

MICRO-FOUNDATIONS OF FIRM-SPECIFIC HUMAN CAPITAL: WHEN DO EMPLOYEES PERCEIVE THEIR SKILLS TO BE FIRM-SPECIFIC?

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Drawing on human capital theory, strategy scholars have emphasized firm-specific human capital as a source of sustained competitive advantage. In this study, we begin to unpack the micro-foundations of firm-specific human capital by theoretically and empirically exploring when employees perceive their skills to be firm-specific. We first develop theoretical arguments and hypotheses based on the extant strategy literature, which implicitly assumes information efficiency and unbiased perceptions of firm-specificity. We then relax these assumptions and develop alternative hypotheses rooted in the cognitive psychology literature, which highlights biases in human judgment. We test our hypotheses using two data sources from Korea and the United States. Surprisingly, our results support the hypotheses based on cognitive bias—a stark contrast to expectations embedded within the strategy literature. Specifically, we find organizational commitment and, to some extent, tenure are negatively related to employee perceptions of the firm-specificity. We also find that employer-provided on-the-job training is unrelated to perceived firm-specificity. These results suggest that firm-specific human capital, as perceived by employees, may drive behavior in ways unanticipated by existing theory—for example, with respect to investments in skills or turnover decisions. This, in turn, may challenge the assumed relationship between firm-specific human capital and sustained competitive advantage. More broadly, our findings may suggest a need to reconsider other theories, such as transaction cost economics, that draw heavily on firm-specificity and implicitly assume widely shared and unbiased perceptions.

Drawing on human capital theory, strategy scholars often emphasize the importance of firm-specific human capital (FSHC) for creating and sustaining competitive advantage (Chadwick &

Dabu, 2009; Hatch & Dyer, 2004; Kor, 2003; Mayer, Somaya, & Williamson, 2012; Wang, He, & Mahoney, 2009). In theory, firm-specific skills (less valuable externally) create a gap between employees' value in their current job and their next best alternative. Such gains are assumed to be shared between employees and firms and hinder mobility as other firms would offer lower wages (Becker, 1964). Hence, FSHC reflects essential knowledge that sustains advantages and allows firms to appropriate some of the value created (Coff, 1997).

However, this logic requires labor markets to be informationally efficient in that actors have unbiased estimates of general human capital and FSHC (Campbell, Coff, & Kryscynski, 2012; Coff & Raffiee, 2015). It is assumed that “firms and individuals *do* understand how much firm-specific human capital they possess” (Groysberg, 2010:

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328; emphasis in original).¹ This reflects an *asymptotic asymmetry* problem in the strategy literature (Foss & Hallberg, 2014) as resource-based theory often presumes incomplete information (Mahoney & Pandian, 1992).

When we allow for such market imperfections, perceptions of firm-specificity become a central issue and it is unclear whether they would align with theoretical sources of these skills such as tenure or on-the-job training (Crook, Todd, Combs, Woehr, & Ketchen Jr., 2011; Hatch & Dyer, 2004). Thus, despite being a key construct, we know little about when employees actually perceive their skills to be firm-specific. This is a critical gap since employee perceptions ultimately drive behaviors (Adams, 1963; Vroom, 1964) such as turnover or investments in skills. Extant theory assumes that employees avoid firm-specific investments so their mobility is not limited (cf. Coff & Raffiee, 2015; Kruscynski & Ulrich, 2015) but this may not be the case if employee perceptions are based on imperfect information.

This paper marks a critical foray into the micro-foundations of FSHC by theoretically and empirically exploring employee perceptions (Barney & Felin, 2013; Felin & Foss, 2009). Given the paucity of research in this area, we begin with hypotheses that follow logic from extant strategy research (i.e., labor markets are informationally efficient). Thus, extant literature leads us to expect that employee perceptions of firm-specificity will be positively related to organizational tenure, on-the-job training, and organizational commitment.

We then relax the efficiency assumptions and draw on the cognitive psychology literature to develop a theory of employee *perceptions* of firm-specificity under imperfect information. Such perceptions may be subject to many cognitive biases, leading to predictions in stark contrast to extant strategy theory. We use two large samples collected in two countries (Korea and the U.S.), where employees reported the extent to which they believed their skills to be firm-specific. These data are uniquely suited to address this question and our use of two independent samples strengthens the validity and reliability of our findings (Goldfarb & King, 2016).

Surprisingly, our findings largely support hypotheses drawn from the cognitive psychology literature.

Specifically, we find evidence that organizational commitment and tenure are negatively related to employee perceptions of firm-specificity while on-the-job training is unrelated to perceived firm-specificity. These results contradict existing strategy theory and may challenge the assumed role of FSHC as a source of sustained competitive advantage. This study underscores the need for research on how employee perceptions differ from those of other actors as well as how perceptions may drive behavior. For example, there may be a need to reconsider other theories, such as transaction cost economics, that make strong, yet untested, assumptions about perceptions of firm-specificity.

THEORY AND HYPOTHESES

The Importance of Firm-Specific Human Capital (FSHC)

Many scholars have argued that resources and capabilities may take the form of FSHC (Coff, 1997; Hatch & Dyer, 2004; Kor & Leblebici, 2005)—knowledge, skills, and abilities that have limited value outside of a given firm. There are three reasons that FSHC is central to the resource-based view. First, a firm's unique capabilities typically require valuable and rare idiosyncratic knowledge (Barney, 1991)—firm heterogeneity often demands FSHC.

Second, FSHC functions as an isolating mechanism (Lippman & Rumelt, 1982). Human capital can only serve as a source of *sustained* advantage if rivals are unable to acquire or imitate the resource. Since FSHC is less valuable to other firms, it is thought to be promising as an ex-post limit to resource mobility (Peteraf, 1993). This assumption is drawn from the classic human capital literature (Becker, 1964; Glick & Feuer, 1984; Hashimoto, 1981; Jovanovic, 1979; Parsons, 1972). That is, FSHC will create a gap between the value of workers' skills in the focal firm and their value to other employers, resulting in a pay cut should workers decide to move. Conversely, because general human capital is highly transferable, workers with such skills can switch employers more easily without enduring a wage penalty.²

¹ This is part of a larger set of assumptions about labor market efficiency (e.g., wages are tightly coupled with productivity, value of general human capital is constant across firms, employees are motivated primarily by monetary incentives) (see Campbell et al., 2012).

