

## RESEARCH ARTICLE

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# What keeps the market ticking? The role of third-party audiences and cognitive embeddedness in shaping competitive dynamics in luxury watchmaking

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**Abstract**

**Research Summary:** Competitive dynamics between firms and buyers are shaped by mutually understood conceptual systems that enable market interactions. Third-party audiences, such as the media, play a crucial role in shaping market structure and evolution by facilitating the development of these conceptual systems. Although they do not directly engage in contractual bargaining, third-party audiences stabilize perceptions and facilitate market interactions by cognitively embedding competitive dynamics. Our study examines the coreness of firms within the semantic network of firm names as relayed by the media. We find that higher coreness positively impacts auction prices. This effect is moderated by firm visibility and the tone of media coverage. Our model is tested using a unique dataset from the luxury watchmaking industry.

**Managerial Summary:** We demonstrate that a firm's performance is shaped not only by how prominently or positively it is featured in the media, but also by the

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relational context in which it is mentioned. Firms that are frequently mentioned alongside other key industry players are perceived to be the core of the industry, leading to higher auction prices for their products. The effect is strengthened when a firm enjoys frequent and positive media coverage. For managers, our findings underscore the importance of understanding how and why the media associates their brand with others, as this can enhance its value in secondary markets, and thus potentially boost value capture in primary markets. Our analysis explores the luxury watchmaking industry, a setting that is rarely studied.

#### KEYWORDS

auction prices, cognitive embeddedness, core-periphery, luxury watchmaking, semantic networks

## 1 | INTRODUCTION

Market interactions are cognitively embedded (Cattani et al., 2017; Kennedy, 2008), that is, market participants' perceptions and actions are shaped and constrained by “structured regularities of mental processes” (Zukin & DiMaggio, 1990, p. 15). Indeed, bargaining between firms and buyers does not happen in a cognitive void but depends on mutually understood conceptual systems, such as market categories (Cattani et al., 2017; Cattani et al., 2018; Cudennec & Durand, 2023; Rosa et al., 1999). These systems originate not only from firm-buyer interactions (White, 1981), but also from non-contractual third parties such as critics, analysts, and regulators who shape the bargaining process (Cattani et al., 2017; Sands, 2025). In particular, the media cognitively embed market interactions and dynamics, for instance by shaping market boundaries and determining who belongs to the market (Kennedy, 2008; Lounsbury & Rao, 2004), as well as selecting which events to cover and how to frame them (Fiss & Hirsch, 2005).

When analyzing the role of the media in cognitive embedding, the focus of research has traditionally been on how firm-level properties guide evaluations and economic action. For example, media coverage of a firm's corporate deviance can lead to a loss of legitimacy (Jonsson et al., 2009). Additionally, the extent of media visibility and the valence of coverage tone have been found to trigger changes in a firm's strategy (Shipilov et al., 2019), impact its stock performance (Pollock & Rindova, 2003), and affect how much VC funding it receives (Petkova et al., 2013). In contrast, little attention has been given to cognitive embeddedness stemming from network-level properties—despite firms often being associated in media stories—with the notable exception of Kennedy (2005, 2008) who considered firm names in co-mention ego-networks in a nascent market.

Extending his work to relations between all firms and an established market, we too consider that the conceptual system expressed in the media originates in the way words are



semantically related by textual co-occurrence (Carley & Kaufer, 1993; Carley & Palmquist, 1992; Jones et al., 2012; Mohr, 1998). This can be operationalized as a network where nodes are firm names and co-mentions are ties between them. We specifically focus on cognitive embeddedness arising from firm name coreness in co-mention networks. Given the comparative nature of the valuation process in markets (Khaire & Wadhvani, 2010; Verdaasdonk, 2003) and the impact of firm names on firm valuation (Lee, 2001), specifically of cues that make associations between firms (Kim & Kim, 2022; Kim & Tsai, 2012), our investigation centers on understanding the valuation implications of the position of a firm's name in the conceptual system, as it may shape buyer perceptions of the firm.

We argue that in markets characterized by high uncertainty regarding producer quality, as is the case in creative industries (Caves, 2000), such as luxury (Kapferer & Bastien, 2009), art (Cattani et al., 2008; Khaire & Wadhvani, 2010), fashion (Godart et al., 2014; Kim & Kim, 2022), and watchmaking (Godart et al., 2020; Godart & Claes, 2017), higher coreness suggests broader recognizability and increased viability, which help satisfy buyers' considerations of conspicuous consumption and investment (Mandel, 2009), and translate into a higher willingness-to-pay. We integrate our novel coreness perspective on cognitive embeddedness with existing research on the role of the media in shaping firm valuation. Hitherto, the literature has focused on two dimensions: the extent of firm coverage (i.e., visibility) and the valence of its tone (e.g., Petkova et al., 2013; Pollock & Rindova, 2003; Shipilov et al., 2019). We argue that the positive relationship between the coreness of firm names and willingness-to-pay is moderated positively by firm visibility, and moderated negatively by the negativity of tone. We tested our hypotheses on a seldom-studied context, namely luxury watchmaking. Relying on an exhaustive set of media reports on this industry between January 2001 and December 2009, we constructed semantic networks of co-mentions of watchmaking firms' names, and analyzed the effects of firm name coreness on auction prices of watches made by these firms between January 2002 and December 2010.

We make several contributions. First, we explore the impact of network-level characteristics of cognitive embeddedness on firm valuation, moving beyond questions of categorization within nascent markets (Kennedy, 2008). We thereby show that market-level conceptual systems' structure and dynamics can be analyzed in their own right and impact firm-buyer market dynamics. Second, we add to the literature on the role of non-contractual third-party audiences and their mediating role in markets (Beckert & Aspers, 2011; Cattani et al., 2017; Coslor et al., 2020; Kennedy, 2008) by going beyond attributes of firms taken in isolation, such as tone or coverage, as drivers of economic outcomes (Pollock et al., 2008; Pollock & Rindova, 2003). We consider a network-level measure, focusing on the coreness of firm names. Third, we add to the core/periphery literature, which has traditionally focused on individuals' networks (Borgatti & Everett, 1999; Cattani & Ferriani, 2008; Maoret et al., 2020). By considering semantic networks (Carley, 1994; Carley & Kaufer, 1993), we illustrate a novel mechanism whereby the media, via the coreness of firm names, establish common ground among market stakeholders. Fourth, we advance understanding of the sociological factors that lead to the formation of market prices (Beckert, 2011; Uzzi & Lancaster, 2004; Velthuis, 2003). Rather than focusing on connections among individuals and groups (Ody-Brasier, 2022; Uzzi, 1996)—that is, structural embeddedness—we look at cognitive embeddedness. Finally, our network-based mechanism suggests a new way for managers to gain further insights into value creation in the secondary markets, which may ultimately benefit their performance in primary markets (Bennett et al., 2015).

## 2 | THEORY AND HYPOTHESES

### 2.1 | Coreness in media representations and auction prices

Competitive dynamics are shaped by mutually understood conceptual systems that develop through the influence of third-party audiences, among which the media play a prominent role (Cattani et al., 2017). By associating firms, for example, comparing or contrasting them in describing a market, firms are inscribed in “cognitive market networks” (Kennedy, 2008), based on which participants share a mental map of that market (Hunzaker & Valentino, 2019). This enables social comparisons and evaluations by buyers (Kim & Tsai, 2012; White, 2001). We argue that firms are evaluated as a function of their position in cognitive market networks constituted of the relationships between firm names. These relations are related to, yet conceptually distinct from, social relations that can be observed, for example, in strategic alliances (Uzzi, 1997). In other words, relations between firms in cognitive market networks cannot be reduced to their social or strategic networks (Ferguson et al., 2017). For example, firm names may be associated for reasons unrelated to whether they collaborate, hence a core firm in an alliance network is not necessarily core to the cognitive market network, and vice versa.

