

RESEARCH ARTICLE

Leveraging who you know by what you know: Specialization and returns to relational capital*

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Research Summary: This paper investigates the interaction effects of specialization and relational capital on performance. We distinguish between upstream and downstream relational capital and theorize that higher levels of specialization will buffer against decreases in upstream relational capital, because of deeper domain expertise and stronger downstream relational capital. Conversely, higher levels of generalization permit greater gains from increases in upstream relational capital, due to leverage across a more diversified downstream portfolio of activities. We test and find support for these hypotheses in the context of the US lobbying industry. Our study contributes to the strategic human capital literature by isolating the dimension of specialization and relational capital embodied within individuals and providing performance implications of the interactions.

Managerial Summary: Both “what you know” and “whom you know” impacts performance. Generalists and specialists are different on the “what you know” dimension. On the “who you know” dimension, we distinguish between upstream (supplier) and downstream (client) relationships. We show that specialists are buffered by deeper downstream relations from performance declines when their powerful upstream connections lose power. Generalists benefit from broader networks when their upstream connections gain power. Thus, when the value of their relationships change, specialists and generalists should each assess when they can reap performance benefits, and when they need to bolster against adversities. For firms, our study suggests hiring the right mix of specialists and generalists is important to reduce risks from

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relational losses while enjoying the performance benefits from relational gains.

KEYWORDS

lobbying industry, relational capital, specialization

1 | INTRODUCTION

Specialization (what you know) and relational capital (who you know) are key dimensions of human capital, impacting both value creation and capture. Firms and individuals benefit from investments in human capital (Campbell, Coff, & Kryscynski, 2012; Castanias & Helfat, 1991, 2001; Coff, 1997; Gambardella, Ganco, & Honoré, 2014; Karim & Williams, 2012). Prior studies have separately investigated the performance effects of specialization (Castanias & Helfat, 1991; Custódio, Ferreira, & Matos, 2013; Ferguson & Hasan, 2013; Murphy & Zábojník, 2004; Zuckerman, Kim, Ukanwa, & von Rittmann, 2003) and relational capital (Burt, 1992; Carnahan & Somaya, 2013; Somaya, Williamson, & Lorinkova, 2008). However, fewer studies explore whether specialization interacts with relational capital to impact performance. In part, this is because the inextricable linkages between specialization and relational capital make it difficult to isolate their main and interaction effects on performance (c.f. review in Mawdsley & Somaya, 2016). In this paper, we develop and test a theory about their interactions to answer the following research questions: Are the performance benefits of relational capital dependent on the level of specialization? Do the benefits hinge on whether there is an increase or decrease in relational capital?

The answers to these questions are neither theoretically obvious nor empirically established. Theoretically, it is unclear whether the level of specialization or generalization interacts more strongly with relational capital for performance benefits. Also, for the focal actor, relational capital accrues in both upstream (supplier) relationships for access to key resources (e.g., Hoetker, 2005) and downstream (client) relationships for enhanced revenue generation (e.g., Somaya et al., 2008). However, current research examines each in isolation, leaving unanswered the question of how both types of relational capital may matter simultaneously. Empirically, the answers require a research design with clearly separable measures for specialization and relational capital, and methodologies for addressing potential endogeneity.

Integrating insights from human capital, career specialization, and relational/social capital literature, we hypothesize specialization creates a buffer from the negative effects of decreases in upstream relational capital because of deeper domain expertise and greater embeddedness in downstream client relationships. Specialization is not universally advantageous, however; we predict generalization results in the ability to better leverage increases in upstream relational capital because diverse knowledge translates into broader downstream client networks.

The interplay of specialization and relational capital is important in professional services, where firms rely almost entirely on their employees' knowledge and relational capital to create and capture value. We test our hypotheses in one such context: the US lobbying industry. Lobbyists differ in their level of specialization, some have deep expertise in one or few issues, while others span across multiple and diverse domains. Also, many lobbyists have prior federal government work experience with politicians responsible for making critical policy decisions. These relationships act as valuable

resources, serving as upstream relational capital that enables lobbyists to provide better services to their clients. Our research design exploits exogenous changes in the power of U.S. House and Senate members as sudden changes to the value of lobbyists' upstream relational capital. The unforeseen timing of these events, in conjunction with individual fixed effects, permits us to isolate the interaction effect of upstream relational capital with the level of specialization.

Consistent with prior studies (Bermiss & Greenbaum, 2015; Blanes i Vidal, Draca, & Fons-Rosen, 2012), we show the value of upstream relational capital in this industry: lobbyists gain revenue when their political connections gain power and lose revenue when their political connections lose power. More specifically to our main propositions, we find specialization buffers performance from decreases in upstream relational capital, while generalization permits greater gains from increases in upstream relational capital. These results are robust to alternative specifications that address potential sampling, selection and measurement errors, and alternative causal mechanisms at play, such as career dynamics and endogeneity of the level of specialization.

Our findings contribute to the literature streams from which we draw. Within the strategic human capital literature (Campbell, Coff, & Kryscynski, 2012; Mawdsley & Somaya, 2016; Nyberg & Wright, 2015), we contribute by integrating literature streams on relational capital and specialization, and by examining their separate and interactive effects on performance. We inform work in relational capital by explaining differences in upstream and downstream relational capital for the focal actor (Hoetker, 2005; Kale, Singh, & Perlmutter, 2000; Somaya et al., 2008) and illuminating how one type of relational capital may be leveraged with the other, based on specialization. In other words, we contribute by showing gains in upstream relational capital serve as a "general purpose technology" which provides greater returns to generalists because it can be leveraged across a diversified downstream client base (Conti, Gambardella, & Novelli, 2016). At the same time, losses in upstream relational capital can be offset by deeper downstream embeddedness and domain expertise. Finally, within the career specialization literature, a few studies have identified conditions under which specialization may yield differential benefits. We contribute to the current debate on the benefits of specialization versus generalization (Merluzzi & Phillips, 2016) to show an important conditioning factor relates to the interaction with relational capital. Finally, we show generalists are not always better positioned for "dynamic environments" (Hannan & Freeman, 1977; Uzzi, 1997). We find advantages of an environmental change depends on the direction of the change, not merely its existence. For managers, our study implies that firms and individuals can craft better strategies by considering the interactions and tradeoffs between "what you know" and "who you know."

2 | THEORY

Individuals create value by leveraging prior investments in human capital. Harking back to Becker (1962), a key dimension of human capital relates to "what you know." Knowledge can differ in the level of specialization, and differential investments in specialization and expertise through education, training, and experience have consequences for both individual and organizational performance (Coff, 1997; Ferguson & Hasan, 2013; Miller, Zhao, & Calantone, 2006; Nyberg & Wright, 2015).¹

¹The literatures on human capital and strategic human capital are intertwined, yet distinct. As Nyberg and Wright (2015) note, human capital literature focuses on *individuals'* ability to create and capture value in the marketplace, and strategic human capital literature focuses on how *firms* may build and gain strategic advantages through their human capital. Our study is chiefly about human capital (and at the individual level of analysis), but we borrow and extend insights in the strategic human capital perspective too, inasmuch as firms in professional services rely disproportionately on human capital for their performance, relative to other contexts such as high technology (Teecce, 1986, 2003).

Organizational theorists have also argued for advantages of career specialization because it leads to clearer identities (Leung, 2014; Zuckerman et al., 2003). A second dimension is relational capital, or “who you know.” Relational capital fosters mutual trust among individuals and results in superior access to resources held by others and enhanced revenue generation (Hoetker, 2005; Kale et al., 2000; Nahapiet & Ghoshal, 1998; Portes, 1998). An important feature of relational capital is its bilateral nature, which causes the value to be subject to the choices and circumstances of others.

While specialization and relational capital are conceptually distinct, their inextricable linkages challenge discernment of individual and interactive effects. For example, several papers in Mawdsley and Somaya’s (2016) literature review on employee mobility and performance outcomes call on both dimensions, but many are not able to distinguish their individual effects. Some of the work aggregates the effects across the two (e.g., Corredoira & Rosenkopf, 2010; Groysberg, Lee, & Nanda, 2008; Phillips, 2002); others invoke characteristics of one while theorizing about the other (e.g., Campbell, Ganco, & Franco, 2012; Somaya et al., 2008). Empirically, the linkages also imply potential confounding of measures. For example, in the knowledge spillovers literature (Rosenkopf & Almeida, 2003; Song, Almeida, & Wu, 2003), Singh and Agrawal (2011) show performance benefits attributed to enhanced learning among colleagues (a relational capital concept) are really a result of mobile inventors continuing to build on their own prior knowledge (a specialization concept). As a result, Mawdsley and Somaya (2016) note “The joint occurrence of different types of human and relational capital... creates significant challenges for distinguishing between alternative mechanisms..., and many research opportunities remain in clarifying and understanding the interactions between these mechanisms” (p. 91). We address this need below.

2.1 | Career specialization

The decision to specialize has serious implications for an individual’s depth of knowledge (expertise), skills, and social relationships (Castanias & Helfat, 1991; Lazear, 2004; Leung, 2014; Zuckerman et al., 2003). There are advantages to both specialization and generalization. Specialization allows individuals to develop deep skills and expertise in a specific area (Becker, 1962; Parsons, 1972; Rosen, 1983), and creates a clarity of identity (Leung, 2014; Zuckerman et al., 2003), which acts as a signal of quality in labor markets (Becker & Murphy, 1992). The advantage to generalization stems from the need for coordination and communication, and bridging across distinct domains of knowledge (Cr mer, Garicano, & Prat, 2007; Cust dio et al., 2013; Ferreira & Sah, 2012; Karim & Williams, 2012; Murphy & Z bojnik, 2004).

