supermarkets compete beyond pricing strategies and multiple smaller specialised distributers sell hygiene products. This renders coordinated behaviour more complicated.

[56] Marc Ivaldi et al. 'The economics of tacit collusion' (2003) In: Final Report for DG Competition European Commission. Toulouse: IDEI.

are low. The increased competition from entry puts a downward pressure on the distributors' margin and constitutes the starting point of the H&S cartel. To avoid the increase in competition or the hindrances of coordination, the vertical restraints should have sufficient disciplinary effect to fix a H&S cartel.

2. *Can We Explain the Relatively Long H&S Cartel Investigations?*

The length of the procedure can be perceived as a part of the administrative cost. If we consider a fixed number of employees per case, longer procedures clearly involve a higher cost.[57] Two main reasons may explain the relatively lengthy procedures to investigate H&S cartels. *First*, as vertical restraints are treated differently than horizontal cartels, it is complicated for competition authorities to assess a blend of both. Indeed, the law usually provides more discretion regarding vertical agreements and it is up to the competition authority to determine whether a rim, or horizontal collusion between the spokes, is also established.[58] *Second*, the indirect exchange of information between the competitors at the horizontal level of a H&S cartel also impacts the duration of the investigation. The EU guidelines on horizontal restraints also clearly prohibit the indirect exchange of sensitive information through third parties.[59] However the Competition and Markets Authority and the British Court of Appeal are the only ones that provide guidance to assess this indirect exchange of information.[60] They clarify for H&S collusion that undertakings involved in multiple separate vertical agreements may be considered as member of a single illicit agreement when the following three conditions are met (assuming that D_1 and D_2 are the spokes and that M is the hub)[61]:

(i) Retailer D_1, in the downstream market, reveals sensitive and commercial information, such as prices, to supplier M with the intention to distort market conditions by passing this information to its competitor, retailer D_2.
(ii) Supplier M effectively manages to pass the information (in this example prices) to retailer D_2 who is aware of the circumstances, i.e. that the information stems from its competitor.
(iii) D_2 uses the disclosed information by fixing its future price level.

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[57] Kai Hüschelrath et al. 'Cartel enforcement in the European Union: determinants of the duration of investigations' (2013) 34(1) European Competition Law Review 33.
The assessment of cartel harm to consumers, companies and the economy goes far beyond the length of the cartels. For an exhaustive analysis see: OECD, 'Guide for helping competition authorities assess the expected impact of their activities' (2014).
[58] See fn (n 27).
[59] See fn (n 8).
[60] See fn (n 21).
[61] Odudu (2011). See fn (n 11).

Compared to horizontal agreements considered as *per se* illegal, we suggest that H&S cartel members thus succeed in further complicating the task of competition authorities. Nevertheless, even though the investigation and conviction of H&S cartels is relatively time-consuming, studies demonstrate that the benefits from enforcement by far outweigh the total costs of that enforcement.[62] It would therefore be useful to enhance the legal guidance regarding this type of cartels. Falls and Saravia (2015)[63] indeed underline the little practical guidance from the US Department of Justice and the difficulty to distinguish between a hub, which is part of the cartel, and a third party – in the vertical chain – 'helping' the cartel. A better understanding of H&S cartels as well as generalised models on their determinants and structures may help guide competition authorities in this complicated task. Elements to determine the involvement of the wholesale and retail sector in each H&S case as well as the asymmetry between undertakings could be accounted for when assessing whether the hub is part of a single illicit agreement.

V. Hub and Spoke Cartels: Generalised Summaries of Type 1 and Type 2

This section summarises the general determinants of Type 1 and Type 2 H&S cartels regarding economic incentives and the structure of the cartel. General descriptions can be helpful for a better understanding and assessment of these types of collusion. For instance, it facilitates the distinction between multiple vertical restraints and a H&S cartel.

