Performance Implications of Using Signaling and Screening for Expanding Interfirm Business Networks: Evidence from Franchising

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Abstract

Entrepreneurial business firms such as franchisors can enhance their network performance by attracting high-quality partners and preventing low-quality partners from joining the network. We draw on agency and transaction cost theories and the substantive literature on voluntary information disclosure to develop a theoretical framework that examines the consequences of using signaling and screening mechanisms for interfirm network performance. Our model posits a complementary effect for signaling and screening because of their ability to offset the disadvantages of each other. We empirically evaluate our hypotheses through econometric analyses of a unique multi-sector panel dataset from the U.S. franchising industry. We find that ex-ante signaling and screening at the contractual relationship formation stage are complementary mechanisms that enhance network performance when they are used together. Additionally, we find that specific investments by the focal firm and by the partners positively moderate the performance impact of screening and signaling, respectively. Our findings suggest that the joint use of screening and signaling and the synchronization of specific investment commitments by both sides can assist an entrepreneurial business network in mitigating the double-sided adverse selection problem at the formation stage of dyadic network partnerships and enhancing network performance.

Keywords: Business Network, Signaling, Screening, Sales Performance, Double-sided Adverse Selection, Interfirm Relationships, Franchising, Voluntary Information Disclosure, Panel data analyses.

1. Introduction

Extant research has shown that the use of franchising by a firm enables it to enhance business network performance by aiding access to financial and managerial resources (Norton, 1995; Oxenfeldt & Kelly, 1968), and reducing agency costs (Brickley & Dark, 1987; Rubin, 1978). Bradach (1997) specifically notes that franchising facilitates the generation of innovations. Franchising-driven interfirm networks undertake technological changes, offer new products, introduce and improve the design of business processes, open up new markets or new sources of supply, and set up new business organizations and/or new methods of handling material – Schumpeter (1939) views all of these actions that reflect "doing things differently" (Schumpeter, 1939, p. 80) as innovation.

Interfirm networks create value and enhance organizational performance by enabling specialized resources and capabilities that are aimed at organizational processes such as coordination, integration, and learning (Amit & Zott, 2001). According to Lepak, Smith, and Taylor (2007), organizations can create value through innovation and invention activities that are suggested by Porter (1985) as developing new ways of doing things, using new technologies, methods and forms of raw material. Sorenson and Sorensen (2001) submit that franchising leads to more innovative exploration because franchisees are highly motivated to maximize local performance and, therefore, they adapt to environmental opportunities more frequently. Windsperger and Dant (2006) emphasize franchisees' outlet-specific know-how and local market knowledge as innovation assets that play a crucial role in the structure of franchise chains and of decision rights in franchising (Mumdžiev & Windsperger, 2011). Mallapragada and Srinivasan (2017) provide comprehensive and conclusive empirical support for the perspective that a firm's use of franchising improves organizational innovativeness in terms of both product and process

innovation. The authors identify franchising as an extension of a firm's boundaries that facilitate innovativeness. These findings are consistent with much of the broader interfirm networks and innovation literature, where (a) a firm's creation and use of an interfirm business network (e.g., franchising, joint ventures, alliances) is viewed to enable it to expand its resources and capabilities (Koch & Windsperger, 2017) and (b) inter-organizational networks (and the underlying enhancement of capabilities) are seen as key drivers of value creation (Aarikka-Stenroos & Ritala, 2017) and organizational performance (Kohtamäki, Partanen, Parida, & Wincent, 2013).

While interfirm business networks enable a firm to expand its resources and capabilities to stimulate and drive organizational performance, these gains can be undermined by transaction and agency costs (e.g., adverse selection). For example, franchisors face a tradeoff between control and innovation (Bradach, 1997) because of their dependence on both standardization and local adaptation (Kaufmann & Eroglu, 1999). When a firm looks to develop its interfirm business network, its future resources, and capabilities, operations and outcomes (including those related to innovation) benefit from both attracting high-quality prospective partner firms as well as preventing low-quality prospective partners from joining the network. At the same time, high-quality prospective partner firms will want assurances about the quality of the focal firm (and the business opportunity it offers to prospective partner firms). These two sets of goals and perspectives result in a double-sided adverse selection problem. For firms to fully realize the innovation and performance benefits of expanding organizational boundaries through network formation, it is necessary for them to address ex-ante agency problems (such as the double-sided adverse selection problem) that are caused by information asymmetry between the focal firm and its prospective network partners (Heide, 2003).

We draw on organization economics theories (particularly transaction cost theory and agency theory) and the substantive literatures on inter-organizational relationships and voluntary information disclosure to empirically study a firm's strategies for addressing the ex-ante information asymmetry problem at the formation stage of new interfirm relationships for its business network. Specifically, we examine signaling and screening mechanisms that mitigate such information asymmetry problems and enhance network performance. Firms may address the adverse selection problem they face by using a screening mechanism to check the quality of prospective network partners. Also, they may mitigate the adverse selection problem faced by prospective network partners by voluntarily disclosing their private information to signal the quality of their business concept to prospective network partners. In keeping with Wathne, Heide, Mooi, and Kumar (2018), we view screening and signaling as governance mechanisms because they are means to 'infuse order,' mitigate conflicts and gain mutual benefits in an interfirm business network. Thus, a firm can use signaling and screening mechanisms to address the double-sided adverse selection problem and fully realize the potential innovation process and outcome gains from enhancing resources and capabilities by expanding its interfirm business networks.

Our study is conducted in the context of the franchising. Franchising has been the setting for several theoretical and empirical studies on agency problems in interfirm networks (e.g., Bhattacharyya & Lafontaine, 1995; Lanchimba, Windsperger, & Fadairo, 2018; Shane, 1996) and is a good example of an institutional environment in which each party (i.e., franchisor or franchisee) needs information about the other party's quality before entering the exchange relationship. Franchising has become a widely prevalent form of retailing in North America, continues to have a substantial retail footprint in other developed economies, and has a rapidly

growing presence in emerging economies. According to Swift, Niu, Despradel, and Li (2019), almost 800,000 franchised business establishments have contributed 787.5 billion dollars of economic output and nearly 8.4 million direct jobs to the U.S. economy. Therefore, franchising is an appropriate context for inter-organizational relationship studies (Dant, Grünhagen, & Windsperger, 2011) and is a suitable setting for the theoretical development and empirical testing of our hypotheses.

Anecdotal evidence as well as extant research studies show that franchisors signal their quality (e.g., Shane, Shankar, & Aravindakshan, 2006) and use screening mechanisms to attract high-quality franchisees (e.g., Jambulingam & Nevin, 1999). In this study, we investigate the effects of screening and signaling (as governance mechanisms) on network performance. We empirically test our hypotheses using a unique multi-source panel dataset from the U.S. franchising industry. Our empirical findings reveal an enhanced performance impact of (a) the joint use of signaling and screening mechanisms as well as (b) the interaction of screening and signaling with specific investments in the partnership by the franchisor and new franchisees, respectively.

This paper aims to contribute to the extant literatures on interfirm networks, voluntary information disclosure, signaling, and franchising in multiple ways.

First, we provide theoretical and empirical evidence for the effect of channel governance mechanisms on business network performance. To address the double-sided adverse selection problem in interfirm relationship formation, we provide theoretical and empirical evidence for the limitation of screening as a sole channel governance mechanism. We introduce signaling as a complementary mechanism to screening and posit that the simultaneous use of these two

mechanisms can offset each other's disadvantages and generate a positive interactive effect on network performance. Such complementary mechanisms can mitigate both sides of the double-sided adverse selection problem that occur during the formation of dyadic relationships in the business network. This study enhances the extant interfirm networks literature by revealing the interactive effects of governance mechanisms on performance in a business network.