The mixed evidence on returns to specialization suggests the effects may hinge on moderating factors. Merluzzi and Phillips (2016) find when institutional and market conditions ameliorate the need for signals, specialization results in a wage discount. Similarly, as individuals progress in their career, generalists may outperform specialists (Murphy & Z bojnik, 2004; Zuckerman et al., 2003). Castanias and Helfat (2001) propose generalists may be more valued in deregulated and mature industries. Ferreira and Sah (2012) relate the advantages of generalization to greater complexity and hierarchies because they increase the premium for coordination.

Most of the above moderating factors examine the effect of market or institutional factors on the value of specialized or general knowledge possessed by individuals. Not examined, however, is whether individual-specific factors such as relational capital may moderate the relationship between specialization and performance. We now turn to this next theoretical building block.

2.2 | Upstream and downstream relational capital

Studies of relational capital suggest a generally positive effect of being connected to others. Relational capital results from individuals' investments, through prior interactions, in building mutual trust and goodwill, resulting in preferential access to resources through these connections (Adler & Kwon, 2002; Burt, 1992; Coleman, 1990; Kale et al., 2000; Nahapiet & Ghoshal, 1998).²

While relational capital may also accrue in interactions within teams or alliances (Adner, 2006; Agarwal, Campbell, Franco, & Ganco, 2016; Groysberg et al., 2008; Huckman & Pisano, 2006; Kapoor & Lee, 2013), we focus here specifically on upstream and downstream relational capital. Relationships with upstream suppliers help enhance firms' product and service offerings by increasing diversity of knowledge base and access to resources (Hoetker, 2005; Mayer & Nickerson, 2005). Similarly, individuals can leverage relationships with key suppliers for superior labor market outcomes (Bertrand, Bombardini, & Trebbi, 2014; Krause, Handfield, & Tyler, 2007). At both levels of analysis, upstream relational capital contributes to value creation through differentiation and cost efficiencies. Similarly, relationships with downstream clients provide enduring business and revenues (Burt, 1992; Gabbay & Zuckerman, 1998; Podolny & Baron, 1997; Somaya et al., 2008). Downstream relational capital enhances value creation for firms by improving trust and reducing transaction costs (Broschak, 2004; Canales & Greenberg, 2015). For individuals, because client ties are portable to other firms (Bermiss & Greenbaum, 2015; Carnahan & Somaya, 2013), downstream relational capital can translate into increased likelihood of retention and promotion (Krackhardt & Hanson, 1993), and increased external demand through job referrals (Fernandez, Castilla, & Moore, 2000; Granovetter, 1973, 1985; Lin, Ensel, & Vaughn, 1981).

In summary, scholarly work on relational capital points to generally positive performance effects. To the best of our knowledge though, interactions between specialization and relational capital for performance consequences have not been examined, nor have the concurrent roles of upstream and downstream relational capital for the focal actor. Our hypotheses development focuses on the interactions between specialization and upstream relational capital, while also examining how downstream relational capital as a mechanism impacts the performance effects.

2.3 | Specialization and decreases in upstream relational capital

Consistent with the literature on relational capital, a decrease in upstream relational capital should result in a decrease in performance (Bertrand et al., 2014; Blanes i Vidal et al., 2012; Carnahan & Somaya, 2013). In addition to this main effect, we argue specialization buffers against decreases in upstream relational capital. The sources of this insurance are twofold, relating first to deeper domain expertise, and second to deeper embeddedness in downstream relationships.

First, specialization leads to deeper domain expertise (Becker, 1985; Rosen, 1983), which retains its value even when upstream relational capital value decreases. Deep domain expertise results in a closer fit to the resources needs of their clients (Baker, 1984; Bertrand et al., 2014; Eccles & Crane, 1988). Given high costs of acquiring deeper domain expertise (Ferreira & Sah, 2012; Rosen, 1983), the potential alternatives to a person with higher level of specialization may be more limited than otherwise. In other words, the markets for individuals with higher levels of specialization may be thinner than those with lower levels, and all else equal, these individuals will be harder to replace. Thus, while decreases to upstream relational capital will adversely affect all individuals, the higher

²Though the alliances literature invokes relational capital at the firm level of analysis, the mechanisms relate to interactions among managers. Here, relational capital facilitates assurances against opportunistic behavior and improves coordination and communication (Agarwal, Croson, & Mahoney, 2010; Gulati, 1999; Kale et al., 2000).

marginal cost of replacing someone with a higher level of specialization will buffer them against these negative effects.

Second, just as specialization leads to deeper domain expertise, it also leads to deeper structural embeddedness with buyers in the area of specialization (Uzzi, 1997).³ We adopt a definition of structural embeddedness akin to Karim's (2012) definition, which refers to the routinized coordination and tightly coupled market activities between actors.⁴ A higher level of specialization will result in deeper structural embeddedness, because of greater intensity of effort and focus on each client (Bermiss & Greenbaum, 2015; Tyler & Stanley, 2001). Embedded ties with clients, in contrast to purely arms-length ties, foster trust (Uzzi, 1996), encourage commitment (Dwyer, Schurr, & Oh, 1987), enhance attachment (Seabright, Levinthal, & Fichman, 1992), establish obligations (Burt, 1992; Coleman, 1990; Granovetter, 1985), and minimize opportunistic behavior (Granovetter, 1985). Given a greater likelihood of downstream structural embeddedness, clients will have more routinized coordination, tighter coupling, stronger attachment, and greater dependence on individuals with higher levels of specialization. Because of lower transaction costs and increased knowledge flows (Dyer & Singh, 1998; Ferreira & Sah, 2012; Rogan, 2014; Uzzi, 1999; Uzzi & Lancaster, 2004), this downstream embeddedness makes individuals who are more specialized better positioned to realize the benefits from long-lasting exchange relationships (Bermiss & Greenbaum, 2015; Broschak, 2004; Rogan, 2014; Seabright et al., 1992). Therefore, individuals who are more specialized will be buffered from the deleterious consequences of decreased upstream relational capital (Granovetter, 1985; Seabright et al., 1992). In sum, given greater domain expertise and greater structural embeddedness associated with higher levels of specialization relative to generalization, we predict the following.

Hypothesis 1 (H1) *Individuals with higher levels of specialization will be less adversely affected by decreases in upstream relational capital than individuals with higher levels of generalization.*

2.4 | Specialization and increases in upstream relational capital

In addition to direct benefits of increased relational capital (Bertrand et al., 2014; Somaya et al., 2008), we predict individuals who are more generalized are better poised to exploit increases to their upstream relational capital than those who are more specialized. An increase in upstream relational capital serves as an infusion of a general-purpose resource that has broad demand-side applications. Although there may be high fixed costs to acquiring the upstream relational capital, the marginal cost of deploying it is low, given its relatively non-rival nature and potential fungibility across multiple domains (Agrawal, Cockburn, & McHale, 2006).⁵ Upstream relational capital, like many other intangible assets, does not obey the "law of conservation" (Teece, 1980, p. 226) because it is both indivisible (Montgomery, 1994),⁶ and it may be used in several non-competing sub-markets without

³Note that Uzzi (1997)'s arguments for embeddedness as a liability in the face of a negative downstream relational capital change are consistent with our logic because the mechanisms at play relate to increased interdependence.

⁴Karim (2012) uses structural embeddedness to discuss the relationship between business units and their parent firm. We use the same underlying logic for the relationship between two distinct firms with an ongoing relationship.

⁵Relational capital is not perfectly non-rival, as there is a limit to the number of possible connections and benefits one is allowed to extract from a relational tie. However, on the continuum from perfectly rival to perfectly non-rival, relational capital is less rival than most other resources.

⁶Notably, relational capital meets Teece's (1980, 1982) qualification that the resource should be indivisible because personal connections are difficult to transfer to others. Further, there are significant contracting problems with intangible assets like relational capital (Caves, 1982; Wernerfelt & Montgomery, 1988).

significantly reducing its value (Montgomery & Wernerfelt, 1992). Thus, there exists the potential to increase its utilization through expansion into new markets and segments, much like a general-purpose technology shock (Bresnahan & Gambardella, 1998). However, the ability to expand into new markets and acquire new exchange partners may not be homogeneously distributed (Conti et al., 2016). Rather, there can be a threefold limitation due to the level of specialization, stemming from knowledge, identity, and network position.

Just as a firm's scope is limited by resources (Breschi, Lissoni, & Malerba, 2003; Penrose, 1959), an individual's scope is limited by their knowledge domain. Generalized knowledge and information apply to a broader set of sub-markets. The breadth of individuals who are more generalized may allow them to be considered a satisfactory supplier in a larger number of sub-markets, even if not the best supplier in any of them (Ferreira & Sah, 2012; Lazear, 2004). The broad knowledge base associated with generalization allows for better leveraging of increases in upstream relational capital. Relatedly, higher levels of specialization constrain expansion into new sub-markets because of a lack of requisite presence and identity (Padgett & Ansell, 1993; Phillips, Turco, & Zuckerman, 2013; Zuckerman et al., 2003). Although individuals possessing greater levels of generalization may be discounted in any one sub-market (Zuckerman, 1999), they are less likely to face identity-based limits to market entry (Phillips et al., 2013). Finally, generalization also relates to the ability to span a greater number of sub-markets, on account of being more centrally located in the network of potential buyers. Network centrality has been linked to power (Brass, 1992), career success (Lin et al., 1981; Marsden & Hurlbert, 1988), mobility (Podolny & Baron, 1997), and resource acquisition (Tsai & Ghoshal, 1998). Higher centrality enables the leveraging of existing ties (Gulati, 1995) and the creation of new ties (Tsai, 2000).

Accordingly, we predict higher levels of generalization to enable better utilization of increases in relational capital; not only given an existing presence in more sub-markets but also because of better ability to identify and exploit market opportunities to deploy relational capital.