² Here we use the term *general human capital* to refer to human capital that is not specific to a firm. This includes industry-specific human capital since that is valuable to rivals and thus subject to competitive pricing. This logic also assumes that the use-value of general human capital is homogeneous across firms (Campbell et al., 2012).

The third reason FSHC is critical to resource-based theory revolves around rent appropriation from human capital (Coff, 1999). The gap in the value of FSHC means that the focal firm may be able to retain employees with FSHC for less than their value in use. That is, employees' next best offer would be lower and the firm could beat external offers and still capture some of the value created. For example, Bidwell (2011) found that, while external hires tended to have relatively stronger signals of general human capital (e.g., education) and were paid significantly more, lower paid internal hires (with FSHC) tended to be more productive on average.

Increasingly the strategy literature has explored the dilemma that workers may be reluctant to invest in FSHC (Wang et al., 2009; Wang & Wong, 2012). For example, employees may be vulnerable to a "hold-up" problem (Wang et al., 2009; Williamson, 1975) where employers act opportunistically, perhaps by lowering wages or benefits, once the investment is made (Kessler & Lulfesmann, 2006). Here the only alternative for dissatisfied employees might be to accept even lower wages elsewhere. Employees may also be reluctant to invest in FSHC if they have concerns that their firm may fail, rendering their investments in FSHC useless. Indeed, this dilemma is thought to be quite significant, prompting the use of governance safeguards to alleviate hold-up concerns (Mahoney & Kor, 2015) or even driving costly corporate diversification so that FSHC can be redeployed in different divisions (Wang & Barney, 2006).

Perceptions of FSHC: Expectations from extant strategy theory. While the logic presented above is largely taken for granted in the strategy literature, it requires several strong implicit assumptions (Campbell et al., 2012; Groysberg, 2010). Most importantly, labor markets must be informationally efficient so perceptions of human capital are unbiased (Coff & Raffiee, 2015). While perfect information is not essential, firms and workers must be adept at assessing what skills are transferrable to set appropriate wages and so workers can decide what skills to acquire. This condition is essential for FSHC to limit worker mobility and drive their reluctance to invest in FSHC. The coarse signals that employers rely on, like years of schooling, are observable and seem to meet this criterion. However, these do not capture substantial individual variation within similar years of schooling or tacit knowledge such as industry recipes (Spender, 1989) that is general but hard to observe.

The following hypotheses reflect strong (unbiased) information efficiency inherent in the strategy

literature. As such, we begin by assuming perceptions are aligned with objective FSHC.

Organizational Tenure and FSHC

Given the belief that FSHC hinders employee mobility, it is understandable why tenure at a firm is often used as a proxy for firm-specificity (Crook et al., 2011). Common examples of FSHC include tacit knowledge (Polanyi, 1962) that focuses on idiosyncratic organizational routines (Grant, 1996), a firm's culture (Wang, Barney, & Reuer, 2003), or an organization's physical or social landscape (Lazear, 2009). The accumulation of such skills is generally assumed to occur over time. Bidwell (2011) used this logic to predict that external hires will have lower initial performance than internal hires—experience can be more valuable within a specific firm than it is across firms. Similarly, studies have found that individuals tend to suffer a decline in performance upon moving to other workplaces (Campbell, Saxton, & Banerjee, 2014; Groysberg & Lee, 2009; Groysberg, Lee, & Nanda, 2008; Huckman & Pisano, 2006).

In this sense, FSHC might be viewed not so much as an investment decision but rather as a byproduct of prolonged tenure within a firm. Regardless of the nature of the decision, assuming informational efficiency, workers should perceive that FSHC increases with tenure in the firm.

Hypothesis 1a. Organizational tenure will be positively related to employee perceptions of firm-specific human capital (FSHC).

Employer-Provided On-the-Job Training (OJT) and FSHC

Similarly, employer-provided training has been used as a proxy for FSHC (e.g., Hatch & Dyer, 2004). While training that takes place outside of the firm (e.g., formal education) is assumed to be more general, internal training—particularly on-the-job training (OJT) provided by the employer—is assumed to be *relatively* more firm-specific (Hatch & Dyer, 2004; Lepak & Snell, 1999; Lynch, 1991). For example, arguing that firm-specific assets are needed to sustain advantages, Dierickx and Cool (1989: 1505) note: "Generic labor is rented in the market; firm-specific skills, knowledge, and values are accumulated through on the job learning and training." While such training often includes general skills as well, it is a common way for workers to acquire FSHC. Indeed, OJT may be especially useful for learning firm-specific policies/procedures/

routines, the organizational culture, and how to perform idiosyncratic jobs. Thus, while not all aspects of OJT are firm-specific, relatively more of this knowledge will be firm-specific than would be the case for other types of training. Again, given informational efficiency, this should be reflected in worker perceptions.

Hypothesis 2a. Employer-provided on-the-job training (OJT) will be positively related to employee perceptions of firm-specific human capital (FSHC).

Organizational Commitment and FSHC

Drawing on transaction cost economics (TCE) and human capital theory, it is assumed that employees are reluctant to make firm-specific investments (Mahoney & Kor, 2015). Williamson (1975) suggested that firm-specific investments expose employees to the potential for opportunistic behavior or “hold-up” once the investments are made. Accordingly, workers with FSHC may face personal risk if the firm fails, if their position is eliminated, or if the firm decides to appropriate additional value after FSHC is acquired (Wang et al., 2003; Wang & Barney, 2006). Importantly, this logic requires informational efficiency in that employees must know which skills are firm-specific in order to avoid such investments (Coff & Raffiee, 2015).

Wang et al. (2009) argued that firms could alleviate hold-up concerns and encourage employees to invest by signaling credible commitment to shared governance mechanisms that build trust (employee stock ownership, relational governance, etc.). These would engender greater employee affective commitment commensurate with enhanced commitment on the part of the firm (Klein, 1987). Put another way, part of the psychological contract would be that both employees and the firm would exhibit greater commitment (Brickson, 2005; Rousseau, 1995).

Independent of trust-based governance mechanisms, there may be a sorting effect where employees who decide to invest in FSHC are systematically more committed. Accordingly, for committed workers who do not plan to leave, the threat of hold-up or potential wage penalty in the case of mobility may be less salient. In contrast, less committed employees may be reluctant to forego investments in general skills to build FSHC and may choose to exit. Again, this logic suggests that as organizational commitment increases, so would investments in FSHC. Thus, assuming informational efficiency, this should be reflected in employee perceptions:

Hypothesis 3a. Organizational commitment will be positively related to employee perceptions of firm-specific human capital (FSHC).