Firms are the key actors of the market, therefore we focus on their names. Firm names are one of the most efficient cues to a firm in terms of its history, quality, and performance (Tadelis, 1999) for established firms, or complete *lack thereof* for new or younger firms. This is especially true in mature markets like watchmaking, where longstanding incumbents are well known and new names have no track record. In addition, names carry information about a firm’s culture and identity (Fombrun & Shanley, 1990; Glynn & Abzug, 2002; Ingram, 1996), and can even influence stock market performance (Cooper et al., 2001; Lee, 2001) or perceptions of organizational creativity (Seong & Godart, 2018). Finally, buyers pay particular attention to cues that associate firms with one another when evaluating them (Kim & Tsai, 2012).

The importance of cognitive market networks is more pronounced in creative industries that rely on organization-based work (e.g., fashion or advertising) rather than short-term collaborative projects between individuals (e.g., movies or music). While in project-based creative industries underlying collaborative networks are observable to a large extent (Cattani & Ferriani, 2008; Lee & Gargiulo, 2022), in organization-based creative industries (e.g., watchmaking), they are largely unobservable, as firms often try to obfuscate the source of their competitive advantage. Hence, it is how the media represents names in relation to one another that creates common ground for stakeholders to make sense of the market.

Core/periphery structures in networks abound (Barsky, 1999; Fonti & Maoret, 2016; Sedita et al., 2020). The core is a dense interconnected cluster; the periphery a set of nodes loosely connected to the core and each other (Borgatti & Everett, 1999). Coreness indicates the relative position of a firm on a continuous core/periphery spectrum. In our context of organization-based creative industries, firm names are organized in network configurations (Grandori & Furnari, 2008) by being selectively co-mentioned in the media. The meaning of a “tie between words” (i.e., a co-mention) varies from one context to another, but when two concepts are related “they tend to resonate with one another or be complementary and so display an associative power” (Godart & Galunic, 2019, p. 155). Like Kennedy (2008, p. 273), we consider that the extent of co-mentions captures the degree of rivalry or similarity between firms. However, he only considers direct co-mention neighbors (i.e., firms’ ego-networks) because his study concerns a nascent category which, by definition, cannot yet display any meaningful core/periphery structure. As the category matures and given the ubiquity of core/periphery



structures in networks (Barsky, 1999; Fonti & Maoret, 2016; Sedita et al., 2020), it makes sense to extend the analysis beyond ego-networks: the whole structure of co-mentions of *all* firms should be considered. Over time, as firms are compared more often, a subgroup becomes more representative of the industry and constitutes a core.

In economics, luxury and art are considered asset classes where buyers' willingness-to-pay is driven by two main considerations: conspicuous consumption and investment motives (Mandel, 2009). Luxury watchmaking is no exception. Speaking to the conspicuous consumption motive, one of our collector states:

"Why do I wear a 50,000[EUR] Vacheron [Constantin] on my wrist? Because I cannot bring my Ferrari into the boardroom."

Illustrating the investment motive, another collector at an auction organized by Antiquorum, the specialized luxury watch auction house whose data is used in our study, said:

"I like tracking the price of my collection and those models I might be interested in acquiring. I'm a big Omega aficionado and when I saw this speedy [Speedmaster] starting at 1,100[USD] with only one bidder I knew I had to get in on the action. I just outbid the guy once and [...] got it for 1,500[USD] which is amazing. Similar limited Ralph Schumacher editions sold for 4,500[USD] just last month. I guess I'll keep it because I like the blue dial, it's different from my regular black and white [Speedmaster] Moonwatches, but it's always great to know that you already made some money. I can resell this tomorrow for at least double what I just paid."

In established markets, third-party audiences are essential in maintaining a conceptual common ground between market participants, particularly in the creative industries. These are fraught with uncertainty regarding quality (Beckert & Aspers, 2011); products can be virtually indistinguishable yet achieve vastly different price levels (Hirsch, 1972). For instance, market categories change over time, in part due to the role of third parties in determining membership (Cattani et al., 2017; Lounsbury & Rao, 2004). Although the market itself is recognized and legitimized, not all firms are equally positioned in the cognitive networks that represent it. Some are better positioned as they are selectively co-mentioned with firms who themselves are densely co-mentioned with others in media stories, thereby increasing their coreness.

Being more often co-mentioned with others and having greater coreness makes some firms appear to be more quintessential representatives of their market (Maoret et al., 2020), resembling more central firms and thereby gaining increased legitimacy, as in the craft beer industry (Verhaal et al., 2017). This contributes to what Kennedy (2008, p. 276) calls high "mindshare"—the level of consumer awareness and recognition of the firm in comparison to its competitors, ultimately strengthening its overall viability (Hoyer & Brown, 1990). This is critical in luxury because luxury products are safer investments when the firm that produces them is still in operation (Desai et al., 2008), and even more salient in watchmaking where watches need to be regularly checked by experts from the brand (Carcano & Ceppi, 2010). Highlighting the importance of firm viability for investment protection purposes, one of our collectors says:

"If I'm buying a watch that costs 200,000 EUR or more, especially a complex one, I really need to know the brand and the watchmaker behind it because I need to be sure I can get it serviced or repaired. These brands [mainly selling very high-end

watches with complications] often sell maybe 50-150 watches per year, there's no guarantee they'll be around forever. It's always a risk when you buy such complex watches. I love Greubel [Forsey] for instance, but how many people do I trust to fix my gyroscopic tourbillon? [...] And it helps a great deal if the brand is still around when you wanna sell it [the watch] to the next guy, because he will have the same questions."

At the same time, higher coreness makes firms stand out more and therefore their products serve as recognized (and recognizable) indicators of wealth driving "conspicuous consumption" (Veblen, 1899), better than peripheral firms' products, as they generate more recognition both from "those in the know" and the broader audience targeted by wealth signaling (Kapferer & Bastien, 2009). In sum, products from firms with higher coreness satisfy the two main drivers of buyers' willingness-to-pay in art and luxury markets: conspicuous consumption and investment value (Mandel, 2009; Pesando, 1993). Hence our first hypothesis:

**Hypothesis (H1).** The higher the coreness of a firm's name in networks of firm names in media reports, the higher the realized prices of its outputs at auctions.

## 2.2 | The various dimensions of media coverage

Research on the effects of media coverage usually focuses on two dimensions: extent and tone. Extent (i.e., visibility) refers to the number of articles published about a firm or how often this firm is mentioned, and tone refers to the valence of the coverage (i.e., how positive or negative it is). Both are firm-level (nodal) properties. Below we integrate our novel network perspective on media-derived cognitive embeddedness with prior research. Like Bail (2021), we consider that visibility and tone filter and shape the information that is made available to buyers, hence the media acts as a "prism" that amplifies how buyers view specific firms.

We argue that a firm's visibility will positively moderate the effect of its coreness on the auction prices of its outputs as it amplifies its perceived coreness. Indeed, buyers are boundedly rational and attention to information is unequal (Hoffman & Ocasio, 2001). A firm with high visibility is more readily available in buyers' minds, making it more noticeable when they are subsequently exposed to it (Hawkins & Hoch, 1992; Kahneman et al., 1982), such as in media stories. If a firm is more readily available from a cognitive point of view, the likelihood that information related to the firm will be noticed increases (Kim & Kim, 2022), in particular associated names that are co-mentioned with the firm, as consumers attend to cues that prompt comparisons (Kim & Tsai, 2012). This unequal attention to a highly visible firm, and thus other co-mentioned firms, increases the perception of its connectedness to them. Therefore, the perception of the focal firm's coreness increases as more attention is given to its connections than to those of a firm with low visibility. Hence our second hypothesis:

**Hypothesis (H2).** The visibility of a firm positively moderates the relationship between the coreness of its name in networks of firm names in media reports and the realized prices of its outputs at auctions.