Hypothesis 2 (H2) *Individuals with higher levels of generalization will benefit more from increases in upstream relational capital than individuals with higher levels of specialization.*

3 | EMPIRICAL CONTEXT AND RESEARCH DESIGN

3.1 | The US federal lobbying industry: Brief description

Lobbying is the process through which individuals and interest groups influence decision makers in the legislative or regulatory process and has an impact on trillions of dollars of public policy activity every year. As a professional services industry, US Federal lobbying accounted for \$3 billion in 2014 alone, with more than 12,000 lobbyists working either in one of the 2,000 lobbying firms or serving as in-house lobbyists for interest groups or firms.

Several features make the lobbying industry a favorable setting for our study. First, as with other professional service contexts, the lobbying industry relies chiefly on individuals' human and relational capital (Bertrand et al., 2014). Second, there is a strong positive correlation between individual and firm-level measures of human/relational capital and performance. Third, it is possible to measure a lobbyist's specialization using the distinct issues (e.g., defense, transportation, etc.) covered by congressional committees in the Senate and the House. These well-defined demarcations enable a clean, reliable, and continuous measure of specialization. Fourth, it is feasible to link

relational capital measures to individual lobbyists, and differentiate between both upstream relational capital—connections to politicians in key decision making roles (Bertrand et al., 2014; Blanes i Vidal et al., 2012)—and downstream relational capital—ties to client organizations (e.g., General Electric) seeking lobbying services (Bermiss & Greenbaum, 2015). Fifth, the Lobbying Disclosure Act (LDA) requires registration and public disclosure of all lobbying activities, both in terms of dollars and number of lobbying contracts. Finally, as described in greater detail below, the lobbying industry enables a research design that can leverage multiple individual-level exogenous shocks to upstream relational capital (Blanes i Vidal et al., 2012).

3.2 | Specialization and relational capital in the lobbying industry

As noted above, the lobbying industry is demarcated into 78 distinct issues. Table A1 in Appendix lists the formal classification scheme of these issue areas, as predefined by the Secretary of the Senate and the Clerk of the House of Representatives, the lobbying dollars and the number of lobbyists who participated in each issue between 1999 and 2008. The differentiated interests across distinct domains imply lobbyists can choose among varying degrees of specialization (LaPira, Thomas, & Baumgartner, 2014). The characteristics of the lobbying industry require both general and specific knowledge. General knowledge relates to information regarding legal and legislative processes, and familiarity with how decisions are made by policymakers (Salisbury, Johnson, Heinz, Laumann, & Nelson, 1989); such knowledge is fungible across all domain areas of expertise (Blanes i Vidal et al., 2012). The need for specificity arises from lobbyists serving as knowledge intermediaries to time-constrained politicians on behalf of their clients (Bertrand et al., 2014; Salisbury et al., 1989). This enables us to compute a Herfindahl–Hirschman Index (HHI), as detailed below, for the level of specialization.

Given their role as information intermediaries between policymakers and interest groups, lobbyists have both upstream and downstream relational capital. Important in this context is the *revolving door* phenomenon, where federal public employees leave their congressional staff positions to become lobbyists; Blanes i Vidal et al. (2012) report more than 56% of lobbying firm revenues can be attributed to revolving door lobbyists, and almost 70% of the top 50 lobbyists had some type of federal experience. Thus, prior connections through work experience to current policymakers constitute an important source of upstream relational capital. Downstream, lobbyists' prior experience with client organizations provides them with both relational and structural embeddedness (Bermiss & Greenbaum, 2015).

3.3 | Research design: Exogenous changes to upstream relational capital

We map the empirical context on to the ideal research design for testing our hypotheses. Ideally, one would first randomly assign different levels of specialization to test the effect of specialization on performance. However, the random assignment of specialization can be relaxed, as we are not making causal claims about the effect of specialization on performance. In fact, we allow for changes in the level of specialization over time, exploiting within-person variation in the level of specialization. Second, one would analyze the impact of relational capital changes on performance by identifying changes in relational capital that are exogenous with respect to performance. Specifically, exogenous changes in relational capital should (a) not be affected by lobbyists (reverse causality), (b) not be easily anticipated by lobbyists nor by potential clients, and (c) be orthogonal to lobbyist's characteristics, with no selective impact based on the level of specialization.

TABLE 1 A comparison of an ideal design and study design

Variable of interest	Ideal experiment	Our design
Generalist/specialist	Randomly assign random values of HHI among lobbyists.	We allow for changes in the level of specialization over time. Exploits within person variation in the level of specialization. Our identification of the interaction terms (Upstream relational capital X Specialization) depends on the assumption specialization is not correlated with the timing of shocks and lobbyists are not able to perfectly foresee and react to the changes in upstream relational capital.
Changes in relational capital	An exogenous change in the level of relational capital with (a) no reverse causality and (b) no anticipation of events	Assignments to powerful committees cannot be affected or anticipated by lobbyists because (a) committee assignment rules are complex and flexible taking into account for preferences, seniority, background, election margin, and the importance of the member's district, (b) securing a seat in a powerful committee would mean giving up a seat in another committee they previously have served, and (c) few vacancy arises in powerful committees usually as a result of changes in the party's share in Congress and unexpected electoral outcomes.
Selective impact of relational capital change	Relational capital shocks should not selectively impact individuals based on the level of specialization.	All 78 issues are affected when a politician is assigned to a powerful committee. 65.1% of lobbying reports between 1999 and 2008 co-occur with the two issues exclusively covered by the powerful committees.

Political connections are key upstream relational assets, and their value varies based on position and power. We exploit incidences where the value of upstream relational capital exogenously increases/decreases due to changes in the position of active politicians who are connected with revolving door lobbyists. We do so by tracking (a) politicians' assignment to (increase in upstream relational capital) and from (decrease in upstream relational capital) powerful Congressional committees, and (b) appointments to committee chair (increase in upstream relational capital), and exit from a congressional seat (decrease in upstream relational capital).

Among over 40 standing committees in both chambers of Congress, the four most influential committees are the Finance and the Appropriation Committees in the Senate, and the Ways and Means and the Appropriation Committees in the House (Blanes i Vidal et al., 2012; Duso, 2005). These committees pass appropriation bills for federal spending and draft tax legislation. Sixty-five percent of lobbying reports are associated with these four committees, reflective of both the gravity of issues covered and the number of legislative activities conducted. Thus, the ascent (descent) of a connected politician to a powerful committee directly impacts the value of a lobbyist's relational capital and serves as a positive (negative) shock. These shocks to lobbyist's upstream relational capital conform to the exogeneity requirements of an ideal experiment (See Table 1). Assignments to powerful committees can neither be affected nor be anticipated by lobbyists. These assignments represent complex interactions of vacancies, seniority, electoral votes, and trade-offs across seats in congressional committees. Only a handful of seats in powerful committees become available, making it harder to expect who will be newly assigned to powerful committees. Also, once a politician is assigned to a powerful committee, it is rare for them to relinquish the position (Schneider, 2014). Further, the shocks should not selectively impact individuals based on their level of specialization. Given the four committees cover a broad range of issues because they often entail budgetary and taxation concerns, this is largely true in our context. As reflected in Table A1, there is a high co-occurrence rate of all specific issues with the four committees.

To confirm the robustness of our measure of relational capital changes, we consider other shocks too. Committee chairs are key congressional leadership positions with significant agenda-setting power (Evans, 1996). Committee chairs organize and allocate work among subcommittees, establish procedures and cover other administrative matters of the committee (Schneider & Koempel, 2012). These positions provide access to current leaders of Congress and receive substantial media coverage. For increases in the lobbyist's upstream relational capital, we track connected politicians' selection to a committee chair for any of 40 standing congressional committees. This shock is also arguably exogenous, satisfying the three criteria noted above. Similar to assignment to powerful committees, influencing or anticipating chairmanship is unlikely due to complexity in the selection process (Schneider & Koempel, 2012).

The departure of a politician from a chair position, as a mirror to the above positive shock, cannot be used as an alternative identification strategy for relational capital. Both parties restrict committee chairs to serve no more than three consecutive terms, making it relatively easy for lobbyists to anticipate occurrence and thus violating the exogeneity condition. Also, stepping down from a chair position does not necessarily mean a weakening of political power, as the politician may move to other powerful committees. Accordingly, to measure decreases in upstream relational capital, and similar to Blanes i Vidal et al. (2012), our identification strategy utilizes loss of congressional seats by connected politicians for a loss in the value of a connection. While exits due to retirements may be easier to anticipate (making our results downward biased), many exits are results of unexpected failure in reelection. There is also no reason to believe changes in congressional members' power are correlated with the specialization of their former staffers, therefore satisfying the third criterion of no selective impact based on the level of specialization.

3.4 | Data sources and sample

The LDA mandates both lobbyists and their clients register with the Secretary of the Senate and the Clerk of the House of Representatives, and file semiannual lobbying reports. Each report lists the amount lobbied for each client (for lobbying firms) or total lobbying-related expenses (for organizations with in-house lobbyists), information on which issue area and bills are related to the lobbying activity, and which lobbyists contacted specific chambers of Congress or federal agencies. These reports, aggregated by the Center for Responsive Politics, are one of our key data sources. We also draw on data compiled by Blanes i Vidal et al. (2012) using Lobbyist.info database published by Columbia Books and LegiStorm databases, data on campaign contributions from the Federal Election Commission, and on congressional committees from the Senate Office of Public Records and Office of the Historian of the House of Representatives.