In sum, the extant strategy literature leads us to expect organizational tenure, OJT, and organizational commitment to be *positively* related with workers’ perceived FSHC.

Perceptions of FSHC: A cognitive psychology perspective.³ In this section, we relax the assumptions embedded within the strategy literature regarding FSHC and consider more deeply the cognitive process associated with the formation of subjective evaluations. As we shall see, by doing so we derive predictions regarding perceived FSHC that starkly contrast with those generated from the extant strategy literature.

First, we relax the assumption of informational efficiency. Not surprisingly, this assumption has been relaxed in many prominent labor economics theories (e.g., Spence, 1973) and market frictions play a crucial role in the broader strategy literature (Barney, 1991; Leiblein, 2011; Mahoney & Pandian, 1992; Mahoney & Qian, 2013). Thus, the fact that informational efficiency remains an underlying assumption regarding FSHC is a salient example of asymmetric assumptions within the strategy literature (Foss & Hallberg, 2014).

Second, we relax the assumption that assessments of firm-specificity are unbiased. Indeed, the fact that actors are subject to cognitive biases has been long recognized by strategy researchers (Barnes, 1984; Powell, Lovallo, & Fox, 2011; Schwenk, 1984), yet the notion that employees and firms make unbiased assessments regarding FSHC has remained a key implicit assumption.⁴ Relaxing this assumption allows perceptions of firm-specificity to vary among actors even if the quantity and quality of information is homogeneous (e.g., Kahneman, Slovic, & Tversky, 1982; Mather, Shafir, & Johnson, 2000). This, in turn,

³ We wish to be forthcoming that, given deeply entrenched assumptions of information efficiency regarding FSHC in the strategy literature, these hypotheses were not developed ex-ante. However, once it was apparent that perceptions did not follow expected patterns, we developed the theoretical explanations posed in this section.

⁴ Interestingly, Wang and Wong (2012) have argued that, when managers exhibit the bias of escalation of commitment toward risky projects, it increases employee incentives to invest in FSHC. However, we are unaware of research that has investigated how or if cognitive biases influence employee perceptions of firm-specificity itself.

allows us to develop a theory of *perceived* FSHC, even if such perceptions are inaccurate.

Ex-Ante Versus Ex-Post Perceptions of FSHC

Importantly, when we relax these assumptions, we must differentiate between perceptions of FSHC ex-ante and ex-post investment. That is, if perceptions of FSHC are subjective, an employee may perceive a skill's specificity one way prior to making the investment (i.e., ex-ante evaluation) and another way afterward (i.e., ex-post evaluation). This distinction is not relevant in the existing strategy literature because subjective and objective FSHC are assumed to be tightly coupled (Campbell et al., 2012). Thus, we suggest that an employee may invest in what she initially perceives to be general (firm-specific) skills and later perceive those same skills to be firm-specific (general). This would not be possible in the context of perfect information.

In this study, we develop a theory to explain employee perceptions of FSHC ex-post investment. However, our arguments underscore the need for future research exploring the drivers of ex-ante perceptions as well as an examination of conditions under which ex-ante and ex-post perceptions are most likely to have meaningful differences.

Organizational Tenure and FSHC

Several potential sources of cognitive bias lead us to expect a negative relationship between tenure and perceived firm-specificity—even if actual objective specificity were increasing over time. As discussed, extant theory assumes that employees are reluctant, ex-ante, to invest in FSHC (Mahoney & Kor, 2015). However, the fact that employees should prefer *not* to make firm-specific investments ex-ante has important implications for how they are likely to perceive the specificity of their skills, ex-post. Since our study explores ex-post perceptions, it seems plausible that employees may question their earlier decisions to acquire FSHC. Upon reflection, they may regret prior investment decisions if they feel they resulted in firm-specific knowledge or skills that are not strongly valued in the labor market.

Festinger's (1957) theory of cognitive dissonance suggests that humans strive to maintain internal consistency, and, when faced with inconsistency, seek to resolve it by modifying behaviors or altering beliefs. If longer tenured employees develop more firm-specific skills then they will likely experience increasing psychological discomfort and inconsistency given their

inherent preference to develop general skills. However, employees cannot modify past behavior regarding such investments. As a result, cognitive dissonance theory suggests that employees may achieve internal consistency by modifying their beliefs regarding what constitutes firm-specificity (Festinger, 1957). In this sense, even if longer tenured employees have developed a large share of firm-specific skills they may ignore this information or modify their beliefs regarding firm-specificity, leading toward a bias to perceive their skill portfolio as being relatively more general than firm-specific.

Choice supportive bias offers similar logic in that individuals seek to view past behaviors in a positive light, and, as a result, overstate positive aspects of past behavior while underestimating or ignoring negative aspects (Mather et al., 2000). This is highly relevant when employees assess the firm-specificity of their skills since most skills have both specific and general components. That is, skills are best reflected on a continuum between specific and general rather than being purely one or the other (Becker, 1964). In addition, a person's portfolio of skills may include a mixture of such varied skills (Lazear, 2009). Thus, in an effort to minimize regret and maximize satisfaction with past choices, choice supportive bias suggests that when employees retrospectively assess the firm-specificity of their skill portfolio, they will overstate the general components (even if they are marginal) while downplaying or ignoring firm-specific components (even if they are substantial) (Mather et al., 2000). This leads to a systematic bias where employees will perceive their skill portfolio as relatively more general even if it is quite firm-specific.⁵

Employees' ex-post evaluations of their skills are also likely to be subject to errors in retrospective accounts or recall bias (e.g., Golden, 1992, 1997). Such errors in reporting past actions from memory

⁵ Similarly, the literature on self-enhancement and superiority bias suggests that individuals tend to exhibit a tendency to describe themselves more positively than a strictly normative criteria would suggest (Brown, 1986; Krueger, 1998). Likewise, as with choice supportive bias, theories of positive illusions suggest that individuals disregard negative information to create a positive illusion that all is well (Taylor, 1989; Taylor & Brown, 1988). Again, assuming employees prefer to develop general skills, these cognitive biases would suggest that employee reports of FSHC may overestimate the degree to which their skills are comprised of general human capital. Importantly, if tenure marks an increase in actual FSHC, it may increasingly trigger these biases.