Second, we contribute to the voluntary information disclosure literature and answer Srinivasan and Sihi's (2012) call for research on the effects of voluntary marketing information disclosure as one of the research areas that not only extends the marketing literature but also contributes to finance and accounting literatures. We examine the effect of voluntary disclosures on performance in the relatively novel context of interfirm networks; this phenomenon has been hitherto studied mostly in the context of financial markets (Healy & Palepu, 2001). By studying voluntary disclosure in the interfirm networks (specifically, franchise networks) context, we are able to both understand the organizational performance consequences of voluntary disclosures as well as observe these effects over a period of time - as opposed to a single point in time, as is the case for many finance and accounting studies (e.g., Chahine & Filatotchev, 2008). Therefore, our study provides insights on the consequences of voluntary disclosures to business partners (rather than stock market investors and analysts) and contributes to a better understanding of the outcomes of such disclosures.

Third, we contribute to the signaling theory literature, by providing insights on the performance outcomes of quality signaling in a B2B context and investigating how signaling interacts with another interfirm relationship governance mechanism (screening) in impacting performance. Although signaling has been known as a helpful mechanism for B2B relationship

formation, there have been very few empirical studies on the consequences of signaling for network performance (Connelly, Certo, Ireland, & Reutzel, 2011).

Fourth, we seek to enrich the franchising literature and provide insights for franchising practitioners and public policymakers by investigating the consequences of franchisors' voluntary disclosure strategies. Our findings can help public policymakers determine whether such disclosures need to be mandatory. This issue has been the topic of intensive debate in franchising practice and regulation (Hershman & Mazero, 2008).

This paper is organized as follows. First, we present our theoretical background, conceptual framework and hypotheses (with the underlying theoretical rationales). This is followed by a description of data, measures, empirical settings, and analyses. We conclude with a discussion of the results and implications of the study.

2. Theoretical Background and Framework

Information asymmetry among business network members can lead to opportunistic actions in exchange relationships (e.g., Mishra, Heide, & Cort, 1998). In Akerlof's (1970) terminology, the inability of one exchange party to discover the inherent quality of the other party's skill, service, or product is known as the 'adverse selection' problem. Contrary to the traditional agency theory characterization, each party has the simultaneous role of both principal and agent in many interfirm relationship settings. For example, in franchising, this phenomenon is identified by Grünhagen, Zheng, and Wang (2017) as 'dual-agency' because, in this type of relationship, each party relies on the performance of the other party for fulfilling its business goals. This dual-agency setting can give rise to a double-sided adverse selection problem which is a critical issue for firms that, on the one hand, need to communicate their quality (e.g., through

quality signaling) to prospective channel partners to attract them and their assets (such as financial and managerial resources) to survive and grow (Michael, 2009) and, on the other hand, need to prevent low-quality partners from joining the network (e.g., through qualification and selection standards) to mitigate subsequent ex-post transaction costs such as monitoring and litigation (Stump & Heide, 1996; Wathne & Heide, 2000). Given the presence of information asymmetries and the absence of the use of such signaling and screening mechanisms, both sides of the partnership face the problem of adverse selection (Grünhagen et al., 2017). Drawing on extant economics and inter-organizational relationship literatures, we submit screening and signaling as two mechanisms that can enhance network performance through addressing the problem of double-sided adverse selection.

Our theoretical framework looks at the use of governance mechanisms at the formation stage of new exchange relationships in a business network. In other words, we look at ex-ante signaling and screening as well as specific investments –by both parties- in a new franchise relationship. We maintain that proper use of these governance mechanisms at the formation stage of new relationships furthers the successful expansion of the franchise network with high-quality franchisees. According to Fadairo and Lanchimba (2014), franchisees who provide human and financial resources contribute to the rapid growth of the network. Therefore, we need to measure the outcome of such a process in a way that captures both the quantity and quality of network members. Sales revenues reflect the product of the number of network members and the quality of these members. According to Yin and Zajac (2004), store sales is the most important indicator of performance in the franchising industry and is highly correlated with profit. Thus, this measure of performance can also be viewed to reflect value creation in the network, echoing Porter's (1985, p. 38) view that "value is measured by total revenue, a reflection of the price a

firm's product commands and the units it can sell". Adding low-quality members to the franchise network dampens sales revenues for the chain because low-quality or opportunistic franchisees not only perform weakly but also damage the brand, and this hurts overall network performance. Therefore, we use sales performance as a two-dimensional measure that captures the quantity and quality (i.e., the capability to generate sales) of the network members. Now we develop our hypotheses regarding the direct, interactive, and moderated effects of signaling and screening on network sales performance. Figure 1 represents the conceptual model corresponding to our hypotheses.

Insert Figure 1 about here.

Screening. According to Matinheikki, Pesonen, Artto, and Peltokorpi (2017), member selection – by suggesting predefined criteria - is a critical process in creating and maintaining the vitality of a business network. A number of prior studies have suggested screening through a selection process as a mechanism for mitigating information asymmetry and addressing the adverse selection problem (e.g., Antia, Mani, & Wathne, 2017; Bergen, Dutta, & Walker, 1992; Wathne & Heide, 2000; Wathne et al., 2018).

Drawing on transaction cost theory, Heide and John (1990) propose ex-ante verification of the partner's ability for doing business as a mechanism to preempt opportunistic actions. According to Stump and Heide (1996), the ambiguity about the performance of the partner and her potential opportunism is mitigated by the qualification of the partner. Agency theory literature suggests screening as a mechanism to address the adverse selection problem and to assure the ability of the agent to perform the job (Bergen et al., 1992). According to Wathne and Heide (2000), in the marketing context, screening and qualification programs are used to minimize franchisees' risk of quality shirking. They submit that ex-ante selection of exchange

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partners through a selection mechanism is 'the most straightforward way of managing opportunism' and they offer several anecdotal examples of using a set selection criteria for choosing prospective agents by a principal. Wathne et al. (2018) offer several instances of firms (e.g., Toyota, Xerox, Dell, Home Depot, and Chick-fil-A) using selection criteria that enable them to identify a partner with appropriate abilities. Kacker, Dant, Emerson, and Coughlan (2016) show that screening of franchisees by the use of qualification standards enhances chain performance. Such a selection mechanism mitigates the adverse selection problem for franchisors and decreases their ex-post transaction costs. Therefore, we posit that ex-ante screening through a partner selection mechanism improves business network performance by preventing low-quality prospective partners from joining the network. Otherwise, the poor performance of these low-quality partners could hurt the network directly and also by damaging the brand in ways that impact other network members. Moreover, the effort and cost saved from dealing with problematic partners can be invested in improving the network's business processes as well as products and services, thereby further enhancing performance.

H1: Rigor of the focal firm's (franchisor's) screening mechanism in the formation stage of a new partnership is positively associated with the network's performance.

Signaling. In economic contract theory, signaling involves one party sending some information to another party. As explained by Spence's (1973) seminal study, an agent sends signals to the principal to prove her capabilities for performing the job. Signaling theory has been applied in management studies in a variety of research contexts that are characterized by information asymmetry between an agent and the principal (Connelly et al., 2011). Drawing on the previously defined conceptualization of dual-agency, we introduce signaling as a governance mechanism for addressing the other side of the double-sided adverse-selection problem (the

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franchisee's perspective) in business networks. We argue that when a principal (e.g., franchisor) plays the role of an agent for the other party (e.g., franchisee) for some tasks, then she needs to signal her quality (i.e., the ability to successfully perform these tasks) to that party and attract them to join the partnership. Otherwise, the prospective partner (e.g., franchisee) remains skeptical about the quality of business opportunity and may, therefore, hesitate to join or invest in such a relationship. In this manner, a proactive firm can, through its actions, alleviate the adverse selection problem faced by its prospective partner. For example, franchisors use voluntary disclosure of their network performance to signal the profitability of their business concept to prospective franchisees (Sadeh & Kacker, 2018). Therefore, we posit:

H2: Signaling quality of a network's business opportunity for the partners by the focal firm (franchisor) in the formation stage of new partnerships is positively associated with the network's performance.