We construct a sample of lobbyists who participate in the U.S. federal lobbying industry between 1999 and 2008. Each variable is observed on the semiannual basis as LDA requires disclosure of the lobbying activities within the period. Our pooled sample includes 195,530 lobbyist-period observations with 25,179 unique lobbyists in the panel of 20 semiannual periods. To investigate the interaction of a lobbyist's relational capital changes and the level of specialization, we require our sample to have a sizable change in the value of relational capital. Thus, we focus on a type of revolving door lobbyists that heavily rely on relational capital: a lobbyist who has worked as a personal staffer of a Senator or a Representative. Senators and representatives may hire fewer than 10 to more than 50 personal staffers to assist them in policy-making and legislative matters, constituent communications, budgeting, and scheduling. A significant number of the personal staffers leave to become revolving door lobbyists every year. For example, between 2010 and 2011, 264 ex-staffer who left Capitol Hill became registered lobbyists (Drutman, 2012). Following Blanes i Vidal

TABLE 2 Number of shocks to upstream relational capital

Variables	# of lobbyists affected	# of observations
Loss of power	93	654
Loss of connection	253	2,006
Gain of power	165	960
Gain of chair	92	283

et al. (2012), we restrict our sample to ex-congressional staffers who have worked for a Senate or a House Representative before entering the lobbying industry. Our estimation sample then has a total of 1,109 revolving door lobbyists, spanning 10,777 observations in 20 semiannual periods.

3.5 | Dependent variables

The main dependent variable of interest is the natural log of a lobbyist's *Lobbying revenue* reported in semi-annual lobbying disclosure reports. Lobbying revenue is calculated by aggregating the dollar amount of lobbying contracts each lobbyist is involved in each time period. In our revolving door lobbyist sample, mean revenue is \$863,948 and median revenue is \$420,000. Given the highly skewed distribution (the top decile of lobbying revenue in the sample is \$2,140,000, more than five times larger than the median revenue), we use a natural logarithmic scale.

3.6 | Independent variables

3.6.1 | Upstream relational capital

We create four dummy variables to capture changes in upstream relational capital. As discussed above, our two key independent variables are constructed using connected politicians' assignments into and out of four powerful committees in Congress. The negative shock, *Loss of power* is coded 1 for observations after the first period a connected politician is no longer assigned to one of the powerful committees and 0 otherwise. The positive shock, *Gain of power*, is equal to 1 for when a politician connected to a lobbyist is first assigned to one of the powerful committees and until the politician exits the committee, and equals 0 otherwise. We only consider politicians newly assigned to powerful committees in the sample period, excluding politicians that leave one powerful committee to simultaneously enter another powerful committee. Two additional variables are also created based on loss of office, and appointment to committee chair. *Loss of connection* is coded 1 for observations after a politician connected to a lobbyist leaves office and 0 otherwise. These exits of connected politicians are largely due to defeats at reelection or voluntary retirement. A total of 253 lobbyists in our sample were affected by the exits of politicians, three short of the number of events Blanes i Vidal et al. (2012) used. We exclude the three cases in which connected politician exited the House to become a Senator. *Gain of chair*, is coded 1 for the years when a politician connected to a lobbyist is selected to be the chair of a standing committee in Congress and 0 otherwise. We only consider the events where a non-chair politician newly becomes a chair during our sample period. The number of events for each shock is presented in Table 2.

3.6.2 | Level of specialization

Following Bertrand et al. (2014), we use the Herfindahl–Hirschman Index (HHI) to measure the specialization of individual lobbyists. Specifically, we use:

$$HHI_{it} = \sum_{m=1}^{78} \left(\frac{s_{imt-1}}{s_{it-1}} \right)^2 \quad HHI_{it} = \sum_{m=1}^{78} \left(\frac{s_{imt-1}}{s_{it-1}} \right)^2$$

where s_{it-1} is cumulative lobbying revenue for lobbyist i until period $t-1$, s_{imt-1} represents cumulative lobbying revenue for lobbyist i for the specific issue area m until period $t-1$, and 78 denotes the number of pre-defined issue areas. By construction, the HHI can vary from 0 to 1; larger numbers indicating a higher specialization.

3.7 | Control variables

Our key control variables include a set of variables that capture various aspects of human capital and upstream relational capital accumulated in the course of a lobbyist's career. Other than political connections, human capital the lobbyists accumulate in the industry can be decomposed into industry-specific and firm-specific human capital. We control for *years of experience in lobbying* to gauge the level of experience that capture industry-specific human capital. To capture firm-specific human capital, we included *tenure in lobbying firm (in years)*, measured as the number of periods a lobbyist worked in the current lobbying firm. Client ties, as noted above, represent critical downstream relational capital and a key source of competitive advantage in professional service industries (e.g., Somaya et al., 2008). We control for *Cumulative # of clients* by counting the number of unique clients a lobbyist had until the period $t-1$. Further, while we base our changes to upstream relational capital on prior employment experience, lobbyists may secure preferential access to politicians in other ways. One important path for doing so is through campaign contributions (Ansola-behere, Snyder Jr, & Tripathi, 2002; Bertrand et al., 2014). Bertrand et al. (2014) argue campaign contributions reflect preexisting ties and the desire to access a politician. We create a dummy variable *Campaign contribution tie* coded 1 if a lobbyist has made an individual campaign contribution to a politician in the previous election, and 0 otherwise.

Lobbying as an in-house lobbyist may be systematically different from the experience of lobbyists working in lobbying firms (Hrebenar & Morgan, 2009), and accordingly, we control for this difference by including *Lobbying firm* as a dummy variable coded 1 if the lobbyist filed a lobbying report as a member of a lobbying firm within a semiannual period, and 0 otherwise. We control for *Firm size*, the total number of lobbyists employed by the firm in a given period. One semiannual period time lags were given to all variables except the dependent variables and variables that captures the changes in relational capital.

3.8 | Estimation methodology

To test Hypotheses 1 and 2, we estimate panel regression models including time and lobbyist fixed effects. Time fixed effects are essential to capture the cyclical nature of politics. For example, we observe lobbying revenue surges when a new Congress starts and decreases as the end of a term approaches. We also include lobbyist fixed effects to control for any time-invariant lobbyist characteristics not observed in the data. These fixed effects allow us to control for human capital a lobbyist has accumulated before entering the lobbying industry. In addition, lobbyist fixed effects also capture characteristics of the connected politicians, such as party affiliation and whether they are a Senator or a Representative, which is highly time invariant. By having lobbyist fixed effects, we focus only on the within-lobbyist variation across semiannual periods. Standard errors are clustered by connected politicians to account for the potential nonindependence of standard errors at the politician level, which is closely related to the nature of the shock. The results are robust to clustered

standard errors at the lobbyist and the firm level. In supplementary analyses, we examine main and interaction effects of changes in upstream relational capital and specialization on client ties. Because client ties are measured as counts, we conduct panel fixed effect negative binomial regressions with time and lobbyist fixed effects included.

4 | RESULTS

We report descriptive statistics in Table 3. Table 4 presents results for our main analyses. Model 1 (Table 4) is a baseline regression of *lobbying revenue* on the control variables. Among the controls, *tenure in a lobbying firm* is positively associated with *lobbying revenue*. The positive association between *years of experience* in the industry and performance is likely absorbed by *tenure in a lobbying firm* as the two variables are highly correlated (0.712) as seen in Table 3. Both *cumulative number of clients* and *campaign contribution tie* have positive and significant coefficients, as we would expect. In addition, the negative and significant coefficient on the *lobbying firm* dummy indicates in-house lobbyists receive more revenue than those working for a lobbying firm. Model 2 adds the measure of *specialization* (HHI of issues covered), one of our main independent variables of interest. The coefficient suggests an increase in the level of specialization by one standard deviation is correlated with about a 24% decrease in revenue. With a small standard error of 0.085, the coefficient estimate is statistically significant at the 99.9% confidence level.

Models 3 through 6 (Table 4) test Hypothesis 1 using two different changes to lobbyists' upstream relational capital. Model 3 demonstrates lobbyists witness an approximately 33% decline in revenue when there is a *Loss of Power* of their connected politician. In line with Hypothesis 1, Model 4 indicates the negative effect on revenue is mitigated as the level of specialization increases. The interaction term is statistically significant at the 99% confidence level. Figure 1 plots the marginal effects for each level of specialization (higher HHI correspond to higher levels of specialization) when there is a sudden decrease in upstream relational capital. One can see the stark differences in percent declines in revenue, ranging from a low of 60% to zero change as HHI increases. The marginal effect loses its statistical significance within the 95% confidence interval as HHI exceeds 0.4. We note this may be due to the empirical fact that more than 75% of our observations are in the range of 0 to 0.4, implying a weaker power of the test at higher levels of specialization. The average level of specialization in our population is 0.298 and the standard deviation is 0.269 (see Table 3), so much of the variation in the level of specialization is observed in this range. These results are corroborated in Models 5 and 6, using the second measure of decreased upstream relational capital: the exit of a connected politician from Congress. Therefore, we find support for Hypothesis 1 across both measures of decreases to upstream relational capital (exit from a powerful committee and exit from Congress).

Models 7 through 10 in Table 4 investigate the impact of increases to upstream relational capital. Model 7 demonstrates lobbyists experience a 26% increase, on average, in lobbying revenue following a connected politician's *Gain of Power*. Supporting Hypothesis 2, Model 8 indicates the effect of this increase in upstream relational capital is significantly amplified for generalists. The estimate is statistically significant at the 95% confidence level. Figure 2 plots the marginal effects for each level of specialization (lower HHI correspond to higher levels of generalization) when there is a positive shock to upstream relational capital. The percent increases in revenue after a sudden increase in upstream relational capital ranges from 40 to 10% as HHI increases, with a loss of statistical significance within the 95% confidence interval for HHI greater than 0.5. As seen in Figure 3, approximately 83% of lobbyists in our sample have HHI below 0.5, which suggests the results are not

TABLE 3 Descriptive statistics and Pearson correlations^a

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. LN revenue	12.912	1.340	1											
2. # of client ties	10.308	11.964	0.661	1										
3. Loss of power	0.060	0.238	0.028	0.043	1									
4. Loss of connection	0.185	0.388	-0.011	0.008	0.441	1								
5. Gain of power	0.088	0.284	0.014	-0.012	-0.079	-0.108	1							
6. Gain of chair	0.024	0.152	-0.012	-0.010	-0.039	-0.071	0.049	1						
7. Specialization (HHI)	0.298	0.269	-0.371	-0.215	-0.076	-0.062	0.051	0.034	1					
8. Years of experience in lobbying	7.848	5.307	0.147	0.099	0.169	0.294	-0.06	-0.084	-0.265	1				
9. Tenure in lobbying firm (in years)	2.359	2.317	0.103	0.109	0.142	0.230	-0.063	-0.061	-0.152	0.712	1			
10. Cumulative # of clients	24.928	28.822	0.549	0.732	0.142	0.146	-0.034	-0.039	-0.292	0.443	0.287	1		
11. Campaign contribution tie	0.457	0.498	0.204	0.164	0.013	0.046	-0.106	-0.039	-0.136	0.099	0.035	0.178	1	
12. Lobbying firm	0.899	0.302	-0.061	0.245	0.032	0.072	-0.003	0.001	0.013	-0.027	0.078	0.170	0.076	1
13. Firm size	15.666	21.438	0.243	0.116	0.049	0.077	0.011	-0.024	-0.192	0.102	0.120	0.210	0.015	0.109

^a N = 10,709.