1. Towards a Generalisation of Type 1 H&S Cartels

The typical structure of Type 1 H&S cartels is characterised by a hub with a dominant position in distribution and competing spokes at the manufacturing level. These cases start with the desire to avoid competition in distribution. This goal is achieved by setting multiple vertical restraints, either RPM or exclusive dealing, imposed by the hub. The horizontal collusion appears to ensure compliance by all the spokes. The role of the hub involves several aspects. It bilaterally communicates with each spoke and guarantees that all behave in a specified way. In addition, it monitors the behaviour of each spoke and establishes a punishment threat for spokes

[62] Oxera, 'The costs and benefits of measuring the costs and benefits of competition policy' (2017) <https://www.oxera.com/agenda/the-costs-and-benefits-of-measuring-the-costs-and-benefits-of-competition-policy/> accessed 20 October 2018.
[63] See fn (n 2).

unwilling to comply with the collusion. For the punishment threat to be credible, the bargaining power of the hub needs to sufficiently large.

2. *Towards a Generalisation of Type 2 H&S Cartels*

This type of cartel is characterised by RPM between a manufacturer (the hub) and several distributors (the spokes). The upstream market is never a monopoly and the downstream market is composed of firms with cost asymmetries (smaller and larger players) and relatively low barriers to entry. The enforcement of horizontal collusion is not possible without the involvement of the hub. Downward pressures on the manufacturer's margin are often the trigger for the formation of the H&S cartel. In addition, there is a credible and harmful delisting threat. To avoid further downward pressures on its margin, the manufacturer initiates a horizontal collusion between the distributors via RPM. Parallel to a Type 1 H&S cartel, the role of the hub involves several aspects. The manufacturer coordinates and monitors the behaviour of the spokes. It also establishes a threat of embargo to prevent deviations from collusive behaviour. The major distributors should collude for the punishment threat to be credible.

VI. Conclusion

H&S cartels involve both horizontal and vertical restraints. The hub is a key player and uses vertical restraints to facilitate horizontal collusion between the spokes.[64] Competition is less fierce, or even eliminated, and prices tend to increase. This situation clearly harms consumer welfare and the overall economy.

After briefly reviewing the extant literature, we analyse cartel members' incentives and mechanisms of collusion are analysed from an economic point of view. Starting from twelve cases and following Falls and Saravia (2015)[65], we detect three main types of H&S collusion and discuss for each type the importance of both the distribution of the cartel profit and the punishment threats. In addition, we attempt to make a visual representation for each type.

Subsequently, we present and discuss descriptive statistics on the duration of the infringement as well as on the duration of competition authorities' investigations. Intriguingly, the life span of a H&S cartel is relatively short, whereas the time needed to convict it is relatively long. The former finding could be explained by cost asymmetries which are directly related to the industry level concerned, i.e. the distribution sector. The latter is justified by the atypical form of H&S

[64] See fn (27).
[65] See fn (2).

cartels and the difficulty for competition authorities to investigate indirect information exchanges. Furthermore, this article proposes a generalised format for two types of H&S cartels. Even though each case has its own specificities, we are optimistic that the insights in this article will help to better understand H&S cartels and therefore could also improve the assessment by competition authorities. The EU and US competition policy frameworks are from a legal perspective fit to deal with this relatively new phenomenon of H&S cartels. Nevertheless, sound decision making is only possible when knowing the mechanisms and specific characteristics of this peculiar form of collusion. We thus advocate the further development of a clear analytical framework that is based on the structure of these cartels and accounts for the incentives of all companies involved. First steps are being made to extend the classical models of collusion to other types of collusive behaviour such as H&S cartels. However, many routes for future research are still open.

Among many others, an interesting issue to be addressed in future research certainly concerns communication between cartel members. By communicating with each spoke, the hub collects more information compared to the spokes. As a result, the hub has more arguments to negotiate with competition authorities, which makes its punishment threat for non-complying spokes even more credible. Exploring how the information is shared and what it implies for the cartel may help authorities to destabilise H&S cartels. For instance, following US competition law, ruling-out the possibility for ringleaders to apply for leniency may reduce the capacity of the hub to credibly threaten non-complying spokes. Subsequently, it would be useful to study how the asymmetries between firms in both information and structure may influence the incentives to report the cartel and apply for leniency[66]. Finally, it is obvious that more cases are needed for quantitative research to infer, for instance, which factors (and to what extent these factors) impact the stability of H&S cartels.

[66] Londoño Rodrigo and Caroline Buts 'The tell-tale heart: leniency policy in hub and spoke cartels' (*Work in progress*).