     Screening and signaling interaction. As we posited earlier, screening and signaling by a firm have the ability to address the information asymmetry problems between the firm and its prospective partners, alleviating the adverse selection problem faced by the firm and by its prospective partners, respectively. These two mechanisms can also have a synergistic effect on network performance through their ability to offset some inherent disadvantages of each other in an interfirm relationship, as described in the following two paragraphs.

     Although a screening mechanism can prevent low-quality partners from joining the network, it can also disappoint high-quality potential partners if it imposes an excessive cost on them. Sometimes, the screening process entails high costs for the firm being screened; for example, Xerox Corporation forces its potential suppliers to participate in a costly specific

certification program (Wathne & Heide, 2000). Along the same lines, some franchisors set criteria such as minimum financial net worth, business experience and so on for prospective franchisees that want to join their network. In a selective play[1], when the prospective partner has the choice to not play, she may choose not to bear the cost of becoming qualified for this network and hence join another business that has a simpler, less costly selection process. In free-market economies, there are often many investment opportunities for entrepreneurs such as prospective franchisees. Therefore, in the formation stage of a partnership (when the parties are not yet locked-in to the relationship), they may choose to ignore a potential partnership that has a high ex-ante cost of screening. Although this screening mechanism alleviates the franchisor's adverse selection problem, it can hurt their network performance by decreasing the number of prospective franchisees (including high-quality potential applicants). To address this problem, a franchisor needs to convince these prospective franchisees about the profitability of the business opportunity in front of them -- that being part of the network is remunerative enough for high-quality franchisees to compensate for the higher costs imposed by rigorous screening criteria faced by them. We posit that signaling the quality of the business concept through voluntary disclosure of private information is a suitable mechanism for this purpose. Therefore, if the principal chooses to signal the profitability of the partnership, then potential partners have more incentive to join the applicant pool. Quality signaling dampens the negative effect of rigorous screening on potential partners' motivation for partnership and therefore increases the number of applicants for the partnership.

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[1] "Selective play" paradigm refers to a setting that players have the option to leave the relationship, contrary to the prisoner's dilemma game in which players are locked in their relationship (Hayashi & Yamagishi, 1998).

A quality signal from the franchisor provides the prospective partner (i.e., franchisee) an assurance about the quality of the franchise concept and, hence, alleviates the adverse selection problem for the prospective franchisee. However, the signaling mechanism can attract both low- and high-quality potential partners to join the network. A franchisor motivated to expand its network by seeking a large number of new applicants may fall into a trap and partner with opportunistic and low-quality applicants. Such partners can damage the franchise brand and increase the franchisor's ex-post transaction costs of dealing with them. A sound selection mechanism has the ability to screen and prevent low-quality prospective partners from entering the network and proactively prevent these ex-post costs for the franchisor.

Therefore, we suggest that simultaneous screening and signaling by franchisor act as complementary mechanisms in partnership relationship formation, mitigating the double-sided adverse selection problems of the franchisor (principal) and franchisees (agents), and enhancing performance of the network.

H3: Simultaneous use of signaling and rigorous screening mechanisms by the focal firm (franchisor), is positively associated with the network's performance.

Specific investments. During the formation stage of an interfirm relationship, in addition to evaluating the abilities of the partner to perform the job, firms need a mechanism to ensure that their partner will not engage in opportunistic actions in the future. Transaction cost theory suggests that specific investments made by one party in an exchange relationship increase the risk of opportunism by the partner (Stump & Heide, 1996; Williamson, 1985). However, Ghosh and John (1999) suggest that specific investment in joint value-creation processes can benefit the partnership and create competitive advantages. According to Jap (1999), such investments can

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lead to enhanced strategic outcomes through benefit 'pie expansion'. Rokkan, Heide, and Wathne (2003) find that specific investment consequences are contingent on certain relationship conditions, and such investments can create bonds and decrease the receiver's opportunism in the presence of a strong norm of solidarity. In our model of network relationship formation, when a firm with a rigorous partner selection standard commits to make higher specific investments in the relationships with the selected partners, we expect better performance for the network – such investments give assurance to the partner about the adherence of the firm to developing the business and give her incentives for going through the costly selection process. Therefore, the principal's specific investment in the relationship dampens any negative effect of the rigorous screening mechanism in attracting high quality partners and, consequently, enhances network performance.

H4: The focal firm's (franchisor) specific investment in the relationship, positively moderates the relationship between the rigor of the screening mechanism and the network's performance.

Specific investments in the exchange relationship by business partners such as franchisees can also enhance the network's performance under certain conditions. Signaling profitability of the business opportunity by the focal firm can attract all types of prospective partners -including opportunistic ones- to the business network. However, the signaler can also ask for some specific investment commitments by the applicants. Such a requirement acts as a self-selection mechanism and prevents opportunistic agents – such as incapable franchisees (Windsperger, 2001) - from joining the channel because they can lose their investment if they do not perform well. Thus, we predict that simultaneous signaling by the focal firm and it asking prospective partners to commit to making specific investments in the partnership will enlarge the proportion of high-quality prospective partners in the pool of applicants. This pool provides the

focal firm with greater opportunity to expand its network with high-quality partners who contribute to a superior level of performance. Hence, we posit that:

H5: The partner's (franchisee's) specific investment in the relationship, positively moderates the relationship between signaling and the network's performance.

3. Empirical Analyses

3.1. Data

We test our hypotheses using unbalanced panel data from the U.S. franchising industry for the period of 2001 to 2009. We build our unique dataset by combining data from two different sources. The independent variables are from the Bond's (2001-2009) Franchise Guides that have been publishing annually from 1985 to 2009, with some exceptions. It includes more than 1000 franchise chains and has been widely used in extant franchising research (Antia et al., 2017; Combs & Castrogiovanni, 1994; Lafontaine & Blair, 2009; Lafontaine & Shaw, 2005). The outcome measure is collected from Franchise Times (2001-2009) magazine that annually publishes data for 200-300 franchise chains from several industries and has been used in previous franchising research (El Akremi, Perrigot, & Piot-Lepetit, 2015; Kosova, LaFontaine, & Zhao, 2012). Our final sample is an unbalanced panel of 1620 observations from 354 franchisors of different industries for nine years. Table 1 contains details of our variable and construct operationalizations.

Insert Table 1 about here.

3.2. Dependent variable

We measure performance using the chain's sales revenue. As noted by Shane (2001) and El-Akremi et al. (2015), private ownership of most franchised chains limits the availability of their financial data and the potential to create composite performance measures. Sales have been used as a measure of performance in many retailing and franchising studies by researchers (e.g., Botti, Briec, & Cliquet, 2009; Combs, Ketchen, & Hoover, 2004; Perrigot, Cliquet, & Piot-Lepetit, 2009). Also, sales revenue is a key indicator of performance because it is highly correlated with profit and is comparable across multiple industries and public or private firms. (El Akremi et al., 2015; Yin & Zajac, 2004)

Although our model does not directly measure whether the adverse selection problem is overcome, extant literature claims franchisors' performance will be improved by the extent to which their strategies mitigate agency problems. Shane, Shankar, and Aravindakshan (2006) find that strategic actions such as signaling by franchisor mitigate uncertainty and information asymmetry and enhance chain performance. Michael and Combs (2008) argue that franchisors' policies for addressing agency problems can influence franchisees' survival. Kacker et al. (2016) show that franchisors' strategies to overcome adverse-selection and moral-hazard problems enhance chain performance.

We collect chain sales revenue data from Franchise Times magazine. Since this measure is an integer quantity and shows a decreasing return to scale (El Akremi et al., 2015), we normalize chain sales revenue through log transformation.