TABLE 4 (Continued)

DV: LN revenue	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lobbyist fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	10777	10777	10777	10777	10777	10777	10777	10777	10777	10777
R squared	0.0720	0.0904	0.0942	0.0962	0.0955	0.0970	0.0927	0.0937	0.0905	0.0915

^a Standard errors clustered by connected politicians.

(0.2365)

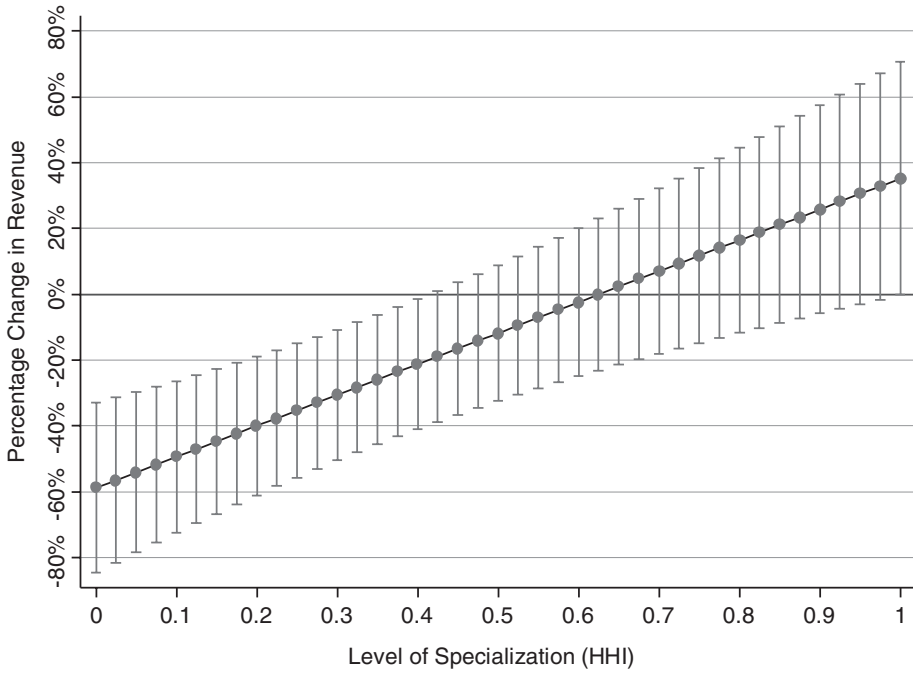


FIGURE 1 Percentage changes in revenue due to loss of power by level of specialization

driven by outliers in our sample. The effect of an increase in upstream relational capital is corroborated with the alternative measure—appointment to a chair of a standing committee—as well (Models 9 and 10), providing additional support for Hypothesis 2.

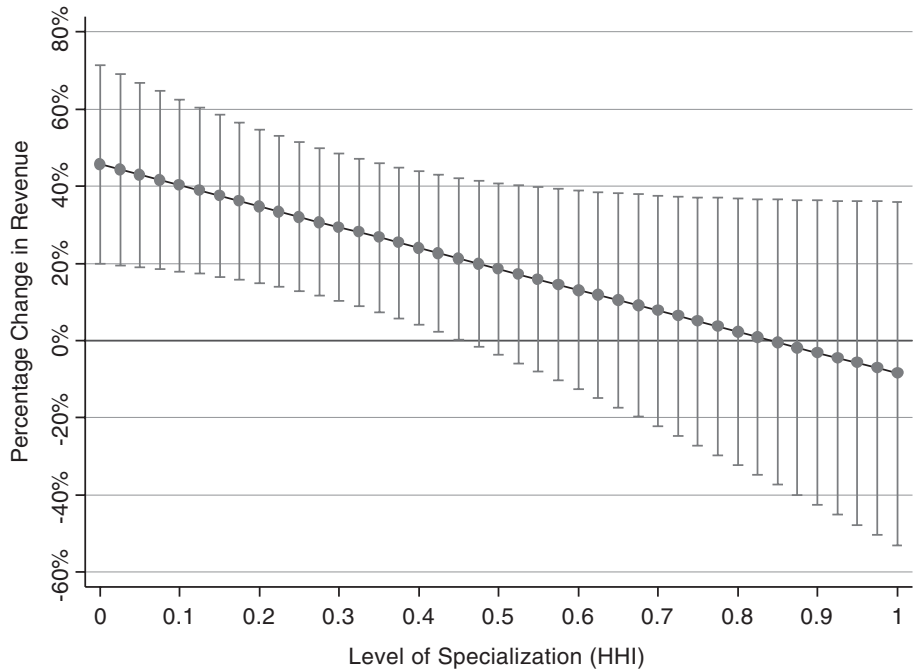


FIGURE 2 Percentage changes in revenue due to gain of power by level of specialization

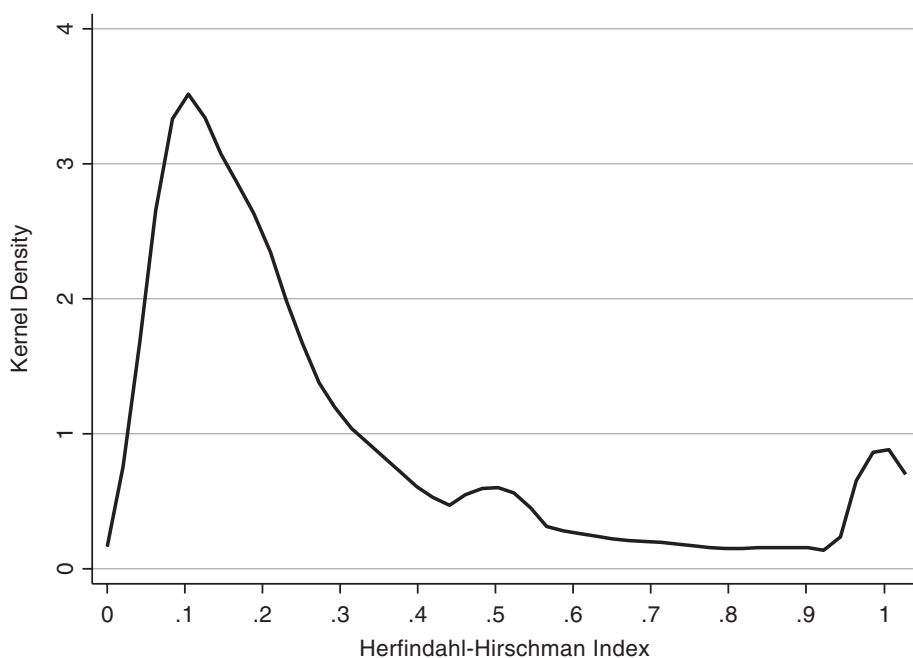


FIGURE 3 Kernel density estimates of level of specialization (HHI)

4.1 | Supplementary tests

We now turn to additional tests to examine the role of downstream relational capital in differential changes to performance based on the level of specialization after changes in upstream relational capital. In these analyses, our key dependent variable is *Number of client ties*, measured as the number of different lobbying cases from different clients assumed by the lobbyist in that period. We also created several variants of client tie and revenue measures: *the number of client ties retained*, *the number of new client ties added*, *retained tie revenue*, and *new issue revenue*. We measure *Number of clients retained* by counting the clients who were represented by the lobbyist before and after the shock. *Number of new clients* is measured as a count of new client ties added after a shock. *Retained tie revenue* is calculated by taking a natural log of revenue generated from retained ties. We also created the variable *New issue revenue*, as the natural log of revenue from issue domains the lobbyist did not occupy before a shock.