In addition to visibility, valence of tone is often considered when assessing the impact of the media on markets. Positive tone can increase a firm's IPO performance (Pollock &





Rindova, 2003), whereas negative tone can lead to lower returns (Ahmad et al., 2016). We argue that tone valence will influence how overall information about a firm, such as its coreness, is perceived (Bail, 2021). People tend to pay more attention to, and remember, negative information (Baumeister et al., 2001). Negative bias dominates perceptions and is more likely to be acted upon (Bonardi & Keim, 2005; Shipilov et al., 2019).

A negative interaction between coreness and negative tone can be attributed to two main factors. First, networks act as “prisms” (Podolny, 2001) amplifying market perceptions about firms based on their network positions. For instance, a higher level of coreness amplifies the delegitimizing effects of negative information, doing more significant damage. As a firm's coreness increases, negative coverage is more likely to be perceived, discussed, and remembered, magnifying its impact. Therefore, the more negative the tone, the more it will undermine the positive cognitive effects of coreness. Second, firms with higher coreness are more likely to be leaders in their industry (e.g., better performers or innovators; Chiu, 2008) and hence they may be held to higher standards by various stakeholders. As the negativity in tone increases, the contrast widens between what such stakeholders expect and the firm's actual behavior, leading to backlash. This can take the form of a loss of trust and credibility, two factors that are crucial to a firm's appeal and customers' willingness-to-pay for its products. The more negative the tone, the stronger the backlash and the faster trust and credibility are eroded, with heightened long-term consequences for customer loyalty and investor confidence. Hence our third hypothesis:

**Hypothesis (H3).** The extent of negative tone used in the coverage of a firm negatively moderates the relationship between its coreness in a network of firm names and the realized prices of its outputs at auctions.

### 3 | METHODS

#### 3.1 | Data sources, sample, and the auction process

We constructed a comprehensive and unique database combining well-respected online and print sources. For the auction prices paid by buyers—our dependent variable—and to control for the main watch-level variables affecting these prices, we used data from *Antiquorum*, the world's leading auction house for luxury watches and the first one entirely devoted to timepieces (Luxferity, 2020). Founded in 1974 in Geneva, it holds many world price records (WatchTime, 2009). We collected data on all the auctions it organized globally: Geneva (delocalized once in Zurich), New York City, and Hong Kong, averaging 10 auctions per year across these three venues.

Building on one of the authors' attendance at an Antiquorum auction in Hong Kong (June 2014), along with information from their website and interviews with the CEO and an expert appraiser, we can further detail the process. Each auction lasts a day, split into two sessions—morning and afternoon—during which 300 to 500 watches are sold. Starting about one month before the auction, Antiquorum publishes a catalogue on its website listing all the watches to be sold. The catalogue displays a picture of each watch, along with details of all relevant attributes such as brand, model, and functions, as well as a monetary estimation range provided by the venue's expert appraiser, which serves as a reference point for buyers. On auction day, the lots are sold in catalogue order using an English-style auction, where the highest bid wins.

The bids are public and live. For each watch, the auctioneer starts with an opening bid, typically set around the lower end of the expert's estimate and above the reservation prices of both the seller and the auction house (as the house gets a percentage of the final price as fee). The auctioneer also sets a minimum bidding increment which is based on the current bid and increases as the bidding progresses. For instance, when the current bid is USD 1,000, the minimum increment might be USD 100–200, whereas if the current bid reaches USD 10,000, the minimum increment could rise to USD 1,000–2,000. The highest bid at any moment remains valid and guarantees the watch unless a higher one displaces it before the auctioneer counts to three and slams the hammer down, validating the outstanding bid (hence hammer price). Rarely (8.7% of the times in our sample), if no bidder is willing to meet the auctioneer's starting bid, the auctioneer will lower it until someone accepts or until it reaches the seller's or house's reservation price. If no one bids at that point, the lot is withdrawn and remains unsold.

There are four ways to bid for a watch: in person, by phone, by internet, or by submitting a pre-bid, which must specify a reservation price (no “buy at all costs” option is allowed). In case of pre-bid, once all the live bidders (in person, internet, and phone) have placed their final bid, if it is below the pre-bid reservation, the auctioneer acts as the pre-bid bidder, competing against the outstanding bid to buy the lot at the lowest possible price below the pre-bid reservation. In the extremely rare case of multiple identical pre-bids, preference is given to the first one received by the auction house. At most auctions, the ratio of in person bidders to those bidding remotely is between one in seven and one in ten, meaning most prefer to use one of the latter three methods, with internet bidding being the most common and pre-bids the least. This suggests that buyers are not venue-dependent and form a rather global crowd, whereas the venue correlates mainly with the sellers as lots disproportionately come from sellers located near the auction venue.

To construct firm-level controls, as in Godart et al. (2020) and Godart and Claes (2017), we used *Wristwatch Annual*. It is a comprehensive annual trade magazine widely regarded as a reference in the industry by both professionals and collectors. It provides detailed watch-level information about the upcoming collection from each featured watchmaker and is published ahead of the year it references, shortly after Baselworld (the watchmaking equivalent of the Annual Conference of the Strategic Management Society) which is held annually around April. For instance, the 2005 edition contains information about what were at the time the upcoming 2005 collections but was released around May 2004, making it a source of lagged information for auctions in 2005. We explored the 2002–2010 editions; 2002 was the earliest edition of *Wristwatch Annual* available in English at the time of data collection. We aggregated watch-level data at the firm-year level and complemented it with hand-collected firm-level information such as founding date, country of headquarters location, and so forth, using other public sources like firms' websites and data from the two main professional organizations of the industry: *Fédération de l'Industrie Horlogère Suisse* and *Fondation de la Haute Horlogerie*.

With Switzerland being by far the global industry leader (Raffaelli, 2019), over the last 15 years, the authors attended five *Journées Internationales du Marketing Horloger* (International Watch Marketing Days), the only conference dedicated to the marketing of luxury watches which gathers hundreds of people each year, including firm executives, industry insiders, journalists, and academics in La Chaux-de-Fonds (Switzerland), the cradle of watchmaking. During numerous formal and informal interviews and conversations, participants such as Osvaldo Patrizzi (the founder of Antiquorum); top executives from major Swiss companies (e.g., Hublot, Tag Heuer, Panerai...); and leading academics from the *Institut du Marketing Horloger* (Institute of Watch Marketing) in Neuchâtel (Switzerland), repeatedly recommended





the use of the aforementioned sources to define our population of luxury watchmakers and gather our data. Our firm population was therefore composed of the intersection of all the firms listed in Wristwatch Annual between 2001 and 2009 and the firms sold by Antiquorum between 2002 and 2010 (due to the lag).

Finally, to construct the independent variable and moderators we used *Factiva* which gathers all articles from the most important news outlets worldwide (both print and online). *Factiva* is one of the largest news aggregators in the world and is routinely used in academic research to analyze media coverage of industries and companies (Bednar, 2012; Bednar et al., 2013). We searched for all articles that mentioned any of the firms in our population at least once between 01/01/2001 and 12/31/2009 (media data is lagged by 1 year) and removed duplicate articles. We restricted the search to *Factiva*'s worldwide luxury watchmaking category in English.<sup>1</sup>

Overall, there were 79 Antiquorum auctions held between January 2002 and December 2010, involving 15,473 watches sold originating from 87 watchmaking firms mentioned at least once in 25,714 media articles. This research setting is ideal for our inquiry since luxury watchmaking is a well-established and mature category dating back to the 16th century (Landes, 1979, p. 3). It also involves high levels of aesthetic and technological complexity (Godart et al., 2020), which leaves significant room for third-party audiences to influence consumers' perceptions, notably by accounting for firms' identity, values, and history—key drivers of value in our setting (Zorik & Courvoisier, 2007).