may bias longer tenured employees to report their skills as being more general, in part because ex-post assessments are influenced by the availability bias (Kahneman et al., 1982; Tversky & Kahneman, 1973, 1974). That is, people estimate frequencies based on the ease at which instances can be recalled from memory (Tversky & Kahneman, 1973). FSHC may be systematically harder to recall than general skills since FSHC is often hard to observe (Prendergast, 1993). Indeed, Groysberg (2010: 328–329) noted that firm-specific skills have become increasingly “soft” (e.g., relationships) as opposed to “hard” (e.g., computer proficiency). Softer skills may tend to be more tacit and are thus hard to convey, unconscious, and often taken for granted. Thus, when employees assess specificity, examples of harder general skills may be more salient and easier to recall from memory than softer firm-specific skills. This, in turn, may bias employees toward overestimating the degree to which their skills are general.

The availability bias may be even more impactful for long tenured employees since they will tend to have more examples of general skills to recall. In addition, the effect of the availability bias may be exacerbated for FSHC that was acquired early in an employee’s tenure (e.g., organizational socialization, learning basic routines, etc.). In this case, not only are firm-specific skills less likely to be accessible due to their vague nature, but also because they may have been developed earlier in the employee’s tenure.⁶ Again, the increased ease of recall (Tversky & Kahneman, 1973) suggests that longer tenured workers may systematically overestimate the transferability of their skills.

Finally, longer tenured employees may be prone to the false consensus bias (Loewenstein, O’Donoghue, & Rabin, 2003) in that, the longer they are with a particular company the more they may assume that other firms operate in similar ways. Given the context of imperfect information, when employees do not know how other employers operate, they may fill in information gaps with what they know from their current employer. This would lead longer tenured employees to overestimate how general their skills are.

Taken together, these arguments suggest that, ex-post investment, longer tenured employees may be

systematically biased to perceive their human capital portfolios as more general.⁷ Thus:

Hypothesis 1b. Organizational tenure will be negatively related to employee perceptions of firm-specific human capital (FSHC).

Employer-Provided On-the-Job Training (OJT) and FSHC

Similar arguments can be made for employer-provided OJT and perceived FSHC. Again, the starting point is that employees typically prefer general to firm-specific skills. Like tenure, this preference may bias workers who have completed OJT to perceive the resulting skills as largely transferable. This may be due to cognitive dissonance where employees modify their beliefs about what constitutes firm-specificity (Festinger, 1957) or choice supportive bias where employees overemphasize training that is generally applicable while underestimating firm-specific training (Mather & Johnson, 2000; Mather et al., 2000). Thus, even if employees receive highly firm-specific OJT, they may alter their beliefs to conclude that the skills are firm-specific (e.g., “other firms will value knowledge of my firm’s proprietary products”) or emphasize the general components. This is important because, even if OJT is heavily firm-specific (Lynch, 1991), at least some of the training will be more general, and, again, choice supportive bias suggests that employees will overstate such content when assessing the firm-specificity of OJT.

Recall bias may also influence employees who receive OJT to perceive their skill portfolio as more general (Kahneman et al., 1982; Tversky & Kahneman, 1973, 1974). As described above, OJT may enhance both the softer firm-specific skills and harder general skills. However, softer skills (like getting along with team members) are harder to observe and may be less salient than harder, more general, skills (like how to make a sales call). As such, when assessing specificity, workers may first recall sessions of OJT and then recall the harder (general) skills learned in such training. As a result, employees who receive more OJT may be biased toward perceiving their skill portfolio as more general. Similarly, if cognitive dissonance steers perceptions of OJT

⁶ Contrary to assumptions in the literature, FSHC may be developed more heavily early in an employee’s tenure (socialization, learning basic routines, etc.). We explore this possibility further in the discussion section.

⁷ The biases we describe above are not exhaustive. Indeed, if employees prefer general skills, then other biases (e.g., egocentric bias [Ross & Sicoly, 1979], confirmation bias [Nickerson, 1998]) lead to similar predictions.

toward transferability (Festinger, 1957), or general components of OJT are overemphasized (Mather & Johnson, 2000; Mather et al., 2000), then this will exacerbate the effect of recall bias on workers who receive OJT toward perceiving their skills as largely general even if the training was heavily firm-specific.

Together, these arguments suggest that, ex-post investment, workers with more OJT will be systematically biased to perceive their human capital portfolio as more general. Thus:

Hypothesis 2b. Employer-provided on-the-job training (OJT) will be negatively related to employee perceptions of firm-specific human capital (FSHC).

Organizational Commitment and FSHC

There are many reasons to believe that perceived FSHC might be negatively related to organizational commitment. First, we must recognize that *affective* organizational commitment goes beyond intentions to stay at the firm—it reflects a positive attitude toward shared objectives (Gardner, Wright, & Moynihan, 2011). Thus, a dissatisfied worker who feels stuck at a firm (few alternatives), but chooses not to exit, would tend to report lower affective organizational commitment (Crossley, Bennett, Jex, & Burnfield, 2007).

Based on our earlier logic, it seems likely that, if employees perceive their skills to be largely firm-specific, they may feel frustrated by prior decisions that brought them to that point. In addition to feeling exasperated by their own decisions, they may also feel tricked or betrayed by the firm to acquire skills that are not valued externally. These feelings are anticipated in the literature as reasons why workers are reluctant to invest in FSHC (Wang et al., 2009; Wang & Barney, 2006; Wang & Lim, 2008). As a result, one might expect these workers to report lower affective commitment to the organization, ex-post.

Causality may also run the other way. Uncommitted workers may be prone to report that their skills are firm-specific because they feel stuck. Under this logic, an employee's skills may not actually be firm-specific, but uncommitted and dissatisfied employees may believe that their skills are not valuable to other firms. That is, rather than being dissatisfied with their prior investments in FSHC, employees' perceptions of firm-specificity may be an outcome of reduced organizational commitment. In this sense, the perceived firm-specificity could be a manifestation of dissatisfaction as opposed to actual firm-specific skills.