3.3. Independent Variables

Screening. According to Ouchi (1979), screening the quality of agents through certain selection criteria is a control mechanism to decrease transaction costs. Stump and Heide (1996)

maintain that partner selection and qualification are used as a control mechanism for partner opportunism and they measured it by the partner's present skills. Franchisors screen their prospective franchisees through a set of selection criteria such as their financial net worth, business and industry experience, formal education and so on. We measure the rigor of the screening mechanism by using the average of the franchisors' rating of the importance of multiple selection criteria (measured on a five-point scale). These ratings are available in Bond's Franchise Guide, and this measure has been similarly used in prior franchising research (Antia et al., 2017; Kacker et al., 2016). According to Antia et al. (2017), franchisors place importance on their key selection criteria to ensure that prospective franchisees possess the necessary abilities to success.

Signaling. Michael (2009) notes that entrepreneurs such as franchisors signal quality of their business concept to prospective franchisees for attracting resources. He suggests voluntary disclosure of earnings by the franchisor as a potential signal of quality. Sadeh and Kacker (2018) find empirical evidence (from a panel dataset of more than 1600 franchise chains) to support the idea that franchisors signal quality through voluntary disclosure of their performance metrics (in the form of Financial Performance Representations). Financial Performance Representations (FPR) –formerly known as Earnings Claims- contain the franchisor's current chain financial metrics such as sales, costs, and profit. Franchisors have the option to provide FPR as a voluntary item of the Franchise Disclosure Document (FDD), which is a required disclosure document in the U.S. by the Federal Trade Commission (FTC). Although the provision of FPR is voluntary, franchisors are required by law to provide truthful information if they decide to provide the FPR. Therefore an FPR supposedly contains truthful information and is a signal of quality (Sadeh & Kacker, 2018). Thus, we measure franchisor signaling with a binary variable

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that takes the value of one if the franchisor provides FPR and zero otherwise. Extant franchising literature suggests multiple mechanisms that franchisors use to signal their quality (e.g., Michael, 2009). However, we only use the provision of FPR as the measure of signaling because other quality signals indicate the general quality of the franchisor's brand or concept while an FPR specifically signals the quality of the business opportunity for the franchisee.

Specific Investments. We measure a franchisor's specific investment by the amount of training that they provide to their franchisees. Williamson (1985) identifies human asset specificity as a type of asset specificity and, according to Dyer and Singh (1998), it refers to transaction-specific know-how of business in a relationship. Franchisors transfer their know-how by training their franchisees, and they vary in the amount of training that they provide. This investment of time in the training of a franchisee's employees may not be re-useable for the franchisor outside of that specific relationship. Training has been previously used in the franchising literature as a measure of franchisors' specific investment (e.g., Hendrikse, Hippmann, & Windsperger, 2015).

We measure franchisee specific investment by the franchise fee that franchisees are required to pay to the franchisor. This is usually a lump-sum non-refundable fee that the franchisee pays initially. Although a franchisee typically also invests in equipment, building etc. when joining the network, the franchise fee is the one element of a franchisee's initial outlays that is purely specific to the relationship – a franchisee typically completely foregoes it if they exit the chain. Franchising researchers have previously considered the franchise fee as a franchisee specific investment (e.g., Sen, 1993; Windsperger, 2001).

Control Variables. Consistent with the extant franchising literature, we control for the effects of chain size and age because they can systematically impact performance (Kacker et al., 2016). We also control for the effect of environmental uncertainty using contract duration time, as is the case in prior studies (e.g., Sadeh & Kacker, 2018). To account for macroeconomic trends, we added dummy variables for the fixed effect of years. We control for franchisor age, ownership of outlets, and membership of the International Franchising Association (IFA) as other signals of quality. We do not control for the effects of other signaling mechanisms on network performance; given the complementarity of such signals with a franchisor use of FPRs (Sadeh & Kacker, 2018), we submit that the absence of any of these specific signals (because of unavailability of data) does not undermine our empirical model. We also control for the effect of multi-unit franchising because current franchisees who add new outlets face a lower level of information asymmetry.[2] We use the lag of sales to control for the omitted factors that impact the dependent variable. Table 2 provides descriptive statistics and bivariate correlations for our variables.

Insert Table 2 about here.

3.4. Model Specification

The nature of our unbalanced panel data and theoretical framework imposes several limitations, including attrition bias and endogeneity. Regarding attrition bias, we note that some franchisors in our sample were not present for all years covered in our panel dataset. Therefore we need to make sure that the absences are random and not systematic; otherwise, the parameters of estimates may be biased (Heckman, 1979). To account for a potential sample selection bias,

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[2] We thank an anonymous reviewer for bringing this to our attention.

we specify a Heckman selection model. Consistent with prior studies in marketing (e.g., Antia et al., 2017; Srinivasan, 2006), we condition the inclusion of an observation in our sample, on the franchisor's characteristics (i.e., size, age, IFA membership, and expansion projection) that contribute to its survival. Thus, we conduct a first stage selection model regression (Equation 1) and calculate the Inverse Mills Ratio (IMR) and insert it in the second stage regression (Equation 6).

$$\boldsymbol{INCLUDE}_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 IFA_{it} + \beta_3 AGE_{it} + \beta_4 EXPAN_{it} + \omega_{it} \qquad (1)$$

> INCLUDE = 1 if the firm i data for year t is included in the data, and 0 otherwise
> $SIZE_{it}$ = Total number of outlets for franchisor i at time t
> IFA_{it} = Membership of IFA for franchisor i at time t
> AGE_{it} = Age of franchisor i at time t
> $EXPAN_{it}$ = Expansion target of franchisor i at time t
> $\omega \sim$ i.i.d. (μ_1, σ_α^2)

Regarding endogeneity, we note that the governance mechanisms – screening and signaling - and specific investments that we use as predictors are the franchisor's strategic choices and, hence, not random assignments. Therefore, they are not exogenous and can cause biased parameters of estimation. To account for this endogeneity problem, we seek instrumental variables that are correlated with the endogenous variables (relevant) and uncorrelated with the error term (Angrist & Pischke, 2009). Finding a "good" instrumental variable (IV) enables us to simulate a random assignment of the subjects in experimental methods (Rossi, 2014) – the gold standard for addressing the endogeneity bias. However, it is difficult to find a perfect IV, and there is no true test for their quality except justification of a good IV based on institutional knowledge (Rossi, 2014). We use lagged mean levels of the endogenous variables across the sample firm's peers (Germann, Ebbes, & Grewal, 2015). We define these peers as franchisors that operate in the same industry. Antia et al. (2017) apply the same approach and claim that,

within an industry, franchisors mimic their peer's strategies, and this leads to some level of homogeneity in the use of governance mechanisms. This is also consistent with the argument in Germann et al. (2015) that the focal firm and its peers operate under similar market conditions and share similar expectations from their strategies. Therefore, our instruments meet the relevance condition. With respect to the exclusion restriction, consistent with the prior studies, we argue that although peers' strategies impact the focal franchisor's strategy, they are not likely to affect her performance outcomes directly. To define industries and peers, we use the Bond's Franchise Guide categorization that divides the franchisors into 40 industries and has been used in the extant literature to define franchise industries (Antia et al., 2017; Sadeh & Kacker, 2018). Consistent with Antia et al. (2017), we also include chain size, IFA membership, business age, and year dummy variables as additional instrumental variables to enhance firm-level variation in governance mechanism choice.

Instrument Validity Checks. To control for the relevance and exclusion restriction conditions of the instruments, we need to check for the empirical validity of the instruments. The Cragg-Donald Wald F-statistic is calculated for each of the instruments in each of the first stage equations, and they all exceed the threshold value of 10 that satisfies the validity of the instrument. Otherwise, according to (Wooldridge, 2010), the weak correlation between the endogenous variables and the instruments lead to biased parameters of estimation.