## 3.2 | Measures

### 3.2.1 | Dependent variable

Our dependent variable is the final realized auction *Price* (hammer price) at the watch level. Since most watches in our sample were sold in Geneva in CHF<sup>2</sup> (Swiss Franc), we converted all prices to CHF using the historical exchange rates of the day. To maintain data consistency at the watch level, we excluded the few lots that contained multiple watches sold as a package, as well as objects that were not strictly wristwatches, such as pendulettes, wall clocks, desk clocks, and pocket watches. To smooth the effect of extreme outliers, we applied the natural logarithm of the variable shifted by one.

### 3.2.2 | Independent variable

Research shows that the strength of the association between two words indicates how related their underlying concepts are (i.e., how semantically related they are), and this is best proxied by both their frequency of co-mentioning and their textual distance (He, 1999; Netzer et al., 2012; Saiz & Simonsohn, 2008). These considerations guided the construction of our measure. We built yearly semantic networks rolling from the 1st of January until the 31st of December with adjacency matrices made of the weighted relationships (number of co-mentions

<sup>1</sup>We did so by restricting the "Industry" parameter to only the search results from: Consumers Goods > Luxury Goods > Luxury Watches" and "Consumers Goods > Watches/Clocks/Parts > Luxury Watches.

<sup>2</sup>1 CHF ~ 1.10 USD as of May 2024.

within a given word distance) between firm names (nodes) in media coverage using Automap (Carley & Diesner, 2005).<sup>3</sup> Since we are interested in the semantic coreness of firms' names only, we parsed the text in each article to *keep only* firm names. We did this by building a thesaurus of all the firm names in our population<sup>4</sup> and then applied it as a (keep) filter in Automap to remove all other words that were not firm names. While doing so, we kept track of the original word distance between firm names, as it is indicative of the strength of their semantic relationship.<sup>5</sup> For instance, the sentence: "Omega is a watchmaker and so is Rolex" was parsed to become "Omega xxx xxx xxx xxx xxx xxx Rolex." The "xxx" keeps track of the previous presence of a word and allows for calculating the (inclusive) word distance between two names (in this case, seven).

Following Carley (1993, 1997), we need to select a relevant word distance limit for counting a relationship (edge) between two concepts (nodes) to ensure that we only include associations that are meaningful without losing too many (due to too short a window) or including those that are meaningless (due to too broad a window). After manually inspecting 50 randomly selected articles, we chose a limit of plus or minus 10 words within two sentences to mimic the average line length in a newspaper article and allow for firm names within two consecutive sentences to be related if they fell within the word distance. In an extensive series of robustness checks (see below), we vary this word distance to remove the potential arbitrariness of our choice. Since we build yearly semantic networks, the edges are summed over the articles of that year. That is, if the same pair (e.g., "Rolex-Omega") is co-mentioned once across three texts within the word distance, we count three edges. From there, a *symmetric* valued adjacency matrix is constructed with a cell containing 0 if two firms are never related in a given year, or a positive integer reflecting the number of times that they are related (e.g., 3 for "Rolex-Omega") to account for the weight of the semantic association.

To test Hypothesis 1, we constructed the *Coreness* of firm names based on these yearly symmetric adjacency matrices. A network with a core/periphery structure has a cohesive core of nodes that are densely related to one another and a periphery of nodes that are unconnected to each other and not strongly connected to the core (Borgatti & Everett, 1999). As in Cattani and Ferriani (2008) and Dahlander and Frederiksen (2012), we fitted a continuous model of core/periphery to our data because the categorical model is too limited and oversimplifies reality by only allowing a structure with two classes of nodes. Although "specifying the ideal blockmodel that best captures the notion of a core/periphery structure is difficult, as there are many reasonable structures to choose from" (Borgatti & Everett, 1999, p. 385), a continuous model solves that problem by not arbitrarily forcing nodes into either the core or periphery, but rather by measuring, in a continuous fashion, a node's connection to a core of densely connected nodes (akin to a center of mass). The algorithm of Borgatti and Everett (1999, p. 387) achieves this by giving higher values to core nodes and lower values to peripheral nodes. Therefore, the product of two core values will be high (a dense relationship between core nodes), the product of a core

<sup>3</sup>Since we are interested in the non-contractual role of the media, we used the article subject tags from Factiva to construct these relationships and focused on the set of articles excluding press releases, advertisements, and branding articles, as these are paid for by firms or are highly correlated with firm sponsorships. This removed 2,307 out of 25,714 articles. However, the results are robust even when coreness is computed on the whole set of articles.

<sup>4</sup>We transformed firm names made up of several words into single concepts, for example, Vacheron Constantin became Vacheron\_Constantin. We also transformed common spelling variations into the same concept, for example, Vacheron, Vacheron & Constantin, Vacheron and Constantin; all became Vacheron\_Constantin.

<sup>5</sup>We followed this procedure: *Generalization Thesaurus* > *Thesaurus Content Only* > *Rhetorical adjacency* (Carley et al., 2013, p. 138).



value and a peripheral value will be medium (a moderate relationship between the core and the periphery), and the product of two peripheral values will be low (an absence of a relation between peripheral members) (Borgatti & Everett, 1999). To avoid simultaneity issues, we lagged our independent variable by 1 year with respect to the DV, that is, we use the corpus of text from year  $t-1$  to affect the DV in year  $t$ . We used the coreness library (Levenson, 2010) built for Python NetworkX (Hagberg et al., 2008) that computes the continuous coreness of Borgatti and Everett (1999).<sup>6</sup>

### 3.2.3 | Moderators

We operationalize media *Visibility* as in prior research by counting the number of times a watchmaker was mentioned in media articles in the year preceding the auction. While this variable is expected to be positively correlated with our independent variable, it is conceptually distinct. Some watchmakers can be highly visible yet not frequently co-mentioned with others and therefore have lower coreness and vice versa. This is because mentioning a watchmaker alone or in association with other watchmakers is often the outcome of two different processes. A solo watchmaker mention is often the result of some form of paid advertisement as companies do not pay to get mentioned with other companies, whereas a co-mention can result from reporting on real-world happenings such as the organization of an event, attendance at industry salons, the reporting of facts or trends, or an opinion piece. As an illustration, here is an example of an article that mentions only one firm and therefore contributes to increasing its visibility but not its coreness:

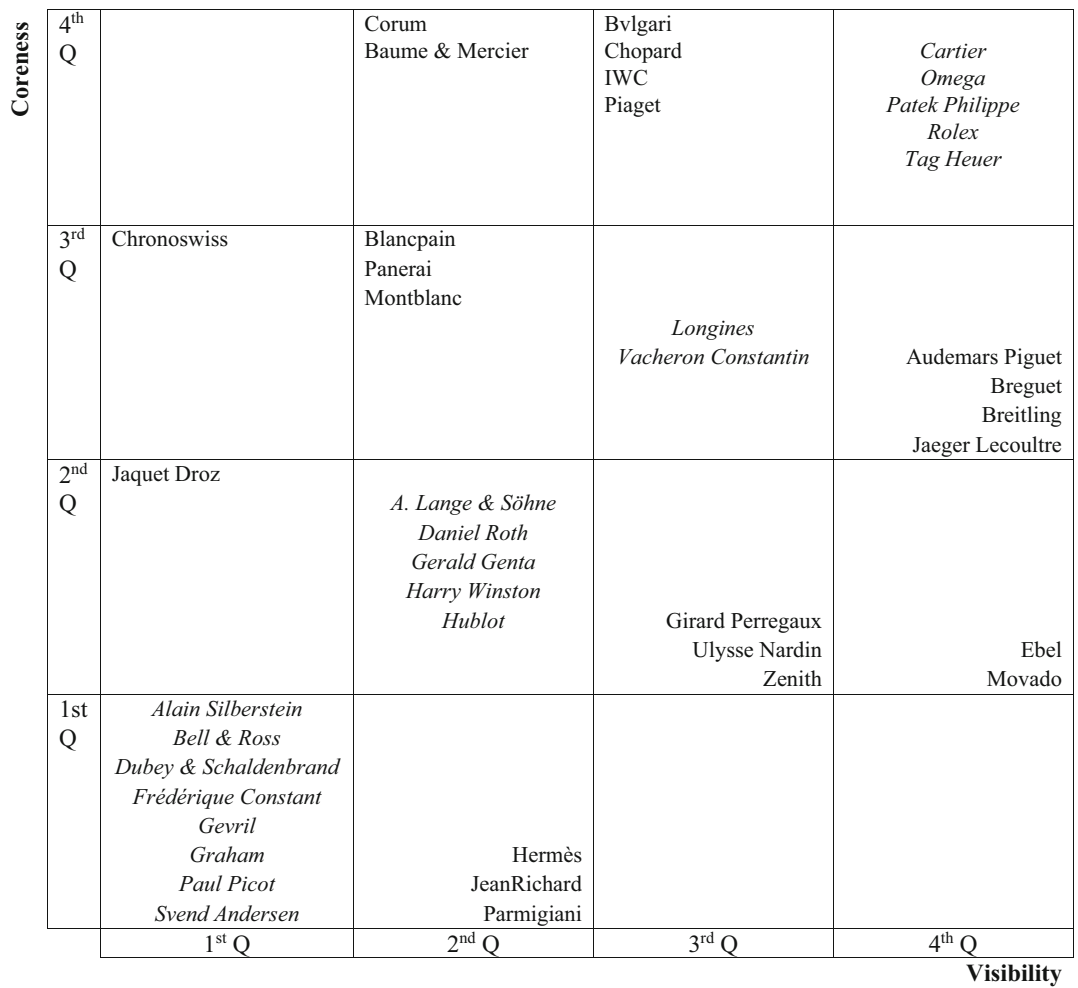
“Through a new distribution agreement, timepieces from Swiss watch brand Hautlence are now available in the United States. Based in Neuchatel, Switzerland, Hautlence has announced a new partnership with Totally Worth It, a New York-based company that distributes a variety of niche Swiss watch brands throughout North America [...] Hautlence prides itself on creating innovative watchmaking concepts and producing calibers that differ from their predecessors.”

In contrast, here is an example of an article co-mentioning firms and hence contributing to an increase in their coreness:

“Rolex, Omega, Cartier, and [...] Patek Philippe—are on the short list of best-known, most-esteemed timepieces. And their popularity is on the rise. Gene Dunn, the watch buyer for B.C. Clark Jewelers [...], said he has seen a sharp increase in the sale of luxury watches in the past three years.”

In Figure 1, we further illustrate this fundamental conceptual distinction by showing the distribution of watchmaking firms by quartiles of coreness (vertical axis) and visibility (horizontal axis) using the media reports from the year 2004. There are 43 firms in e(sample) and 20 are on the diagonal, meaning their coreness and visibility are relatively similar, but 23 are off-diagonal. Those 11 firms above the diagonal are more core than visible and those 12 firms below are more visible than core. As expected, there are no extreme outliers, that is, firms in

<sup>6</sup>We replicated all the results using UCINET VI (Borgatti et al., 2002) but prefer Python as computing the continuous coreness in UCINET VI is not a scriptable function and must be done manually.



**FIGURE 1** Distribution of watchmakers by quartiles of coreness and visibility in 2004 media articles. There are 43 watchmaking firms left in e(sample). Italicized names are on the diagonal. Names are ordered alphabetically within cells.

the first quartile in one dimension but in the fourth quartile in the other. To test Hypothesis 2, we constructed the interaction *Coreness* × *Visibility*.

To compute the extent of *Negative tone*, we proceeded in a manner akin to Shipilov et al. (2019). For each watchmaker, we computed both the negative and positive tone of any article that mentions its name using the LIWC software (Pennebaker et al., 2001) and each was averaged per watchmaker-year. The higher the negative (positive) tone, the more the articles mentioning a firm contain negative (positive) words and expressions. To minimize some of the known limitations of LIWC<sup>7</sup> (Franklin, 2015), we constructed our variable as the ratio of

<sup>7</sup>LIWC's negative (positive) tone only makes a percentage of the number of words in an article that match a predefined thesaurus of negative (positive) words but negations are not taken into account. For instance, “not beautiful” would increase positive tone and “not bad” would increase negative tone. Across a large sample of texts, taking a ratio as we did minimizes that type of error and gives a more accurate overall tone valence. Additionally, LIWC does not provide the formula for its default Tone variable, which reflects overall tone valence, so it lacks transparency.



LIWC's negative tone to positive tone. The ratio is then an increasing function of how negatively a firm is talked about and ranges theoretically from 0 to infinity. When the ratio is  $<1$ , the firm is talked about more positively than negatively and conversely when the ratio is  $>1$ . In our data, the ratio is overwhelmingly leaning toward the positive side as the average is 0.25, the maximum 1.13 and the ratio is  $>1$  for only one firm in 2002. To test Hypothesis 3, we constructed the interaction *Coreness*  $\times$  *Negative tone*. Here is an example of an article that generates a high negative tone:

“Robber returns ropey Rolex. Insult was added to injury after a 73-year-old man had his watch stolen in Bologna last week. The thief sped away on a scooter, only to return moments later and throw the watch back in the owner's face, complaining that it wasn't a real Rolex. The picky thief is still at large but the cheapskate victim was subsequently charged with possession of a fake watch.”

### 3.2.4 | Control variables

To rule out competing explanations, we added several watch- and firm-level controls that could impact the auction price. First, we controlled for watch-level characteristics using the Antiquorum auction catalogue which describes in detail all the watches to be sold, including information such as the brand; the types of functions of the watch (e.g., date, moon phase, power reserve, etc.); the materials (leather, stainless steel, etc.); the manufacture date; and so forth. Production costs drive up the list price of a watch and should therefore also drive up the secondary market prices of that watch at auctions. As such, we created a dummy variable indicating whether the watch contained *Gold*, as this is historically the most-used rare material in watchmaking. Another main driver of costs is the technical complexity of the watch movement (i.e., what is contained in the case of the watch) given that more complicated watches are more costly to make. In watchmaking, the complexity of a watch increases with the number of functions that the movement can perform. Simple movements contain combinations of hour, minute, second, and date functions. Functions beyond these four begin to distinguish simple movements from more elaborate, and thus more costly, ones. The most common among these next-tier functions is the chronograph, so we introduced a *Chronograph* dummy to account for its presence, which is expected to drive up prices. Finally, the type of movement also matters, so we introduced a *Mechanical* dummy variable indicating whether it is a mechanical movement (automatic or manual winding) versus a quartz one, as the latter is both cheaper to produce and less valued by serious watch collectors.