In Table 5, we investigate whether higher levels of specialization are associated with a loss of fewer clients after sudden decreases in their upstream relational (both measures) by repeating the analysis of Table 4 using an alternative dependent variable—the total number of client ties. Models 1 through 3 demonstrate that, on average, not only do lobbyists have fewer client ties after a decline in their relational capital, a higher level of specialization results in a smaller loss in client ties. For example, based on Model 2, a one standard deviation increase in specialization leads to a 13-percentage-point increase in client ties due to *Loss of Power*. Similarly, we examine *retention* of existing ties rather than the total number of ties in Models 4 and 5. The evidence is consistent: Models 4 and 5 demonstrate increases in specialization enhance the retention of existing clients in the face of negative relational capital shocks. For example, Model 4 demonstrates a one standard deviation increase in *specialization* leads to a 17-percentage-point increase in clients retained after a *Loss of Power*. All estimates are statistically significant at conventional levels of confidence intervals. Finally, Models 6 and 7 suggest individuals who are more specialized are also better able to

TABLE 5 Test of mechanism: decreases in relational capital^a

DVs	Model 1: # of client ties	Model 2: # of client ties	Model 3: # of client ties	Model 4: # of ties retained	Model 5: # of ties retained	Model 6: retained tie revenue	Model 7: retained tie revenue
Years of experience	0.0228 (0.0031)	0.0258 (0.0031)	0.0254 (0.0031)	0.0413 (0.0035)	0.0403 (0.0035)	0.4508 (0.0156)	0.4639 (0.0156)
Tenure in lobbying firm	0.0262 (0.0037)	0.0258 (0.0037)	0.0256 (0.0037)	0.0470 (0.0039)	0.0469 (0.0039)	0.3408 (0.0079)	0.3371 (0.0079)
Cumulative # of clients	0.0023 (0.0004)	0.0026 (0.0004)	0.0023 (0.0004)	0.0006 (0.0004)	0.0004 (0.0004)	0.0119 (0.0010)	0.0116 (0.0010)
Campaign contribution tie	0.0774 (0.0156)	0.0770 (0.0155)	0.0804 (0.0156)	0.0845 (0.0175)	0.0832 (0.0176)	0.0359 (0.0325)	0.0494 (0.0325)
Lobbying firm	1.4900 (0.0338)	1.4906 (0.0338)	1.4939 (0.0338)	1.1121 (0.0370)	1.1115 (0.0371)	-0.0431 (0.0479)	-0.0293 (0.0479)
Firm size	0.0027 (0.0004)	0.0025 (0.0004)	0.0027 (0.0004)	0.0082 (0.0005)	0.0084 (0.0005)	-0.0062 (0.0009)	-0.0057 (0.0009)
Lagged revenue	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)		
Specialization (HHI)	-0.2974 (0.0454)	-0.3282 (0.0458)	-0.3221 (0.0467)	-0.9359 (0.0603)	-0.9651 (0.0621)	-1.9078 (0.0856)	-1.9365 (0.0862)
Loss of power		-0.3533 (0.0454)		-0.2449 (0.0519)		-0.8917 (0.0978)	
Loss of power X specialization		0.4866 (0.1421)		0.6358 (0.1776)		0.1252 (0.2820)	
Loss of connection			-0.1350 (0.0287)		-0.0555 (0.0329)		-0.4604 (0.0639)
Loss of connection X specialization			0.1554 (0.0787)		0.3714 (0.0957)		0.4106 (0.1619)
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Lobbyist fixed effects	Y	Y	Y	Y	Y	Y	Y
N	10766	10766	10766	10757	10757	10777	10777
Log likelihood	-23777.45	-23742.09	-23765.27	-21254.01	-21257.36	-	-
R squared	-	-	-	-	-	0.0643	0.0631

^a Standard errors reported in parentheses.

maintain revenues from existing clients. Although the interaction term in Model 6 is insignificant at conventional levels, Model 7 implies that, after a connected politician exits Congress, lobbyists whose level of specialization increases by one standard deviation experience an 11-percentage-point lower loss in revenue from their existing ties.

Next, we investigate the factors explaining why higher levels of generalization may relate to greater gains in revenue after an increase in upstream relational capital. The negative coefficient of HHI in the main effects regressions on the number of client ties in Table 5 reveals higher levels of generalization are associated with more existing ties: a one standard deviation decrease in specialization is associated with an 8% greater number of client ties (statistically different from 0 at the 99.9% confidence level). The broader scope implies even if the increase in upstream relational capital can be leveraged equally by lobbyists varying in their specialization towards their existing client base, on aggregate, higher levels of generalization results in more revenue gains. Additional tests reported

in Table 6 examine interactions between specialization and increases in upstream relational capital on the number of clients and issues covered. Models 1 and 2 examine the effects on the total number of client ties. The negative coefficient on the interaction term confirms that, after a sudden increase in upstream relational capital, a one standard deviation decrease in specialization leads to a 5-percentage-point increase in gained client ties (Model 1). All estimates are statistically different from 0 at conventional levels of confidence intervals. Models 3 and 4, reveal, the level of specialization does not significantly affect the number of new clients a lobbyist gains after a sudden increase in upstream relational capital (while the interaction term is negative, it is not significant at conventional levels). However, Models 5 and 6 show individuals who are more generalized are able to gain more revenue from new issues (issues they have never lobbied for) following an increase in their relational capital (interaction terms in Models 5 and 6 are statistically significant at the 99.9% confidence level). From Model 5, gain in power of a connected politician for lobbyists with one standard

TABLE 6 Test of mechanism: increases in positive relational capital^a

DVs	Model 1: # of client ties	Model 2: # of client ties	Model 3: # of new tie added	Model 4: # of new tie added	Model 5: new issue revenue	Model 6: new issue revenue
Years of experience	0.0222 (0.0031)	0.0227 (0.0031)	-0.0904 (0.0052)	-0.0894 (0.0052)	-0.0703 (0.0156)	-0.0710 (0.0156)
Tenure in lobbying firm	0.0266 (0.0037)	0.0261 (0.0037)	-0.0454 (0.0086)	-0.0465 (0.0086)	-0.2187 (0.0079)	-0.2207 (0.0079)
Cumulative # of clients	0.0024 (0.0004)	0.0023 (0.0004)	0.0074 (0.0007)	0.0073 (0.0007)	-0.0073 (0.0010)	-0.0073 (0.0010)
Campaign contribution tie	0.0775 (0.0156)	0.0771 (0.0156)	0.0117 (0.0303)	0.0087 (0.0303)	0.0028 (0.0325)	-0.0016 (0.0325)
Lobbying firm	1.4796 (0.0338)	1.4887 (0.0338)	1.3953 (0.0574)	1.4017 (0.0573)	0.5551 (0.0480)	0.5663 (0.0479)
Firm size	0.0026 (0.0004)	0.0027 (0.0004)	-0.0001 (0.0007)	0.0001 (0.0007)	-0.0040 (0.0009)	-0.0038 (0.0009)
Lagged revenue	0.0000 (0.0000)	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)		
Specialization (HHI)	-0.2745 (0.0468)	-0.2784 (0.0459)	-0.2194 (0.0750)	-0.2196 (0.0734)	3.5069 (0.0875)	3.4010 (0.0865)
Gain of power	0.2347 (0.0491)		0.2206 (0.0868)		0.7160 (0.0964)	
Gain of power X specialization	-0.2040 (0.1152)		-0.1214 (0.1864)		-1.4324 (0.2017)	
Gain of chair		0.1460 (0.0506)		0.2223 (0.0946)		0.2708 (0.1088)
Gain of chair X specialization		-0.4233 (0.1444)		-0.3372 (0.2350)		-0.7821 (0.2365)
Year fixed effects	Y	Y	Y	Y	Y	Y
Lobbyist fixed effects	Y	Y	Y	Y	Y	Y
N	10766	10766	10709	10709	10777	10777
Log likelihood	-23764.73	-23772.47	-14461.32	-14462.69	-	-
R squared	-	-	-	-	0.0105	0.0103

^a Standard errors reported in parentheses.

deviation lower level of specialization results in a 38-percentage-point increase in revenue from new issues. Together, the models in Table 6 imply higher levels of generalization permit higher returns from positive upstream relational capital shocks by leveraging these over a larger client base, and by extracting more revenue from new issues.

4.2 | Robustness checks: Alternative specifications and explanations

Our empirical design allows us to address several inference problems that typically threaten empirical identification. In particular, for reasons noted above, changes in upstream relational capital are reasonably exogenous. Given these changes are orthogonal to time-invariant characteristics of our focused sample of revolving door lobbyists, we are also able to hold relatively constant the upstream relational capital with which each lobbyist in our sample is endowed. A limitation of our study is we do not have a clean identification strategy for specialization. However, with the additional assumption that lobbyists cannot perfectly predict and adjust their specialization strategy to upstream relational capital shocks, we are able to exploit individual fixed effects to identify the interaction terms. In other words, if the timing of power changes for connected politicians is not correlated with the level of specialization of their former staffers, then the coefficient estimates for the interaction terms of our regressions should be unbiased. Although our empirical design quells many concerns related to reverse causality and omitted variable bias, we address several residual concerns below (see also a summary in Table 7). Given page constraints, we describe the results below and have the tables available in an online appendix.

4.2.1 | Alternative specifications and measures

Our main results are robust to alternative model specifications, including random effects and clustering of standard errors at the connected politician, lobbying firm, and lobbyist level. For the two main variables of interest, we already noted above our two alternate measures for upstream relational capital shocks. Turning to the level of specialization, as depicted in Figure 3, the distribution of the HHI is right-skewed with a bi-modal distribution. To address this issue, we create dummy variables for specialists with various cutoff points including the median (0.20) and mean value (0.30). Our results are robust to replacing the HHI with these dummy variables (see Table A2). Using the alternative measure also facilitates interpretation of effect sizes. In additional analyses with specialist dummy ($\text{HHI} > 0.20$), we find generalists experience 47.1% ($p < .001$) decrease in lobbying revenue after their connected politician lost a seat on a powerful committee. In contrast, specialists only suffer 7.5% ($p = .53$) of revenue at best, and this decline is *not* statistically significant at conventional levels of significance. For positive shocks, when their connected politicians start to serve on a powerful committee, generalists gain 38.3% ($p < .001$) while specialists gain only 19.6% ($p = .11$) in revenue.