We estimate our model through the *Conditional Mixed Process* (CMP) method, using instrumental variables to address the endogeneity problem. The CMP method, introduced by Roodman (2011), fits seemingly unrelated regressions models for recursive systems of equations and relies on simulated maximum likelihood methods including the Geweke–Hajivassiliou–Keane algorithm (Geweke, 1989; Hajivassiliou & McFadden, 1998; Keane, 1992). According to

Sande and Ghosh (2018), CMP is a robust approach for estimating a model that contains various types of dependent and endogenous variables. It provides more efficient estimates compared to traditional GMM class estimators (e.g., OLS and 2SLS) for limited endogenous variables (e.g., binary or truncated variables) and recursive systems (Roodman, 2011). This method has been used in previous franchising studies (e.g., Antia et al., 2017; Kashyap, Antia, & Frazier, 2012; Kashyap & Murtha, 2017). Applying CMP enables us to account for the endogeneity problem through a system of simultaneous equations as below. We specify our model as four first-stage equations (2 to 5), each for an endogenous variable and the second stage equation (6) that regresses the outcome variable on the predictive values of the endogenous variables.

$$\boldsymbol{SELECT}_{it} = \beta_{10} + \sum_{11}^{14} \beta \ MeanLevels_{i(t-1)} + \beta_{15} SELECT_{i(t-1)} + \sum_{16.1}^{16.11} \beta \ OtherIVs + \omega_{1it} \tag{2}$$

$$\boldsymbol{SIGNAL}_{it} = \beta_{20} + \sum_{21}^{24} \beta \ MeanLevels_{i(t-1)} + \beta_{25} SIGNAL_{i(t-1)} + \sum_{26.1}^{26.11} \beta \ OtherIVs + \omega_{2it} \tag{3}$$

$$\boldsymbol{TRAIN}_{it} = \beta_{30} + \sum_{31}^{34} \beta \ MeanLevels_{i(t-1)} + \beta_{35} TRIAN_{i(t-1)} + \sum_{36.1}^{36.11} \beta \ OtherIVs + \omega_{3it} \tag{4}$$

$$\boldsymbol{FFEE}_{it} = \beta_{40} + \sum_{41}^{44} \beta \ MeanLevels_{i(t-1)} + \beta_{45} FFEE_{i(t-1)} + \sum_{46.1}^{46.11} \beta \ OtherIVs + \omega_{4it} \tag{5}$$

$$\boldsymbol{PERFORM}_{it} = \beta_0 + \beta_1 \overline{SELECT_{it}} + \beta_2 \overline{SIGNAL_{it}} + \beta_3 \overline{TRAIN_{it}} + \beta_4 \overline{FFEE_{it}} + \beta_5 \overline{SELECT_{it}} * \overline{SIGNAL_{it}} +$$
$$\beta_6 \overline{SELECT_{it}} * \overline{TRAIN_{it}} + \beta_7 \overline{SIGNAL_{it}} * \overline{FFEE_{it}} + \sum_{8.1}^{8.16} \beta \ Controls + \beta_9 \ IMR_{it} + \omega_{5it} \tag{6}$$

Where,

PERFORM$_{it}$ = Franchise chain's sales revenue for firm i at year t

SELECT$_{it}$ = The rigor of screening mechanism for firm i at year t

SIGNAL$_{it}$ = 1 if a firm i at year t provides a quality signal and 0 otherwise

TRAIN$_{it}$ = Specific investments by the focal firm (Franchisor) i at year t

FFEE$_{it}$ = Specific investments by partners (Franchisees) of firm i at year t

MeanLevels$_{it}$ = Set of instrumental variables generated by the average of the firm's peers strategies for firm i at year t

Other IVs = Instrumental variables other than the MeanLevels

$\omega \sim$ i.i.d. (μ_2, σ^2)

4. Results

Table 3 illustrates hierarchical results from the CMP estimation. Models 1 and 2 present a model with only control variables and a model with control variables and simple effects respectively. Model 3 shows the estimation results for the full model described in our theoretical framework.

The explanatory power of our full model (Model 3) is demonstrated by the significant Chi-square statistic of 10417.34 (p <0.001). The main effects of screening and signaling on network performance (H1 and H2) are statistically significant but negative (β_1 = -.076, p < .05; β_2 = -.293, p < .05) – these are the opposite of the hypothesized direction. This suggests that the rigor of the screening mechanism and the presence of signaling are negatively associated with sales. We elaborate on these and other results and offer our post-hoc explanation in the discussion section of this paper. We found significant support for H3, reflecting the synergistic effect of signaling and screening on performance (β_5 = .063, p< .05). This is an interesting result and implies that a combination of signaling and screening weakens their negative simple effects and results in a significant positive effect for the interaction.

Insert Table 3 about here.

We did not hypothesize the simple effect of training and franchise fee on sales, but the results show a significant negative effect for both (β_3 = -.005, p < .1; β_4 = -.003, p < .05). This suggests that the unconditional effect of franchisor and franchisee specific investments on performance is negative. Notably, both hypotheses regarding the interaction effects of specific

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investments and governance mechanisms (H4 and H5) are supported. Regarding the control variables, the effects of chain size, business age, the number of owned units, lag of sales, and the joint effect of the dummy variables for years are significant.

Figure 2 illustrates the simple slopes of the moderation effects in our model, following the Aiken and West (1991) approach. Panel a and b demonstrate how the negative effect of screening on performance is diminished in the presence of signaling or high levels of specific investments by the franchisor, respectively. Panel c shows that signaling mitigates the negative effect of high franchise fee (franchisee specific investment).

Insert Figure 2 about here.

5. Discussion and Implications

This study aims to investigate the effect of signaling and screening on business network performance. Extant conceptual and empirical studies suggest that ex-ante screening efforts decrease the risk of ex-post opportunism and hence lead to better performance (Kacker et al., 2016; Wathne & Heide, 2000). However, our results show otherwise. There are a few potential explanations that can help reconcile these apparently contradictory findings. First, the absence of an interaction between signaling and screening in the theoretical frameworks and empirical estimations in prior studies can explain the divergence in the results. This omitted variable can lead to biased parameters of estimation for the effect of screening. Second, the nature of our measure of performance can impact the results. According to Katsikeas, Morgan, Leonidou, and Hult (2015), the effects of identical strategies on various measures of performance are not supposed to be the same. We conceptualize performance in terms of sales revenue for the chain (that is, the product of the number and quality of the outlets in the network), and a negative effect on one component can result in a negative effect on performance. For example, rigorous

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screening may decrease the number of conflicts by selecting high-quality partners and preventing the opportunistic ones from joining the network. However, this rigorous screening can dampen sales by slowing down the process of hiring partners for the network.

Although we hypothesized a positive simple effect of signaling on performance, the results are the opposite. Extant literature and theoretical frameworks predict a positive effect for signaling. However, the signal may attract low-quality partners to the network, or the cost of signaling may exceed its benefits. Since signaling entails disclosure of information, managers may be skeptical about its impact on firm performance for several reasons. First, competitors can take advantage of the disclosed information (Dedman & Lennox, 2009). Second, the cost of collecting, processing, and disseminating the information could negatively affect the firm's performance (Bayer, Tuli, & Skiera, 2017). Third, disclosure of the information about franchise business profitability gives the partners an opportunity for litigations if they cannot realize the expected profit. For example, Hershman and Mazero (2008) note that voluntary information disclosure by franchisors could be misinterpreted as a performance guarantee by a prospective franchisee. Price (2000) notes this issue as a significant cause of many FTC enforcement actions against the franchisors. Thus, the cost of handling such conflicts and litigations can take up much of a franchisor's attention and resources and dilute its focus on strategies that enhance performance.

In such a setting, we propose and empirically show that signaling own quality diminishes the negative effect of screening and leads to a positive interactive effect on network performance. In other words, signaling acts as a complementary channel governance mechanism for screening. It enlarges the pool of prospective partners and mitigates the shrinking effect of rigorous screening. On the other hand, the screening mechanism impedes entry into the network

of low-quality potential partners (that were attracted through the signaling mechanism). This is the most notable result of this study -- although individual governance mechanisms such as screening and signaling can inhibit network performance, they can complement each other and, when combined, lead to network performance improvement.