Aside from cost factors, there are also supply-and-demand considerations that should affect auction prices. We introduced a *Lady* dummy indicating whether watchmakers designed the watch for female customers. Since the watch market is the only jewelry segment heavily driven by demand from male customers, women's watches are usually priced cheaper for similar levels of production costs. Furthermore, we included a *Documents* dummy variable indicating whether the watch came with any certificate of authenticity from the factory. This is expected to drive up the price since it reduces the probability that the watch is fake and it ascertains its origin, year of creation, and sometimes even states the identity of the craftsman. We controlled for scarcity with two dummy variables: *Limited* indicates whether the watch was made as a limited edition or in limited numbers for a special occasion, and *Unique* indicates whether a watch is a unique piece. Limited and especially unique watches are almost

always expected to reach higher prices due to scarcity effects. The age of a watch should have an impact on its price due to a vintage aspect that collectors value. Therefore, we introduced an *Antique* continuous variable, which is the difference between the auction year and the year of make of the watch. This variable is also expected to drive up prices because there are fewer older than newer watches available for resale. Finally, we used the monetary *Expert Estimation* of the watch given by the expert appraiser for that watch prior to the auction. In the Antiquorum catalogue, the expert gives minimum and maximum recommended values per watch, and we used the logarithm of the minimum estimation for our variable as it is widely considered to be a strong anchoring baseline for the final realized price. We expect it to be highly indicative of the final price.

In a second series of controls, we introduced firm-level variables that could explain variance in auction prices. Importantly, we controlled for watchmakers' *Status* by using the average watch price of each watchmaker's yearly collection in Wristwatch Annual. Prices are highly correlated with status and perceptions of quality (White, 1981; White, 2001), particularly in luxury settings where consumption is conspicuous and where they are the best status indicator (Malter, 2014; Veblen, 1899).<sup>8</sup> Status is expected to increase auction prices as has been shown, for example, in the Korean art market (Shin et al., 2014). As networks also act as "pipes" (Podolny, 2001), we constructed *Connections' Status* which is the average status of all firms ego firm is connected to in media reports, weighted by the number of times it is connected to them in the year. Additionally, we controlled for market power which could positively impact the perception of the watchmaker by the consumer due to increased availability of marketing resources. During our observation timeframe, the two main conglomerates were Richemont and Swatch Group. Several watchmakers were also owned by LVMH and Kering,<sup>9</sup> the two main (more general) luxury groups not restricted to watchmaking, but which enjoy significant financial resources. Finally, there were a couple of smaller groups owning only two to three smaller watchmakers. Our models account for this with several conglomerate dummies: *Richemont*, *Swatch*, *LVMH*, *Kering*, *Small group* (the omitted category being no conglomerate affiliation). There were only a few watchmakers that were bought and sold during our study period and the appropriate affiliation adjustments were made. Controlling for conglomerate affiliations is crucial since watchmakers from the same conglomerate could be more often co-mentioned and organizations belonging to conglomerates are usually central to the industry (Barkey & Godart, 2008). There could also be more collaborations reported by the media between organizations within a conglomerate such as personnel mobility, R&D, event organizations, and so on. Since this is an important variable, we also use different operationalizations of it in robustness checks below. Finally, our models control for usual baselines: we include watchmaker fixed effects, auction-year dummies, and auction-month dummies. In a series of robustness checks, we also use auction-specific fixed effects instead of watchmaker fixed effects.

<sup>8</sup>For instance, with an average portfolio price of 59,500 EUR Patek Philippe is considered a higher status watchmaker than Rolex with an average portfolio price of 16,700 EUR (in 2010).

<sup>9</sup>Kering was known as PPR during our study period and made most of its watch related acquisitions post 2008. As it turns out also, during our timeframe there were very few watches sold from watchmakers belonging to the Kering conglomerate and there were none remaining in our final e(sample) and therefore omitted in the tables.





## 4 | ANALYSIS AND RESULTS

Table 1 displays summary statistics of the sample and Pearson's correlation coefficients. The correlations between any of our three variables of interest and all the other controls are low (at most 0.44). As expected, *Visibility* and *Coreness* are somewhat correlated (0.56), but this is not problematic as it is below the well-accepted  $|0.7|$  threshold (Dormann et al., 2013) and because the VIFs of *Visibility* and *Coreness* are 1.87 and 1.92, respectively, which is also well below the accepted threshold of 10 (Dormann et al., 2013). The independent variable and moderators were mean-centered for the analysis, but the descriptive statistics in Table 1 report the non-mean-centered variables for ease of interpretability.

In each auction, there are usually several watches sold per watchmaker and there are several watchmakers. These watchmakers can reappear (in an unbalanced fashion) in multiple auctions over time.<sup>10</sup> Conceptually, we can think of watches as belonging to brands, which are nested within auctions, and we have a continuous dependent variable. Therefore, we must use linear mixed-effects models (xtmixed), which are better suited for treating nested data than regular OLS (xtreg or reg) (Demidenko, 2013; Rabe-Hesketh & Skrondal, 2008; Verbeke & Molenberghs, 2009). These models allow for correctly estimating coefficients and standard errors while also accounting for the effects of the different nesting levels on the dependent variable. In robustness checks, we reverse the nesting levels and allow for the non-strict nesting of the levels; all the results remain.

The results of the regression models are in Table 2. Model 1 is the baseline with all the controls. As seen in Model 2, Hypothesis 1 is supported since the coefficient of *Coreness* is positive and significant ( $b = .12, p < .001$ ) and remains so throughout all models. In terms of economic significance, it has a non-negligible effect strength. Indeed, the average auction price in our sample is 24,060 CHF and an increase of one standard deviation in *Coreness*, ceteris paribus, increases that price to 27,526 CHF, which represents 14.4% ( $=3,466/24,060$ ) of the average price. Introducing *Coreness* also improves model fit, given the decreasing AIC value. In Models 3 and 4, we added the two interaction terms sequentially to test Hypotheses 2 and 3, respectively. In Model 3, we see that Hypothesis 2 is supported since there is a positive and significant coefficient of the interaction ( $b = .10, p = .038$ ). Model 4 shows that Hypothesis 3 is also supported, as the interaction term is negative and significant ( $b = -.38, p = .018$ ). In the fully specified Model 5, which has the best fit given the lowest AIC, all interaction terms remain significant in their expected directions ( $b = .10, p = .04$  and  $b = -.38, p = .018$ , respectively). Overall, we interpret these results as lending strong support for H2 and H3.

### 4.1 | Robustness checks and supplementary analyses

To strengthen the validity of our results, we performed many robustness checks<sup>11</sup>: First, we checked that our coreness effect was robust to its order of inclusion into the models. To that effect, we ran models in which we introduced our independent variable before the baseline controls, and it still had a positive and significant effect. Second, in another series of models, we

<sup>10</sup>For instance, in auction 1, there are 3 Rolex and 2 Omega watches sold, in auction 2, there are 2 Rolex and 1 Patek Philippe watches sold, in auction 3, there are 4 Patek Philippe and 3 Omega watches sold, and so forth.

<sup>11</sup>All tables available from the authors upon request but omitted due to space constraints and were shown to reviewers during the review process.

TABLE 1 Descriptive statistics and Pearson correlation coefficients.