Looking at it from the other side, committed employees may view their skills as more general—even if this is not the case. Committed employees tend to hold their jobs and firms in high regard and exhibit little intention to exit (Mathieu & Zajac, 1990). This positive affective orientation may influence other evaluations (Reibstein, Lovelock, & Dobson, 1980), including perceived firm-specificity. For example, committed employees may be more likely to believe their knowledge and skills are valuable in general (e.g., “I love this company and we do important stuff”). This, in turn, may lead them to think other firms share their beliefs due to the false consensus and projection bias—the assumption that others share one's own attitudes and beliefs (Loewenstein et al., 2003; Ross, Greene, & House, 1977). Indeed, this is consistent with research on depressive realism, which suggests that depressed individuals often have more realistic perceptions of reality (Alloy & Abramson, 1979), while happy people are often subject to optimistic biases (Abrahamson, Alloy, & Metalsky, 1988). Thus, committed employees may have biased perceptions of specificity in that they optimistically believe their skills are widely valued, even if they are not.

It is also possible that, when employees perceive that they are developing general skills within their firm, it leads to greater affective organizational commitment (Gardner et al., 2011). While this may sound counter-intuitive given that general human capital should make workers more mobile, Galunic and Anderson (2000) argued that firms invest in employees' general human capital as part of a psychological contract to engender employee commitment. Stated differently, when employees perceive skills they have developed within a firm are valued elsewhere, it elicits a positive affective response and employees reciprocate by increasing their commitment to the focal firm, despite having greater external options.

Taken together, these arguments suggest that more committed employees may be systematically biased to perceive their human capital portfolio as more general and less committed employees may be biased to perceive their skills to be more firm-specific. Thus:

Hypothesis 3b. Organizational commitment will be negatively related to employee perceptions of firm-specific human capital (FSHC).

In sum, the predictions above contradict those derived from the existing strategy literature. Drawing on the cognitive psychology literature, we expect

organizational tenure, OJT, and organizational commitment to be *negatively* related to workers' perceived FSHC.

METHODS

Data and Sample

We test our hypotheses using two independent data sources. First, we use data from the Korean Labor and Income Panel Study (KLIPS), a longitudinal annual survey of over 17,000 individuals which has been used by management scholars to study labor markets and labor market frictions (e.g., Astebro, Chen, & Thompson, 2011). During each survey round, respondents were asked a series of questions regarding their employment, socioeconomic, and demographic status. Since some questions were not asked each year, we use data from the 2002–2007 surveys. After dropping workers who were unemployed, part-time, self-employed, contract workers, military personnel, and non-respondents on key variables, our final sample consisted of an unbalanced panel with 5,419 individuals and 16,580 individual-year observations.

Second, we use data from the National Longitudinal Survey of Youth, 1979 cohort (NLSY79). The NLSY79 is a longitudinal survey that tracks the employment histories of 12,686 men and women. The survey is administered by the U.S. Bureau of Labor Statistics and has been frequently used by organizational scholars (e.g., Davis, Trevor, & Feng, 2015; Raffiee & Feng, 2014). Respondents were first surveyed in 1979 with annual follow up surveys until 1994 and biennially after that. We use the 1994 survey to capitalize on a unique question regarding perceptions of firm-specificity. We used the same exclusion criteria for the NLSY79 data that we did for the KLIPS. The final sample consisted of a cross-section of 2,438 individuals.

The use of two data sources offers several advantages. First, although the structure of the labor market in Korea is fairly similar to the United States (Kim & Cheon, 2004), the NLSY79 data help ensure that our results generalize cross culturally to Western contexts (Stajkovic, Lee, Greenwald, & Raffiee, 2015). Second, while the design and structure of the KLIPS and NLSY79 is quite similar, the differences between them help address limitations inherent in each data source, as detailed below. Third, replication using two independent samples reduces the likelihood that patterns observed are spurious and increases

reliability of conclusions that can be drawn from our findings (Goldfarb & King, 2016).

Dependent Variable

Perceived firm-specific human capital (FSHC_{Perceived}). KLIPS respondents were asked: “How useful do you think your knowledge or skills which you learned from this job would be for other jobs if you move to another workplace in the same industry and occupation?” Responses were measured using a 4-point Likert scale: (1) Useful as much as in the current workplace, (2) Partly useful, (3) Hardly useful, or (4) I did not learn any special knowledge or skills from this job.

We excluded respondents who reported that they did not learn any knowledge or skills from their job (response 4) since this confounds the specificity of the knowledge with the question of whether there was any knowledge gained. In addition, it is important to note that the survey uses the term “job” and “workplace” interchangeably with the term “employer” in many places so responses generally capture the specificity of knowledge and skills at their current employer, as opposed to job-specific skills within an organization.⁸

The NLSY79 used a different but complementary strategy to measure FSHC_{Perceived}. NLSY79 respondents were first asked if they were able to perform all of the required job duties when hired. Those who could *not* perform all of the duties were then asked how they acquired the requisite knowledge and skills. Thus, we can infer that such knowledge and skills are valuable since, without them, the employee would be unable to perform necessary job duties. Learning activities included company-sponsored training (seminars and classes), informal training with supervisors and coworkers, and self-guided instruction. Respondents provided the number of weeks and average hours per week for each of the learning activities. FSHC_{Perceived} was measured using the following question: “How many of the skills that you learned doing any of these activities do you think would be useful in doing the

⁸ At the start of each survey, administrators ask respondents if they are working at the same job/workplace they reported in the previous survey wave. Respondents chose between “Still working in the same workplace/job” or “Left or quit that workplace/job.” Those who indicated that they had not moved were then asked about changes in responsibilities as well as changes in title/position. Results are robust when we control for such changes.

SAME kind of work you are now doing for an employer other than your current employer?" The 5-item Likert scale ran from 1 = all or almost all of the skills (*low specificity*) to 5 = none or almost none of the skills (*high specificity*).

Independent Variables

Organizational tenure. We measure organizational tenure in the KLIPS and NLSY79 as the number of years a respondent was with a firm. This is calculated by subtracting each person's job start date from the date that the survey was administered. We took the natural log because the distribution was heavily skewed (positively), particularly in the KLIPS sample.