4.2.2 | Career dynamics and the likelihood of becoming a generalist

There may be a trend for lobbyists to become more general as they age, and for their revenues to increase over their career lifecycle. If both of these trends exist, then it is possible that experience (or time) is an omitted variable that explains the negative relationship between specialization and revenue. Empirically, we find support for this conjecture—the mean level of specialization (HHI) does decrease over career age (see Figure 4). In our main analysis, we control for the number of years active in lobbying industry, which should account for linear effects of time. To further test whether our results are sensitive to differences in career age, we restrict our sample to older cohorts of lobbyists and find consistent results for the subset of lobbyists with greater than either mean or

TABLE 7 Alternative explanations and robustness checks

Alternative explanation	Concerns	Robustness checks
1. Career dynamics	<ul style="list-style-type: none"> Lobbyists' level of generalization increases over time. The result may be a reflection of such career dynamics. 	<ul style="list-style-type: none"> Results robust to a subsample analysis with observations in the later stage in each lobbyist's career (Table A3 M1–4). Results robust to HHI calculated only with the past three years of experience (Table A3 M5–8).
2. Firm effect	<ul style="list-style-type: none"> Individuals' level of specialization may be a function of their firms' strategic decisions. 	<ul style="list-style-type: none"> Results robust to firm fixed effects models (Table A4 M1–4). Results robust to controlling for firm's HHI (Table A4 M5–8). Results robust to a subsample analysis excluding in-house lobbyists (Table A5 M1–4).
3. Sampling bias and measurement error	<ul style="list-style-type: none"> Left-censoring of data on lobbying issues prior to 1998 leads to the miscalculation of the HHI. 	<ul style="list-style-type: none"> Results robust to a subsample analysis with lobbyists who are not left-censored (Table A5 M5–8).
4. Survivor bias	<ul style="list-style-type: none"> Right-censoring of lobbyists occurs because lobbyists whose revenue falls under a threshold do not appear in the data. 	<ul style="list-style-type: none"> Results robust to a subsample analysis with lobbyists who were active throughout the sample period (Table A6 M1–4). Results robust to an analysis with an imputed balanced panel for right-censored observations (Table A6 M5–8).
5. Confounding effects among shocks	<ul style="list-style-type: none"> Loss of power may be due to loss of connection. The effect of two negative shocks may be confounded. 	<ul style="list-style-type: none"> Results robust to analysis which controls for presence of other shocks (Table A7 M1–4). Results robust to lobbyists who are not affected by more than one shock (Table A7 M5–8).
6. Measurement error in HHI	<ul style="list-style-type: none"> Size of a lobbying revenue may bias the effect of HHI. Saliency of an issue should be controlled. 	<ul style="list-style-type: none"> Results robust to HHI measured in the counts of issues (Table A8 M1–4). Results robust to HHI inverse-weighted by the # of issues (Table A8 M5–8).
7. Differential effects of relational capital change by HHI	<ul style="list-style-type: none"> Correlation among issues may bias the interaction effect. Relational capital shocks may selectively impact individuals who are more generalized because issues covered by powerful committees are general issues. 	<ul style="list-style-type: none"> Results robust to HHI inverse-weighted by co-occurrence ratio for each issue (Table A9 M1–4). Results robust to HHI inverse-weighted by co-occurrence ratio of each issue with issues covered by the powerful committee (Table A9 M5–8).
8. Heterogeneity in the effect of events due to politicians	<ul style="list-style-type: none"> Difference between politicians who are affected by the events are not accounted for. If each politician experiences the event differently, the events will affect lobbyists differently. 	<ul style="list-style-type: none"> Results robust to politician fixed effects models (Table A10 M1–4). Results robust to a subsample analysis of lobbyists who are connected to the same politician affected by the shock (Table A10 M5–8).

median levels of experience (Table A3 Models 1–4). Additionally, we test our hypotheses using an alternative measure of HHI calculated only with the past three years of experiences. Our results remained unchanged (Table A3 Models 5–8).

4.2.3 | Firm effect and the likelihood of becoming a generalist

Lobbying firms may strategically assign lobbyists to projects or deals, implying the choice of one's level of specialization may not be the individual's alone. While a firm's strategic choice clearly matters, we expect it to be closely aligned with individual lobbyist's capabilities and choices. First, lobbying firms are small in size. The average number of lobbyists for each firm in a lobbying industry is 9.17, but the numbers are highly right-skewed. Additionally, lobbying firms have only 1.23 revolving door lobbyists on average, the focus of our analysis. More importantly, given employment

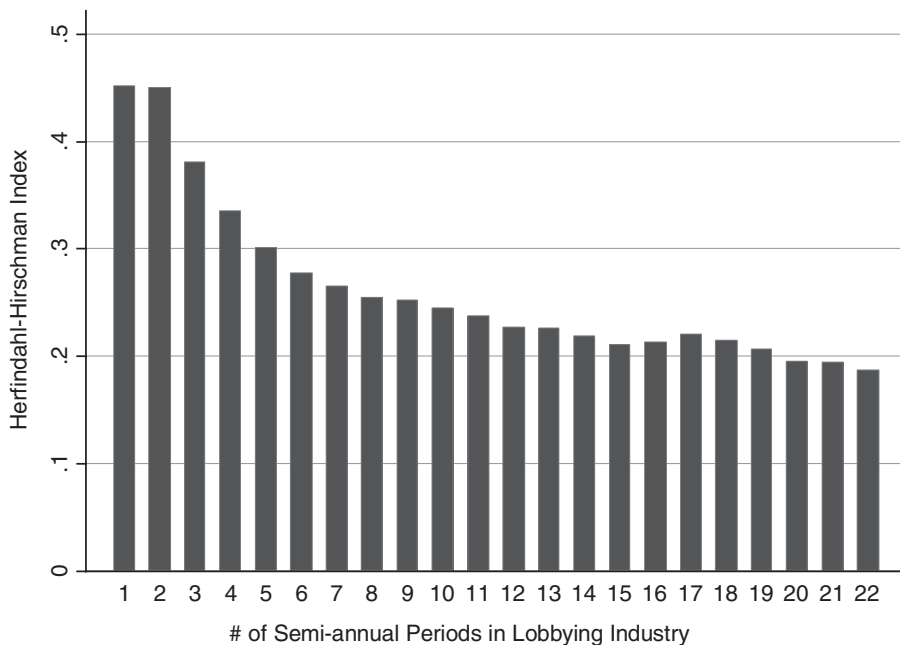


FIGURE 4 Mean level of specialization (Herfindahl-Hirschman Index) for tenure in lobbying industry

is an outcome of a two-sided matching process between firms and individuals, revolving door lobbyists with ready-to-be-leveraged political connections have both more job opportunities and greater bargaining power to align assignments to their capabilities. We already capture this sorting of lobbyists indirectly by including their cumulative number of jobs and tenure in the firm. We find consistent results for both the increases and decreases in upstream relational capital in an analysis with firm fixed effects (Table A4 Models 1–4). The results remain unchanged when we include HHI measured at the firm level to control for the firm’s level of specialization (Table A4 Models 5–8). Lastly, firm choices are particularly salient for in-house lobbyists, and our results are robust to excluding these individuals from the analysis (Table A5 Models 1–4).

4.2.4 | Sampling, survivor bias and measurement error

Our results are also robust to the inclusion of the larger sample of non-revolving door lobbyists. Further, we address the left-censoring limitation of our data for lobbyists whose careers commenced before 1998, when disclosure requirements became effective. This may impact our measurement of specialization, to the extent lobbyists tend to become generalists as their tenure increase. We note this would result in our undercounting the number of generalists, making our tests more conservative. However, to confirm left-censoring is not biasing the results, we dropped all left censored lobbyists (less than 20% of revolving door lobbyists) and found similar results (Table A5 Models 5–8).

Our sample is constructed using LDA lobbying disclosures which exempt lobbyists with less than \$3,000 in quarterly revenue. This may cause survivor bias, excluding lobbyists whose revenues fall below the threshold. We find no evidence the attrition is systematically associated with the level of specialization. Nonetheless, we address this concern in two ways. First, the analysis with a subsample of lobbyists who were active throughout the sample period yields similar results (Table A6 Models 1–4). Second, we create a balanced panel for lobbyists who exited the sample by imputing these observations with the values in the previous observations. Given all explanatory variables,

including HHI are cumulative, they stay the same for imputed observations, and we insert zero for the dependent variables. Our results remained relatively unchanged (Table A6 Models 5–8).

4.2.5 | Confounding effects of committee assignments and loss of connection

Another potential concern is the effect of upstream relational capital on performance is caused by confounding effects or simultaneous treatments. In particular, removal of a connected politician from a powerful committee (loss of power) may be a result of the politician exiting Congress (loss of connection). Although these changes are not theoretically distinct, we believe it worthwhile to empirically separate the two effects. To do so, we test the interaction effect between each relational capital measure and the HHI in the presence of other upstream relational capital measures as control variables. Our results are unchanged for all of the upstream relational capital variables (Table A7 Models 1–4). Second, we re-estimate each effect by using the subsample of lobbyists who were not affected by another upstream relational capital shock in the same direction. The results of this analysis were consistent with our main findings (Table A7 Models 5–8).

4.2.6 | Measurement errors in HHI

Concerns may also arise due to our measure of the issue-based HHI weighted by the dollar amount of each lobbying deal. First, measuring HHI with the size of a lobbying revenue may bias the coefficients because the average sizes of issues are different. To confirm this is not driving our results, we recalculated HHI in terms of issue counts instead of the dollar amounts recorded for each issue and find results unchanged (Table A8 Models 1–4). Second, the saliency of an issue due to the high demand may cause bias in calculating HHI. We measure HHI with an inverse weight by the total number of lobbying deals made for each issue in that period, so this measure captures the level of specialization regarding all 78 issues as having the same importance. Our results remained unchanged (Table A8 Models 5–8). Third, our issue-based measure of HHI is calculated under the assumption the 78 areas are orthogonal. However, if issues are correlated with one another, our HHI measure will be deflated. More importantly, correlations between issues covered by the powerful committee and other issues may bias our coefficients because our research design requires that changes in relational capital not selectively impact lobbyists based on their level of specialization (See Table 1). To address this issue, we account for the co-occurrence patterns among the issues. An issue has a high co-occurrence ratio if the issue is lobbied more with other issues than by itself. Our results are robust to the HHI measure inverse-weighted by co-occurrence ratio (Table A9 Models 1–4) and to the HHI measure inversely-weighted by co-occurrence ratio of each issue with issues covered by the powerful committee (Table A9 Models 5–8).