Variables	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 Price (log)	9.21	1.23	5.29	14.21																		
2 Gold	0.62	0.49	0.00	1.00	.11																	
3 Chronograph	0.20	0.40	0.00	1.00	.12	-.20																
4 Mechanical	0.04	0.20	0.00	1.00	-.16	.02	-.04															
5 Lady	0.06	0.24	0.00	1.00	-.14	.14	-.12	.21														
6 Documents	0.32	0.47	0.00	1.00	.32	.05	-.01	-.05	-.07													
7 Limited	0.14	0.34	0.00	1.00	.15	-.08	.04	-.05	-.09	.23												
8 Unique	0.01	0.07	0.00	1.00	.09	.02	-.02	.00	.02	.04	-.02											
9 Antique	34.08	28.37	0.00	228.00	-.07	.16	-.07	-.11	.07	-.19	-.32	.01										
10 Expert estimation (log)	8.87	1.23	5.01	13.59	.96	.13	.11	-.14	-.13	.31	.15	.09	-.08									
11 Status	33,418	35,055	643	470,000	.11	.11	-.03	.00	.03	.10	.05	.03	-.16	.12								
12 Connections' status	29,681	15,191	2326	339,732	-.08	-.08	.03	.03	.00	.07	.16	.03	-.24	-.08	.41							
13 Small group	0.24	0.43	0.00	1.00	.02	-.20	.01	-.04	-.06	-.22	-.16	-.01	.00	.01	-.09	-.02						
14 LV/MH	0.02	0.13	0.00	1.00	-.13	-.08	.14	-.01	-.02	-.06	.00	.00	-.03	-.13	-.04	.04	-.07					
15 Swatch	0.13	0.33	0.00	1.00	-.18	-.07	.12	-.01	-.04	-.08	-.01	.00	.05	-.20	-.10	.00	-.22	-.05				
16 Richemont	0.25	0.43	0.00	1.00	-.04	.06	-.07	.01	.07	.04	.16	.02	-.07	-.04	.06	.10	-.32	-.08	-.22			
17 Visibility	536.57	752.37	1.00	3909	-.06	-.14	-.05	.01	.00	-.10	-.13	-.03	.04	-.06	-.18	.14	.44	.00	.00	-.20		
18 Negative Tone	0.25	0.08	0.00	1.13	-.06	-.11	.01	-.01	.00	-.14	-.13	-.01	.06	-.07	-.15	.04	.33	-.06	.14	-.22	.30	
19 Coreness	0.53	0.31	0.00	1.00	.03	-.06	-.05	-.02	.02	-.03	-.18	-.04	.14	.00	-.32	-.16	.24	-.10	.22	-.27	.56	.32

Note: N = 15,473. Correlations above |0.011| are significant at  $p < .05$ .



TABLE 2 Mixed effects regressions on *Price (log)*.

	Model 1	Model 2	Model 3	Model 4	Model 5
Gold	−0.0158 [.010]	−0.0162 [.008]	−0.0161 [.009]	−0.0161 [.009]	−0.0160 [.009]
Chronograph	0.0544 [.000]	0.0545 [.000]	0.0542 [.000]	0.0546 [.000]	0.0542 [.000]
Mechanical	0.1076 [.000]	0.1067 [.000]	0.1070 [.000]	0.1068 [.000]	0.1072 [.000]
Lady	−0.0229 [.048]	−0.0230 [.046]	−0.0230 [.047]	−0.0229 [.047]	−0.0228 [.048]
Documents	0.0388 [.000]	0.0369 [.000]	0.0370 [.000]	0.0365 [.000]	0.0366 [.000]
Limited	0.0585 [.000]	0.0586 [.000]	0.0587 [.000]	0.0591 [.000]	0.0592 [.000]
Unique	0.1858 [.000]	0.1839 [.000]	0.1835 [.000]	0.1839 [.000]	0.1836 [.000]
Antique	0.0004 [.002]	0.0004 [.002]	0.0004 [.002]	0.0004 [.002]	0.0004 [.002]
Expert estimation (log)	0.9345 [.000]	0.9345 [.000]	0.9345 [.000]	0.9345 [.000]	0.9345 [.000]
Status (×10.000)	0.0037 [.004]	0.0037 [.003]	0.0038 [.003]	0.0035 [.006]	0.0036 [.005]
Connections' status (×10.000)	−0.0015 [.707]	0.0016 [.691]	0.0018 [.645]	0.0011 [.775]	0.0014 [.728]
Small group	−0.2419 [.140]	−0.2309 [.158]	−0.2215 [.176]	−0.2268 [.166]	−0.2176 [.184]
LVMH	0.0080 [.934]	−0.0029 [.976]	0.0078 [.936]	−0.0013 [.989]	0.0092 [.924]
Swatch	0.4070 [.000]	0.3601 [.001]	0.3834 [.000]	0.3600 [.001]	0.3831 [.000]
Richemont	0.2010 [.011]	0.1978 [.013]	0.2018 [.011]	0.1962 [.013]	0.2002 [.012]
Visibility (×1.000)	−0.0147 [.009]	−0.0180 [.001]	−0.0585 [.004]	−0.0143 [.015]	−0.0544 [.008]
Negative tone	−0.0528 [.250]	−0.0972 [.039]	−0.1050 [.027]	−0.2398 [.002]	−0.2466 [.001]
Coreness		0.1166 [.000]	0.1512 [.000]	0.1234 [.000]	0.1576 [.000]
Coreness × visibility (×1.000)			0.1009 [.038]		0.1000 [.040]

TABLE 2 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Coreness × negative tone</i>				−0.3811 [.018]	−0.3785 [.018]
Watchmaker fixed effects	yes	yes	yes	yes	yes
Month fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
Constant	−1.1359 [.000]	−1.1365 [.000]	−1.1367 [.000]	−1.1367 [.000]	−1.1368 [.000]
Log likelihood	−4479.85	−4471.44	−4469.30	−4468.62	−4466.52
AIC	9207.70	9192.88	9190.59	9189.24	9187.03
Wald Chi-square	191,052	191,247	191,311	191,322	191,386
Observations	15,473	15,473	15,473	15,473	15,473

Note: Exact *p*-values are between brackets. Two-tailed tests.

replaced *Negative tone* with *Positive tone*, which is the inverse ratio of our variable and the results were preserved. This time, the interaction was positive and significant as the ratio increased, that is, as the tone became less negative (more positive), which further supported our theory. Third, our data are not perfectly nested hierarchically. Each watch was made by one firm and was later resold in an auction. However, each firm does not necessarily appear in each auction, and each auction does not necessarily sell watches from the exact same set of watchmakers. To account for this non-perfect nesting, we ran a series of models where we reversed the watchmaker and auction levels' order. Further, in another series of models, we swapped the watchmaker fixed effects for the auction fixed effects. All the results were again preserved. Fourth, conglomerate affiliations are important since they represent “real” associations of firms, and this could be reflected in media coverage as more frequent co-mentions. Therefore, it is important to ensure our semantic coreness is not just a “double counting” of these affiliations but an autonomous effect. To this end, we also operationalized conglomerate affiliations via a simple dummy equal to 1 if a watchmaker belonged to a conglomerate that year (any of them), and via an ordinal categorical variable increasing from 0 to 5 in the order of increasing importance of the conglomerates as described in the control variables section. The results were robust to these two alternative constructions.

Fifth, some auction-specific processes could also impact prices, such as buyer collusion or mandated agents buying watches for several different buyers. However, Antiquorum insiders mentioned that they do not observe these. “Paul Getty”-type behaviors (i.e., aggressively bidding for a first item and scaring off buyers of subsequent similar items to secure lower future prices) are also strongly mitigated because they would be centered around specific brands or specific years of make and our *Antique* control variable as well as the watchmaker fixed effects, present in all models, take care of these concerns. Sixth, we took all the media articles in English from the luxury watchmaking category in Factiva to construct the independent variable. Therefore, we made an English-reading assumption for buyers at these auctions. But Antiquorum auctioneers told us that regardless of the venue, the main pool of buyers was always international and roughly the same in terms of the English-speaking distribution, since for every person physically present at the auction there are about seven to ten people present online at the same time.