On-the-job training (OJT). The KLIPS provides information on several types of employee training. First, all workers were asked if they participated in vocational/occupational training. Although the term "vocational" may be commonly associated with general training, we employed stringent criteria to identify such training that would be most likely to contain firm-specific knowledge and skills. Specifically, we only included training that met the following criteria: (1) the purpose of training was to improve job skills (as opposed to acquiring certifications, learning skills to start a business, etc.), (2) the training was initiated by the employer (as opposed to the employee, the government, etc.), and (3) the training took place on-the-job (as opposed to off-site training centers, private institutions, etc.). OJT is measured as the total worker reported days of training (logged) that met these criteria. While there may still be some general components to such training, these criteria help to identify training that is more likely to include firm-specific knowledge and skills. For example, consider an insurance company that initiated a sales training program. If such training took place on-the-job, it would likely cover knowledge that is specific to the firm (e.g., sales routines and proprietary product information) along with general knowledge about insurance sales (federal regulations, etc.). This would be much less likely if the training were outsourced to a private off-site training center, if the government initiated the training, or if the training led to a professional certification.

As detailed above, the NLSY79 offers a more nuanced measure of OJT that includes hours of informal training with peers, supervisors, and self-training required for the employee to come up to speed. Again, this helps to establish that the content of the

training is important and valued by the firm. We summed (and logged) the hours of informal training with supervisors, peers, and self-guided learning as such sources are most likely to involve tacit knowledge and be associated with the development of FSHC. However, our results remained unchanged when we used a sum of all learning activities as a measure of OJT or used each learning activity discretely.

Organizational commitment. We measure organizational commitment in the KLIPS using five items adapted from Mowday, Steers, and Porter's (1979) Organizational Commitment Questionnaire (OCQ) (see Table 1 for items). The items, on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), were averaged to create a single measure (Cronbach's $\alpha = .91$). The NLSY79 survey does not measure organizational commitment but does report job satisfaction, which we use as a proxy (Le, Schmidt, Harter, & Lauver, 2010). While evidence suggests job satisfaction may be empirically indistinguishable from organizational commitment (Le et al., 2010), theoretically they are distinct (Brooke, Russell, & Price, 1988), and so this proxy should be interpreted with some caution.⁹ Notably, in the KLIPS, organizational commitment and job satisfaction correlate highly ($\rho = .77$) and have similar effects on FSHC_{Perceived}.¹⁰

Control Variables

To account for alternative explanations, we include a series of controls typical in the human capital literature. These measures for each data source are described in Table 1. The control variables included: Gender, Age/Age squared, Education, Managerial occupations, Government occupations, Work experience, Firm size, Industry, Location, and Year.

⁹ While similar theoretical arguments regarding employee willingness to invest in FSHC can be made with regard to job satisfaction, the extant literature has focused primarily on organizational commitment.

¹⁰ The KLIPS includes several measures of job satisfaction. The first is a 5-item scale that includes three items very similar to the Hackman and Oldham (1975) scale (Cronbach's $\alpha = .91$). Second, two different single-item satisfaction measures (satisfaction with job content and with workplace) similar to the single-item scale included in the NLSY79, are asked. Research has demonstrated that single-item measures adequately capture overall job satisfaction (Lee, Gerhart, Weller, & Trevor, 2008). Results in the KLIPS data are robust to each job satisfaction measure.

TABLE 1
Description of Measures

Measure	KLIPS (<i>n</i> = 16,580)	NLSY79 (<i>n</i> = 2,438)
	<u>Dependent Variable</u>	
Perceived firm-specific human capital (FSHC _{Perceived})	<p>“How useful do you think your knowledge or skills which you learned from this job would be for other jobs if you move to another workplace in the same industry and occupation?”</p> <p>(1) Useful as much as in the current workplace (2) Partly useful (3) Hardly useful (4) I did not learn any special knowledge or skills from this job</p>	<p>“How many of the skills that you learned doing any of these activities do you think would be useful in doing the SAME kind of work you are now doing for an employer other than your current employer?”</p> <p>(1) All or almost all of the skills (2) More than half of the skills (3) About half of the skills (4) Less than half of the skills (5) None or almost none of the skills</p>
	<u>Independent Variables</u>	
Organizational tenure OJT	<p>Organizational tenure in years (log) Number of days an employee indicated that they participated in employer initiated training designed to improve job skills which took place on-the-job and within the workplace (log).</p>	<p>Organizational tenure in years (log) Number of total hours an employee spent learning how to perform their job duties (log). This includes informal training through working with supervisors and coworkers and self-guided instruction.</p>
Organizational commitment	<p>To what extent do you agree with the following statements about your organization (1 = strongly disagree, 5 = strongly agree):</p> <p>(1) “This is a good company to work at” (2) “I’m glad to have joined this company” (3) “I would recommend joining this company to my friends who are searching for a job” (4) “I take pride in being a part of this company”</p>	n/a
Job satisfaction	<p><i>Measure 1:</i> To what extent do the following statements describe your feelings about your job (1 = strongly disagree, 5 = strongly agree):</p> <p>(1) “I’m satisfied with the job I’m currently doing” (2) “I’m glad to have joined this company” (3) “I enjoy this job” (4) “I feel this job to a be personally rewarding” (5) “I want to continue this job if other things remain the same”</p> <p><i>Measures 2 and 3:</i> Respondents were asked their overall satisfaction with the content of their job and their overall satisfaction with their workplace (1 = very satisfied, 5 = very dissatisfied; reverse coded).</p>	<p><i>Measure 1:</i> Respondents were asked the following single-question measure of job satisfaction: “How do/did you feel about your job? Do/did you like it very much (4), like it fairly well (3), dislike it somewhat (2), or dislike it very much (1)?”</p>
	<u>Control Variables</u>	
Managerial occupation	Based on the Korea Standard Occupation Classification (KSOC). We create a dummy = 1 if the code indicates the job to be managerial.	Based on U.S. Census Occupational Codes. We created a dummy = 1 if the code indicates the job to be managerial.
Gender	Dummy = 1 for male	Dummy = 1 for male
Age/Age squared	Age in years	Age in years
Education	Years of schooling	Years of schooling
Government	Dummy = 1 if employee works for the government	Dummy = 1 if employee works for the government
Work experience	Total number of jobs previously held	Total number of jobs previously held
Firm size	Dummies for firm size groups as follows: 1–9 employees; 10–49 employees; 50–99 employees; 100–499 employees; 500+ employees	Dummies for firm size groups as follows: 1–9 employees; 10–49 employees; 50–99 employees; 100–499 employees; 500+ employees
Industry	Three-digit Korean Standard Industrial Classification codes	Three-digit U.S. Census Industrial Classification codes
Location	Dummies for region of Korea (17 major regions)	Dummies for region of the USA (4 major regions)
Year	Dummies for year (2002–2007)	n/a—cross sectional sample (year = 1994)