4.2.7 | Heterogeneity in the effect of events due to politicians

Lastly, the effect of committee assignment events on lobbyists may be heterogeneous due to politician characteristics. To test the sensitivity of the results, we conduct the two following robustness checks. First, we run an analysis with politician fixed effects, and the results remain consistent (Table A10 Models 1–4). Second, we control for the potential politician effects by creating a stringent matched sample of relative generalists and specialists connected to the same politician. Out of 402 politicians in the sample, 190 politicians have more than two ex-staffer lobbyists connected to them. Running a politician fixed effect model with this matched sample allows us to compare the effect of relational capital changes between lobbyists of varying levels of specialization who are connected to the same politician. Our results remained relatively unchanged (Table A10 Models 5–8).

5 | DISCUSSION AND CONCLUSION

Specialization and relational capital contribute to both individual and firm outcomes (Burt, 1992; Coleman, 1990; Gompers, Kovner, & Lerner, 2009; Mawdsley & Somaya, 2016). Specialization has been a key variable of interest, with scholars finding evidence for performance benefits in both specialization (Castanias & Helfat, 1991; Leung, 2014; Zuckerman et al., 2003) and generalization (Crémer et al., 2007; Custódio et al., 2013; Murphy & Zábojník, 2004), and for factors that may moderate these relationships (Castanias & Helfat, 2001; Merluzzi & Phillips, 2016; Murphy & Zábojník, 2004; Zuckerman et al., 2003). The performance benefits of relational capital are generally positive. While scholars have noted benefits may stem from both upstream and downstream relations, they have not examined concurrent effects for the focal actor. Within this robust literature, our study contributes theoretically by investigating an unaddressed issue: how might specialization and upstream relational capital interact to affect performance outcomes? To address this issue, we theorized individuals with different levels of specialization are impacted differently by positive and negative changes to their upstream relational capital. Integrating insights from human capital, career specialization, and relational/social capital literature, we posited specialization is an advantage in the face of decreases in upstream relational capital because specialization creates more domain expertise and deeper embeddedness in downstream relationships. However, specialization is not wholly advantageous. Individuals with higher levels of generalization are able to gain more from increases in upstream relational capital because of their diverse knowledge which is applied to broad downstream networks. We find support for both propositions in the U.S. lobbying industry, where we can finely measure each lobbyist's level of specialization based on the issues for which they lobby. Furthermore, the setting allows us to exploit exogenous changes in the power of politicians to identify the causal effects of upstream relational capital. Finally, a battery of additional analyses and robustness tests allows us to investigate the factors behind our main findings, and rule out many alternative explanations.

Several limitations of our study are worthy of discussion, and present avenues for future research. We focus on professional services because firms and individuals in these industries provide and capture value chiefly through their investments in career specialization and relational capital. The lobbying industry, in particular, afforded us a reasonable research design, but this single industry study raises questions regarding generalizability. We believe our theory applies to most contexts, like professional services, where decision makers invest in their own human capital, and in upstream and downstream relations. Given the service sector accounts for almost half of the U.S. GDP and is more than twice the size of the manufacturing sector (Bureau of Economic Analysis, 2008), our study sheds light on important dynamics associated with superior performance in these contexts. However, more studies are needed to ascertain generalizability to other contexts.

Second, given our research design's ability to leverage exogenous changes to *resource access* through upstream relational capital, we theorize about the effects of changes in upstream relational capital, though we also incorporate downstream relational capital as a potential factor enhancing or buffering these effects. As described in detail in the empirical design, we examine the impact on lobbyists with prior employment connections to politicians when these politicians gain or lose power in Congress. Thus, the upstream relational capital we examine relates to the ability to deliver positive outcomes to clients, by leveraging upstream relational capital with politicians *as a resource*. We believe this to be a feature of our study, given the lack of research on exogenous changes to upstream relational capital. Our study complements work that has focused on client ties as downstream relational capital (Bermiss & Greenbaum, 2015; Carnahan & Somaya, 2013; Somaya et al.,

2008), and work on team relationships, which represent an endogenous and strategic interplay between human and relational capital (Agarwal et al., 2016). Further, we hypothesized the relative effects of decreases (increases) of upstream relation capital, conditional on experiencing such an event. We do not address whether the level of specialization may make it more likely to experience such an event, and leave it to future research to investigate this possibility.

Finally, we theorized and measured our main variables of interest at the individual level, based on the premise that both knowledge and relational capital are attributes of the individual rather than the firm. Three limitations arise when extending our findings for strategic human capital implications at the firm level. One, while we controlled for firm-level factors, the potential interactions between individual and firm-level strategies are beyond the study's scope (Cooper & Gubler, 2015; Karim & Williams, 2012). Two, the implications for firm-level performance rest on the critical assumption that there is a close correspondence between individual and firm-level effects. Three, within our context, the same individual developed relational capital both downstream (organizations with lobbying needs) and upstream (politicians). While it is not uncommon for a single individual to occupy a brokerage position in many professional services contexts, firms often separate these duties. Other studies are required to test whether similar mechanisms are at work at other levels of analysis (e.g., business unit and firm levels). Future research may investigate how firms strategically create teams of varying specialization, create a portfolio of generalists and specialists, and take advantage of benefits of career specialization and generalization residing *across* individuals (Cooper & Gubler, 2015). Doing so will enhance our theoretical knowledge of factors that condition both individual level performance effects, the one-to-one correspondence between individual and firm-level performance, and thus, the interplay between human capital and strategic human capital perspectives (Nyberg & Wright, 2015).

The above limitations notwithstanding, our study contributes to both human capital and strategic human capital perspectives (Campbell, Coff, & Kryscynski, 2012; Coff, 1997; Mawdsley & Somaya, 2016). Investments in expertise/skills and relationships are key to performance, but there has been limited attention to their interplay. By integrating insights from the related literatures on career specialization and relational capital, we enrich theoretical understanding of causal mechanisms by focusing on not just main effects, but also the interactions. In doing so, we move beyond debates regarding the dominance of "what you know" vs. "who you know" (Bertrand et al., 2014; Hoetker, 2005), to illuminate the contingency role of knowledge breadth vs. depth on performance effects of changes in relational capital. For example, we show specialization is not only a strategic asset in itself, but it can also be used to insulate from reductions in relational assets. Our research design contributes empirically by disentangling specialization and relational capital and increasing the strengths of causal inferences in the hypothesized relationships.

Within the relational capital literature, scholars have studied performance effects of downstream relational capital (Bermiss & Greenbaum, 2015; Carnahan & Somaya, 2013; Somaya et al., 2008) and endogenous team relationships among employees as upstream relational capital (Agarwal et al., 2016; Ganco, 2013), but there is limited attention to other upstream relational capital measures. This is in spite of related work on buyer–supplier relational capital (Dwyer et al., 1987; Dyer & Singh, 1998; Groysberg et al., 2008; Mayer, Somaya, & Williamson, 2012). Our research ties together isolated examinations of upstream and downstream relational capital, by showing how a focal actor may benefit from ties in either direction. Changes in upstream relational capital may create resource shocks, and downstream relational capital and specialization may ameliorate *and* exacerbate the resultant performance effects.

We also contribute to the related literature on career specialization (Castanias & Helfat, 1991; Custódio et al., 2013; Ferguson & Hasan, 2013; Lazear, 2004; Merluzzi & Phillips, 2016; Zuckerman et al., 2003). The findings on career specialization have been mixed (Padgett & Ansell, 1993; Zuckerman et al., 2003). Some studies have found apparent benefits to specialization that stem from greater expertise (Becker, 1962; Rosen, 1972) and clearer identities (Zuckerman et al., 2003). Others have argued the “robust identities” resulting from generalist strategies offer individuals more freedom to react to changing environments (Padgett & Ansell, 1993). In addition to the human capital insights above that may interest career specialization scholars, our study has specific contributions to this literature stream by showing specialization not only creates differences in knowledge and identities but also in the ability to react to changes in their upstream relational capital. Further, our results suggest “dynamic environments” are not homogenous (Hannan & Freeman, 1977; Uzzi, 1997). We find the benefits and costs of greater levels of specialization are dependent on the direction of dynamism. Interestingly, our results do not align with a general prediction of organizational ecology that predicts generalists are more secure in dynamic environments (Hannan & Freeman, 1977), and in doing so, offers a boundary condition to the security of generalist strategies.

The practical implications of our study are twofold. At the individual level, our study provides insights on what conditions advantage specialists versus generalists. Knowing these interactions will prepare each type of individual to understand when they can reap performance benefits, and when they should bolster against adversities, due to changes in the value of their upstream relational capital. Individuals who are particularly risk averse may be well advised to specialize because this will limit the downside (as well as upside) consequences of changes to the value of their relational capital. On the other hand, risk-seeking individuals may prefer to generalize. Further, individuals with strong connections to upwardly mobile others may prefer to generalize, so they are better positioned to leverage the value of their connections when, and if, they ascend to powerful positions. At the firm level, our study suggests managers should not universally prefer specialists or generalist employees. In addition to the often discussed need to create complementarities between breadth and depth of knowledge, such “portfolio strategies” also enhance their ability to reduce the risks from losses of upstream relational capital, while enjoying performance benefits from gains of upstream relational capital.

In summary, this study explores how positive and negative changes in upstream relational capital differentially affects individuals based on their level of specialization. More specialized individuals are buffered following a decrease in their upstream relational capital because of their domain expertise and downstream embeddedness. On the other hand, more generalized individuals benefit to a greater degree after an increase in their upstream relational capital because their broader knowledge scope and networks allow for greater deployment of their upstream relational capital, leading to higher revenues and more client ties. Thus, our study sheds new light on the roles of specialization and relational capital and suggests these interact for important implications for career outcomes and firm strategies.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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