This study also demonstrates that specific investments in a partnership can have a positive effect on performance if they are combined with an appropriate governance mechanism. Network-based business models such as franchising rely on long-term contractual relationships. We show that balancing of expectations and promises in such relationships leads to higher performance. Our results show that the combination of the focal firm signaling and the partner's specific investment provides such balance and enhances network performance. Similarly, a rigorous screening mechanism by a franchisor can be balanced with the franchisor's specific investments in the prospective partnership. Our theoretical argument for hypotheses 4 and 5 relies on the agency theory perspective that a principal minimizes ex-post costs by designing the relationship mechanisms ex-ante. However, the hypotheses and results can also be explained by the transaction cost view of aligning transactions with governance mechanisms[3]. This is an example of the theories moving toward more common conceptual ground, as noted by Bergen et al. (1992).

The drivers of performance and innovation in business networks have been the topic of interest for researchers and practitioners. According to Normann (2001), service can be provided in two ways, 'relieving' and 'enabling.' Relieving is defined as the specialized party performs

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[3] We thank an anonymous reviewer for bringing this to our attention.

the job that they can do better, whereas enabling is facilitation for the other party to perform the job. These two mechanisms can create a symbiotic relationship for creating value through relieving a party from a task and enabling them to perform what they can do more efficiently and effectively (Lusch, Vargo, & Tanniru, 2010). Such a process can only happen in the presence of a 'collective system-level goal' that is also central to business networks pursuing innovation (Aarikka-Stenroos & Lehtimäki, 2014). According to Matinheikki et al. (2017), those system-level goals' impact on network performance will be mediated by resource investments of the network members. Also, 'member's selection practices' by the network architect influence the process of forming these system-level goals. Furthermore, firms' network capabilities –i.e., their 'ability to develop and utilize inter-organizational relationships' (Walter, Auer, & Ritter, 2006, p. 541) - impact their performance (Kohtamäki et al., 2013). Similarly, franchisors who are the network architects are responsible for facilitating the formation of system-level goals and for managing the 'relieving and enabling' process –that is necessary for innovative value creation- in their relationship with the franchisees.

5.1. *Theoretical Implications*

This study contributes to the interfirm and network relationship, signaling, and transaction cost theories and the voluntary information disclosure literatures. We examine the effect of screening in interfirm network relationship formation characterized by a double-sided adverse selection problem. Our study shows that positive performance outcomes of screening are conditional on the use of an appropriate signaling mechanism[4]. Extant research has investigated

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[4] Note that this conclusion is limited to contexts where the prospective partners have the option to either enter the relationship or ignore it.

different governance mechanisms (Heide & John, 1990), their substitutability (Ouchi, 1979), and interdependency (Stump & Heide, 1996), but to the best of our knowledge, their complementarity has rarely been studied. Therefore, we extend the extant inter-organizational relationship literature by introducing the complementary role of signaling and screening in the network relationship formation process. We suggest that business network performance depends on both the quantity and quality of the network's members. Our empirical context demonstrates a positive association between the simultaneous use of signaling and screening devices and sales performance. Therefore, we claim that franchisors can use signaling and screening mechanisms to attract many franchisee applicants and select only the high-quality ones to achieve the above-mentioned quantity and quality goals. The results support our hypotheses that an appropriate set of governance mechanisms can enhance performance in such a business network. As suggested by Matinheikki et al., (2017), we show that network member selection practices and resource investments in collective actions contribute to the business network's performance. We further complement the extant literature on screening and partner selection by underlining the importance of simultaneous signaling and screening for business networks.

We contribute to organizational quality signaling research in multiple ways. We have empirically studied performance consequences of signaling in a business-to-business context – i.e., franchising. However, much of the empirical research on this topic looks at quality signals in financial markets and the issue of attracting investors to buy a firm's stock. In addition to differences between the two contexts in terms of the forms, risks, and benefits, the ability to study quality signals over time as a longitudinal process (instead of single-shot Initial Public Offering events) is an important and unique feature of our research context (i.e., franchising). This feature enables the researchers to study the stability and strength of signals over time.

Beyond the direct effect of signaling, this study has implications for business networks that face a shortage of prospective partners because of their rigorous screening standards. Extant literature on transaction cost theory maintains that high ex-ante selection and screening standards decrease ex-post transaction costs of having low-quality channel partners (Heide, Wathne, & Rokkan, 2007; Stump & Heide, 1996; Wathne & Heide, 2000). However, our study implies that such a positive effect is conditional on signaling the quality of the business network through voluntary information disclosure. We suggest that in addition to this relationship, there is another opposite force of screening that hurts the performance of business networks by lowering the number of potential partners. Thus, the addition of signaling and its interaction with screening to the model can reveal the pure effect of screening, at least in the context of contractual relationship formation in business networks.

In this study, we hypothesized the iterative effects of signaling and screening, as well as their interplay with specific investments. Jap and Ganesan (2000) indicated that specific investments by retailers negatively impact their perceptions of supplier commitment. We show that franchisor's signals of quality can dampen such a negative effect. Also, we show that franchisors' specific investment in the partnership dampens the negative effect of rigorous screening on performance. These results are consistent with Jap's (1999) claim that such investment can enhance partnership strategic outcomes and Rokkan, Heide, and Wathne's (2003) finding regarding contingency of the specific investment outcomes on certain relationship conditions. These findings enhance our understanding of the interaction between specific investments and governance mechanisms and give managers more tools to control the outcomes of such mechanisms in developing their business network.

This study also contributes to the franchising and voluntary disclosure literatures. Although previous studies (Michael, 2009; Price, 2000; Sadeh & Kacker, 2018) explore the drivers of providing FPR, performance outcomes of such activity have rarely been studied. We provide empirical support for the moderated positive impact of quality signaling (through FPRs) on franchisor performance.

5.2. Managerial Implications

Our study provides a novel framework for business network managers who want to establish or grow their network by attracting high-quality business partners. We show that the better outcomes (in terms of sales revenue) can result from the simultaneous use of screening and signaling mechanisms and their combination with appropriate specific investments in dyadic network relationships.

Our results have implications for franchising practitioners. Our empirical findings in support of quality signaling suggest that high-quality franchisors should provide FPR to signal their profitability to prospective franchisees. In a broader context, this study supports quality signaling by entrepreneurs who need to attract business partners for investment in their entrepreneurial networks. Even though signaling may not have a positive direct impact, a strategic combination of signaling and screening and specific investments helps the managers to enhance their network performance through the addition of high-quality partners. Such a network of capable and qualified partners may foster innovation and drive organizational performance.

Our study also has implications for public policy regarding franchising. Franchise disclosure enforcement and requirements have been the subject of extensive debate among several parties in the U.S. including the Federal Trade Commission (FTC), the International

Franchise Association (IFA), North American Securities Administrators Association (NASAA), the Small Business Administration's Office of Advocacy (SBAOA), the American Bar Association (ABA), and members of Congress (Price, 2000). This study reveals beneficial performance outcomes, under some conditions, of quality signaling through voluntary FPRs. The signaling value of voluntary FPRs gives franchisors some incentives to prepare and provide FPR to attract franchisees. Therefore, making the provision of FPR mandatory undermines its signaling value and imposes the cost of enforcement of mandatory FPRs on the taxpaying public.

6. Limitations and Future Research

This study has some limitations, as is the case for any research study. First, we submit that appropriate governance mechanisms in expanding a business network can mitigate double-sided adverse selection problems, nurture innovation, and performance in the network. However, due to data limitations in our secondary archival dataset, we did not explicitly measure innovations and show how the use of signaling and screening specifically lead to more innovation. Also, direct measures of whether and how the adverse selection problem is overcome are not readily available in our archival data. Addressing these two limitations would provide a good avenue for future research using appropriate data to measure innovation and the degree to which the adverse selection problem is resolved.