Estimation Strategy

To account for the ordinal nature of our dependent variable we employed an ordered probit specification using maximum likelihood estimation (Long, 1997). The structural model of the ordered probit can be written as:

$$y_i^* = x_i\beta + \varepsilon_i \tag{1}$$

where y^* is the continuous (latent) level of the dependent variable, x is a vector of explanatory variables, β is a vector of estimated regression coefficients, and ε is the error term. As y_i^* crosses different thresholds (cut points), the observed variable y_i changes. Thus, in the KLIPS sample, the relationship between our three category ordinal dependent variable $FSHC_{Perceived}$ (y) and the underlying latent variable (y^*) can be written as:

$$y_i = \begin{cases} 1(\text{Low specificity}) & \text{if } y_i^* \leq \tau_1 \\ 2(\text{Medium specificity}) & \text{if } \tau_1 < y_i^* \leq \tau_2 \\ 3(\text{High specificity}) & \text{if } y_i^* > \tau_2 \end{cases}$$

where τ_1 and τ_2 are the first and second thresholds respectively (Long, 1997).

To account for the panel structure of the KLIPS data we estimated a cluster corrected covariance matrix which adjusts standard errors for intragroup correlation among individuals (Nichols & Schaffer, 2007). We opted against the use of individual fixed effects for several reasons. First, coefficient estimates for time invariant variables are precluded from fixed effects models (Greene & Hensher, 2010). Second, the use of fixed effects increases the chances of the incidental parameters problem which produces biased coefficient estimates in nonlinear models, particularly when the number of time periods (T) is small (i.e., small T bias) (Abrevaya, 1997; Greene, 2004). Given that the KLIPS sample used in this study has low T (maximum $T=6$, mean $T= 3.05$) and that several of our time-varying variables have extremely low within-individual variation, individual fixed effects were inappropriate. For the NLSY79, the sample is cross-sectional and so intragroup correlation is not a concern.

RESULTS

Descriptive statistics and correlations are shown for the KLIPS in Table 2 and for the NLSY79 in Table 3. All variance inflation factors (VIFs) are well below 10 (KLIPS: mean VIF = 1.33, max VIF = 1.79; NLSY79: mean VIF = 1.12, max VIF = 1.33), indicating that multicollinearity is not a significant

TABLE 2
Descriptive Statistics and Correlations (KLIPS)

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) $FSHC_{Perceived}$	1.49	0.64	-										
(2) Age	37.52	10.35	0.07	-									
(3) Age squared	1514.96	851.46	0.08	0.99	-								
(4) Gender	0.63	0.48	-0.02	0.15	0.13	-							
(5) Education	13.17	3.00	-0.14	-0.34	-0.36	0.14	-						
(6) Government	0.14	0.35	-0.03	0.09	0.07	0.00	0.22	-					
(7) Work experience	2.92	1.95	0.05	0.22	0.21	0.04	-0.27	-0.22	-				
(8) Managerial occupation	0.15	0.35	-0.16	-0.08	-0.08	-0.10	0.35	0.16	-0.12	-			
(9) Org. tenure	5.67	6.45	-0.05	0.40	0.38	0.16	0.09	0.37	-0.34	0.07	-		
(10) OJT	1.17	17.29	-0.02	-0.02	-0.02	0.00	0.03	-0.01	-0.02	0.01	-0.01	-	
(11) Org. commitment	3.36	0.65	-0.22	-0.02	-0.02	-0.05	0.26	0.27	-0.21	0.21	0.24	0.04	-
(12) Job satisfaction	3.49	0.61	-0.22	-0.02	-0.02	-0.04	0.23	0.20	-0.16	0.20	0.18	0.04	0.77

Notes: $n = 16,580$. Variables are in original metrics (unlogged). Firm size, industry, location, and year are omitted. All correlations above |.01| are significant at $p < .05$, two-tailed.

TABLE 3
Descriptive Statistics and Correlations (NLSY79)

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) FSHC _{Perceived}	1.50	0.96	–									
(2) Age	32.85	2.23	0.01	–								
(3) Age squared	1083.85	147.33	0.01	0.99	–							
(4) Gender	0.49	0.50	–0.04	–0.02	–0.01	–						
(5) Education	13.34	2.45	–0.03	–0.01	–0.01	–0.05	–					
(6) Government	0.18	0.38	0.09	0.07	0.07	–0.10	0.20	–				
(7) Work experience	9.70	5.27	–0.06	–0.09	–0.09	0.16	–0.02	–0.08	–			
(8) Managerial occupation	0.10	0.30	–0.07	–0.01	–0.02	–0.02	0.34	0.01	–0.05	–		
(9) Org. tenure	3.93	4.23	0.01	0.14	0.14	–0.06	0.11	0.14	–0.46	0.06	–	
(10) OJT	186.84	674.78	–0.03	0.01	0.01	0.09	0.09	0.00	–0.07	0.07	0.15	–
(11) Job satisfaction	3.33	0.72	–0.10	0.05	0.05	0.01	0.05	0.03	0.01	0.05	–0.00	0.01

Notes: $n = 2,438$. Variables are in original metrics (unlogged). Firm size, industry, and location are omitted. All correlations above $|.04|$ are significant at $p < .05$, two-tailed.

concern (Neter, Wasserman, & Kutner, 1983). Of course, Age and Age squared are very strongly correlated. However, it is common to include both in the human capital literature since, in theory, individuals taper off human capital investments as they get older since there is limited time to realize returns (Bartel & Borjas, 1977). Our results are robust to dropping Age or Age squared and/or using logged or centered values.

The relatively strong negative correlation between education and age in Table 2 is to be expected in the Korean context. According to the Organization for Economic Co-Operation and Development (OECD) education report (OECD, 2012), Korea has experienced the most dramatic increases in tertiary (higher education) rates of any OECD country. For example, the OECD reports that there is a difference of 25 percentage points between 25–34-year-olds and 55–64-year-olds regarding tertiary attainment. Beyond these, the strongest correlation is between tenure and age (.40). Given that age is sometimes used as a proxy for tenure, this also is unsurprising.