Statistically, these potential differences in buyer distributions and English proficiency across auctions are accounted for by auction fixed effects, which we detailed above. As expected, the results were preserved. Seventh, in the construction of our independent variable, one could argue that our word window limit of 10 for counting a co-mention is arbitrary. We thus reran the models with a series of different windows: 3, 5, 8, 13, 15, 18, and 20 words. To the best of our knowledge, no paper to date justifies the choice of a specific word window: some go as far as not even mentioning the window used, and very few test alternative windows. We therefore see this as an additional contribution because we both justify our window choice and perform a stringent series of sensitivity analyses. Overall, *Coreness* is positive and significant with  $p$ -values  $< 0.001$  from 3 to 20 words (H1). The interaction *Coreness*  $\times$  *Visibility* (H2) is always positive, and its  $p$ -value is below 0.05 between 8 and 15 words and varies from 0.08 to 0.14 below 8 and from 0.07 to 0.08 above 15. The interaction *Coreness*  $\times$  *Negative tone* (H3) is always negative, with a  $p$ -value  $< .05$  from 3 to 18 words, and reaching 0.052 at 20 words. Taken together, these results lend strong additional support to our theory. Finally, we reran the main models with a dichotomous *Core/periphery* variable. Its coefficient remained consistently positive with a  $p$ -value  $< .05$  from 3 to 15 words (often below 0.01), and generally below 0.10 beyond 15.

## 5 | DISCUSSION AND CONCLUSION

In this article, we have examined the link between network aspects of cognitive embeddedness and competitive dynamics in luxury watchmaking. We have explored the coreness of firm names in media coverage and have shown that the higher a firm's coreness in a network of firm names, the higher the auction prices its products achieve. This effect is positively moderated by the extent of that firm's media coverage (visibility), and negatively moderated by the negativity of the tone.

### 5.1 | Theoretical implications

Our work makes several contributions. First, we add to the literature on cognitive embeddedness in markets (Kennedy, 2008) by extending research on nascent markets to well-established ones and showing how network-level properties of cognitive market networks, that is, coreness, impact market dynamics (auction prices) over and above simple attributes of nodes taken in isolation, such as the extent and tone of coverage (Pollock & Rindova, 2003). At the same time, we add to the literature on the sociological determinants of prices (Beckert, 2011; Uzzi & Lancaster, 2004; Velthuis, 2003), which focuses more on the role of social relations among individuals and groups (Ody-Brasier, 2022) than on that of relations among concepts in affecting prices in markets.

Second, we contribute to the literature on the role of non-contractual third-party audiences in markets (Cattani et al., 2017). Third-party audiences reduce market uncertainty and the media play a key role in gathering, synthesizing, and disseminating information about firms, thereby documenting beliefs about market structure and dynamics (Lounsbury & Rao, 2004). By doing so, they contribute to the social construction and maintenance of markets (e.g., Kennedy, 2005; Porac et al., 1995; Porac & Thomas, 1990). We add to the conventional

understanding of the media's role by taking a “semantic network” perspective (Carley, 1994; Carley & Kaufer, 1993).

Third, by doing this, we add to the core/periphery literature in social network analysis (Borgatti & Everett, 1999; Cattani & Ferriani, 2008; Maoret et al., 2020). The traditional focus is on firms' or individuals' networks built from observable social relations or collaborations in the “physical” world. In contrast, we consider semantic networks (Carley, 1994; Carley & Kaufer, 1993) from the “conceptual” space and offer a new type of relationships to further investigate where core/periphery structures take on new meaning and lead to real-world economic consequences. We thereby support the idea that conceptual systems have their own network structure and dynamics related to, yet autonomous from, social and strategic networks.

Finally, our main mechanism adds a counterintuitive spin to the conventional understanding of lack of differentiation (or similarity) in well-established markets that primarily emphasize its downsides (Brandenburger & Stuart, 1996; White, 1981). Our results suggest there is a difference between the consequences of similarity stemming from objective product characteristics (generally negative) and similarity stemming from semantic coreness (positive), thereby illustrating the importance of also analyzing the structure of conceptual systems in markets as it can yield results different from those suggested by traditional strategy research.

## 5.2 | Limitations and future directions

We believe our analyses allow us to extend our claims about the impact of firm name coreness in media coverage on auction prices beyond our empirical context, but we must acknowledge potential limits to their generalizability. Because our context is the luxury sector, there is a prominent secondary market in which conspicuous consumption and investment constitute important drivers of decision-making for buyers (Bennett et al., 2015) as reflected in auction prices (Mandel, 2009). In other industries (e.g., automotive, consumer goods, high-tech), the importance of semantic coreness may be weakened because of the existence of measurable technical features or more objective markers of quality. For example, while conspicuous consumption and investment certainly matter for price dynamics in the automotive industry as well, other factors such as safety and engine power are critical. Overall, we think that when there is less uncertainty about quality, the brand should matter less and the influence of non-contractual third parties like the media should be smaller, hence the effect of semantic coreness should be weaker.

While they are not, strictly speaking, a marker of firm performance per se (as firms do not directly capture value from auctions), auction prices are nevertheless related to overall firm performance. In our setting, this is illustrated by the following quote from Mr. Bennahmias (CEO of Audemars Piguet):

“It is extremely important. If you buy a watch for \$40,000 and two years later it is worth \$12,000, you are not going to buy so many watches from us anymore. Today, everything is public; everybody knows everything. We know the dynamics in the car industry where the secondary market has been working for decades. It is only just beginning in the watch world.” (Corder, 2019)

A fruitful avenue would be to further study the relationship between auction price and firm performance. As illustrated, executives clearly understand that auction prices are related to





their firm's performance, which is why some watchmakers, like Audemars Piguet, have recently fully integrated their secondary markets for better control. In this article, we explore factors impacting auction prices, and believe that, *ceteris paribus*, firms with higher semantic coreness could charge a higher price relative to their competitors, which would make it a source of competitive advantage. Indeed, auction prices (our dependent variable) are reflective of consumer valuations of a firm's outputs and should therefore also be positively related to a firm's capability of extracting higher price premiums via higher list (retail) prices. Professionals are very aware of the fundamental importance of auction prices and their relation to value capture and price premium capabilities. We welcome further research that would explore the impact of cognitive embeddedness on other outcome variables, for example, retail price, and/or clarify the link between the ability to command a higher auction price and the ability to extract a price premium.

Our study considers the link between coreness in the media and auction prices, but previous research has also explored the role played by several other types of third-party audiences such as critics or other field-specific experts (Gouvard et al., 2023; Hsu et al., 2012). This diversity can produce different types of cognitive embeddedness (Brandtner, 2017). The market influence of any third-party is thus likely to be affected by the degree to which their opinion aligns or diverges from others'. Exploring how coreness in media coverage relates to other non-contractual third parties' perceptions would be another productive avenue for research.

Finally, further analyses could investigate the content of media coverage and refine the nature of semantic networks beyond firm names. Which firms are most associated with other important industry concepts beyond competitors' names, and why? For example, are some watchmaking firms more associated than others with concepts such as tradition or innovation? How would such an analysis impact the perception of firms by different external audiences (e.g., experts and consumers)? How does semantic coreness change over time, and what factors drive its dynamics?

### 5.3 | Managerial implications and conclusion

Our results suggest that managers can and should increase their awareness of how the media associate their firms with others and the mental structure this creates. This would enable them to better understand their value creation in the secondary markets which can benefit their performance in primary markets. Indeed, watchmakers are a prime example of producers of scarce, unique products who benefit from a thickening of their secondary markets (Bennett et al., 2015). Therefore, managers should know more about how these markets operate.

In sum, our research highlights the importance of exploring the multiple ways in which non-contractual third-party audiences reduce uncertainty in markets. When considering the media, for example, conventional measures such as extent and tone of coverage, which are node-level parameters, are not sufficient. The coreness of firm names, derived from the semantic structure of media articles, should be integrated and related to these previously studied dimensions of media influence. In this sense, we hope our research helps to build a more comprehensive theory of cognitive embeddedness that is relevant to both scholars and practitioners.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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