Second, we have investigated the interaction of signaling with screening and specific investments. Future research may study the interaction of signaling with other channel governance mechanisms (i.e., incentives, monitoring, and socialization) and other transaction attributes.

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Third, we look at double-sided adverse selection but focus on mechanism design solutions for mitigating it from one side of the dyad – the franchisor. We look at a franchisor's use of screening strategies for alleviating the adverse selection problem it faces and its use of signaling for reducing the adverse selection problem faced by prospective franchisees. Future research might investigate the outcomes from the franchisees' perspective (in terms of strategies prospective franchisees may use to reduce the double-sided adverse selection problem).

Lastly, we empirically examined signaling behavior (in the form of voluntary information disclosure) in a business-to-business context – this context has rarely been the subject of such investigations. However, our empirical analyses are limited to franchising data – therefore, further research may be needed to test our hypotheses in other business network contexts.

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Tables

Table 1: Constructs, Variables, and Operationalizations

Construct/ Factor	Variable	Operationalization
Performance	Log Chain Sales revenue	Log (Sales revenues For the Chain)
Screening	Selection Rigor	Mean of franchisor ratings (Unimportant = 1 to Very Important = 5) of the importance of criteria used for the selection of a potential franchisee. (Antia et al., 2017; Kacker et al., 2016) including: - Financial Net Worth - Formal Education - General Business Experience - Psychological Profile - Specific Industry Experience - Personal Interview
Signaling	Provision of FPR	Binary variable with the value of one, if the franchisor provides an FPR and zero otherwise.
Franchisor Specific Investment	Training	Natural log of the number of hours of training the franchisor provides for the franchisees.
Franchisee Specific Investment	Franchise Fee	Amount of the initial franchise fee in US dollars.
Control Variables	Log Chain Size	The total number of units in the chain.
	IFA Membership	A binary variable with the value of one if the franchisor is a member of IFA and zero otherwise.
	Business Age	The number of years from the initiation of the business.
	Contract Duration	Length of the contract between franchisor and franchisees.
	New Outlet Projection	The number of projected new outlets in the next year.
	Multi-Unit	A binary variable with the value of one if the franchisor allows for multi-unit franchising and zero otherwise
	Log Owned units	Natural log of the number of outlets owned by the franchisor.

Table 2: Descriptive Statistics and Correlations

	Variable	1	2	3	4	5	6	7	8	9	10	11	12
1	Log Sales	1.00											
2	Provision of FPR	-0.07	1.00										
3	Selection Rigor	0.29	-0.06	1.00									
4	Training	0.10	0.05	0.16	1.00								
5	Franchise Fee	0.03	0.12	0.11	0.12	1.00							
6	Log Chain Size	0.72	-0.12	0.03	-0.02	-0.11	1.00						
7	IFA Membership	0.11	0.11	-0.14	-0.05	0.00	0.16	1.00					
8	Business Age	0.48	-0.05	0.19	0.13	-0.03	0.38	-0.04	1.00				
9	Contract Duration	0.13	0.05	0.05	0.15	0.03	0.14	0.02	0.12	1.00			
10	New Outlet Projection	0.18	-0.08	-0.18	-0.10	-0.11	0.53	0.11	0.02	0.07	1.00		
11	Multi-Unit	-0.02	-0.15	0.09	0.05	-0.10	0.03	-0.02	0.05	0.06	0.08	1.00	
12	Log Owned units	0.46	0.04	0.37	0.21	0.05	0.24	-0.04	0.35	0.14	-0.14	-0.02	1.00
	No. of Observations	1,610	1,606	1,499	1,561	1,578	1,618	1,475	1,618	1,601	1,423	1,613	1,605
	Mean	5.924	0.43	3.58	23.658	29.593	6.357	0.828	34.569	14.099	94.59	0.872	2.734
	Std. Dev.	1.459	0.495	0.572	22.945	18.831	1.303	0.378	19.006	6.884	212.947	0.334	2.502
	Min	1.791	0	1.5	0	0	2.89	0	3	0	0	0	0
	Max	11.166	1	5	405	300	10.48	1	107	50	2000	1	9.304

Table 3: CMP Regression Results

	Hyp.	Model 1		Model 2		Model 3	
		Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Independent Variables							
Selection Process	H1			0.002	0.017	-0.076**	0.030
Provision of FPR	H2			0.007	0.019	-0.293***	0.108
Training	-			0.001**	0.000	-0.005*	0.003
Franchise Fee	-			-0.002***	0.001	-0.003***	0.001
Interactions							
Selection * FPR	H3					0.063**	0.029
Selection * Training	H4					0.002**	0.001
FPR* Franchise Fee	H5					0.002**	0.001
Control Variables							
Log Chain Size		0.047***	0.013	0.046***	0.014	0.046***	0.014
IFA Membership		0.018	0.022	0.022	0.023	0.023	0.023
Business Age		-0.001**	0.001	-0.002***	0.001	-0.002***	0.001
Contract Duration		0.000	0.001	0.000	0.001	0.000	0.001
New Outlet Projection		0.000	0.000	0.000	0.000	0.000	0.000
Multi-Unit		-0.008	0.024	-0.016	0.025	-0.011	0.025
Log Owned units		0.014***	0.004	0.013***	0.004	0.014***	0.004
Log Sales (t-1)		0.939***	0.011	0.941***	0.012	0.941***	0.012
IMR		0.015	0.035	0.014	0.036	0.013	0.036
Constant		0.052	0.064	0.085	0.089	0.408***	0.128
No of Sig. Year dummies		4		4		4	
Year dummies joint Sig.		Yes***		Yes***		Yes***	
Log-likelihood		-5338.41		-5344.80		-5337.2067	
Chi-squared test		10503.82***		10402.15***		10417.34***	
Degree of freedom		76		80		83	

Notes: * p<.1; ** p<.05; *** p<.01
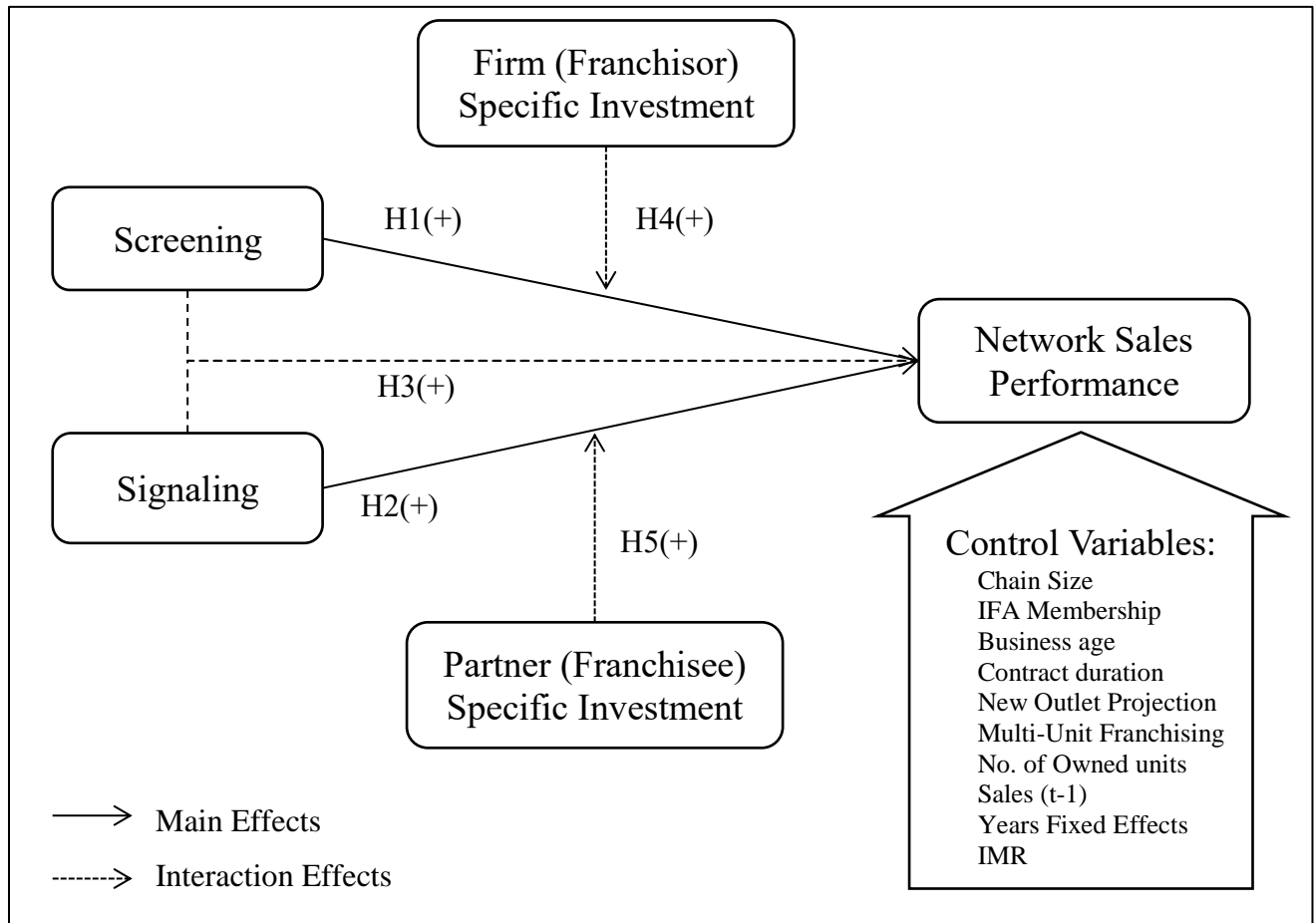
Figures

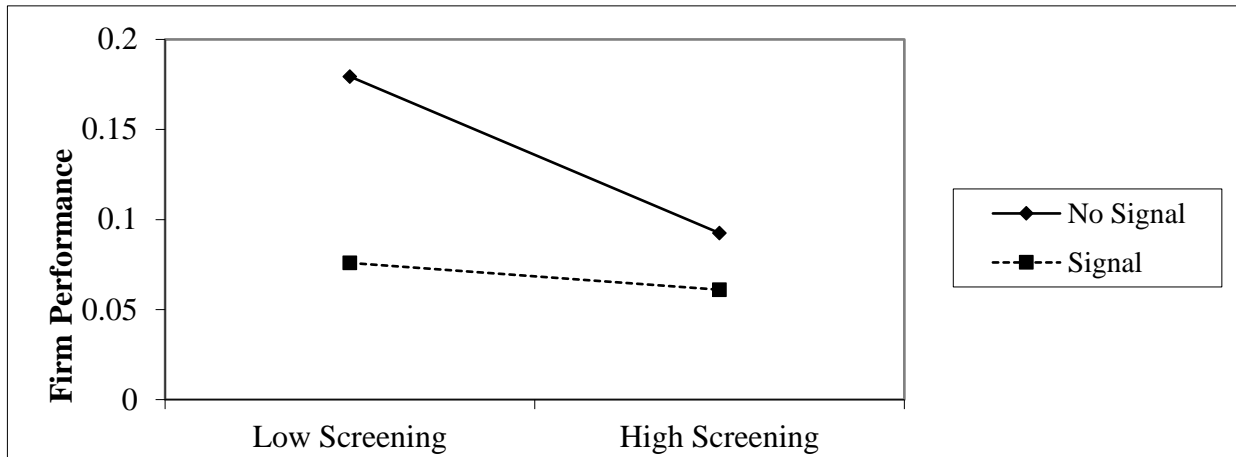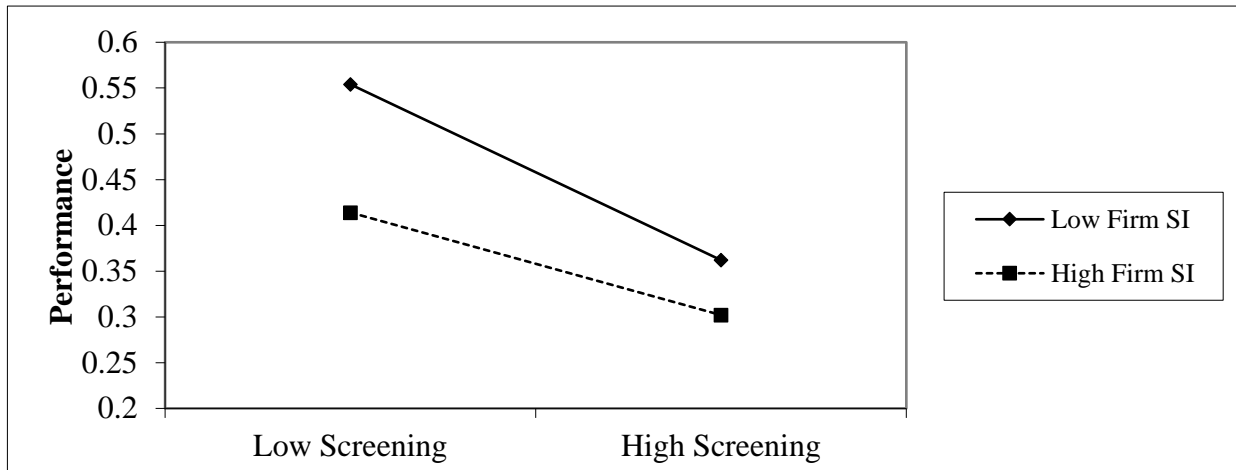**Figure 1: Conceptual framework**

a) Signaling and screening

b) Firm specific investment and screening
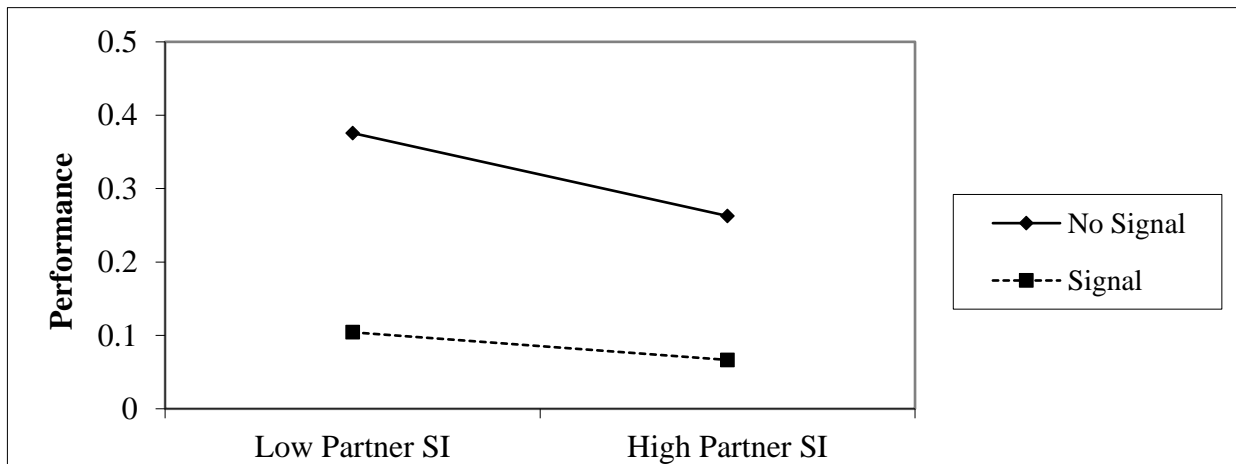

c) Signaling and partner specific investment

Figure 2: Simple slope analysis of the moderation effects