Columns 1–5 in Table 4 display the estimated regression coefficients from our ordered probit regression analysis using the KLIPS sample. Column 1 begins with our controls-only model and column 5 ends with our complete model, which includes all controls and hypothesized effects. Columns 6–8 display the marginal effects (calculated from coefficients in column 5) for each category of our three-category dependent variable FSHC_{Perceived}, holding all other covariates at their means (Long, 1997). Table 5 displays the estimated regression coefficients from our ordered probit regression analysis using the NLSY79 sample. Column 9 begins with our controls-only model and column 13 ends with

a complete model, which includes all control and hypothesized effects. For comparison purposes, columns 14 and 15 report ordered probit regression coefficients using the KLIPS data where, like the NLSY79, we use job satisfaction to proxy organizational commitment. Additionally, given that the KLIPS has a much larger range than the NLSY79 in terms of age, in column 15 we limit our analysis to KLIPS respondents aged between 29 and 37 (the same age range as the NLSY79 sample).

Beginning with the controls, the results presented in Tables 4 and 5 are relatively consistent. In both samples, employees who work for the government tend to perceive their skills as more firm-specific. Males seem to view their skills as being less firm-specific than women and managers perceive their skills as less firm-specific than non-managers. While there is generally less statistical significance in the NLSY79, this is likely attributable to the smaller sample. We now turn our attention to our hypotheses.

Hypotheses 1a and 1b predicted the relationship between organizational tenure and FSHC_{Perceived}. In the KLIPS sample, results from column 2 of Table 4 provide support for Hypothesis 1b over 1a. That is, tenure is negatively related to FSHC_{Perceived} ($\beta = -.09, p < .001$). In terms of marginal effects, a one-unit change in tenure increases the probability of an employee perceiving their skills to be general by 2% ($p < .01$) and decreases the probability that the employee perceives their skills to be moderately and highly firm-specific by 2% ($p < .01$) and 1% ($p < .01$), respectively. Thus, we find support for Hypothesis 1b over 1a in the KLIPS sample.

When we examine the relationship between tenure and FSHC_{Perceived} using the NLSY79 (column 10

TABLE 4
Ordered Probit Regression Results on FSHC_{perceived} (KLIPS)

	Ordered Probit Regression Coefficients					Marginal Effects		
	(1)	(2)	(3)	(4)	(5)	FSHC _{perceived} =1	FSHC _{perceived} =2	FSHC _{perceived} =3
Age	-0.03*** (0.01)	-0.02* (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.02* (0.01)	0.01* (0.00)	-0.01* (0.00)	-0.00* (0.00)
Age squared	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	-0.00** (0.00)	0.00** (0.00)	0.00** (0.00)
Gender	-0.06* (0.03)	-0.06† (0.03)	-0.06* (0.03)	-0.10** (0.03)	-0.09** (0.03)	0.04** (0.01)	-0.02** (0.01)	-0.01** (0.00)
Education	-0.02*** (0.01)	-0.02*** (0.01)	-0.02*** (0.01)	-0.01* (0.01)	-0.01* (0.01)	0.005* (0.00)	-0.00* (0.00)	-0.00* (0.00)
Government	0.05 (0.05)	0.07 (0.05)	0.04 (0.05)	0.12* (0.05)	0.13* (0.05)	-0.05** (0.02)	0.04* (0.01)	0.02* (0.01)
Work experience	0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Managerial occupation	-0.42*** (0.05)	-0.43*** (0.05)	-0.42*** (0.05)	-0.37** (0.05)	-0.38** (0.05)	0.14*** (0.02)	-0.10*** (0.01)	-0.04*** (0.00)
Org. tenure	-0.09*** (0.02)	-0.09*** (0.02)	-0.09*** (0.02)	-0.09*** (0.02)	-0.06** (0.02)	0.02** (0.00)	-0.02** (0.01)	-0.01** (0.00)
OJT			-0.06* (0.02)		-0.04 (0.02)	0.01 (0.01)	-0.01 (0.01)	-0.00 (0.00)
Org. commitment				-0.38*** (0.02)	-0.37*** (0.02)	0.14*** (0.01)	-0.10*** (0.01)	-0.04*** (0.00)
Firm size	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included
Location	Included	Included	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included	Included	Included
Log pseudo likelihood	-13494	-13479	-13490	-13239	-13230			
Wald χ^2	1496.91	1518.05	1510.43	1890.33	1898.27			
Pseudo R^2	0.073	0.074	0.073	0.091	0.091			
N	16,580	16,580	16,580	16,580	16,580			

Notes: Robust standard errors clustered by individual in parentheses. *** $p < .001$, ** $p < .01$, * $p < .05$; † $p < .10$. All significance tests based on two-tailed tests. McFadden's Pseudo R^2 reported. Columns 6–8 show marginal effects estimated from coefficients in column 5 with all other covariates held at their means. Coefficients, marginal effects, and standard errors have been rounded to two decimal places; significance levels calculated using raw values.

TABLE 5
Ordered Probit Regression Results on FSHC_{Perceived} (U.S. vs. Korean Samples)

	NLSY79					KLIPS	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Age	0.52 (0.38)	0.52 (0.38)	0.52 (0.38)	0.54 (0.38)	0.54 (0.38)	-0.02* (0.01)	0.22 (0.20)
Age squared	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.00** (0.00)	-0.00 (0.00)
Gender	-0.07 (0.06)	-0.06 (0.06)	-0.07 (0.06)	-0.06 (0.06)	-0.05 (0.06)	-0.08** (0.03)	-0.03 (0.05)
Education	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	-0.01* (0.01)	-0.01 (0.01)
Government	0.44*** (0.12)	0.44*** (0.12)	0.44*** (0.12)	0.43*** (0.12)	0.44*** (0.12)	0.11* (0.05)	0.25** (0.10)
Work experience	-0.01† (0.01)	-0.01* (0.01)	-0.01† (0.01)	-0.01† (0.01)	-0.01* (0.01)	-0.01 (0.01)	-0.02† (0.01)
Managerial occupation	-0.35**	-0.35**	-0.35**	-0.34**	-0.34**	-0.38***	-0.50***
Org. tenure	0.52	(0.11) -0.02 (0.02)	(0.11)	(0.11)	(0.11) -0.02 (0.02)	(0.05) -0.07*** (0.02)	(0.08) -0.12*** (0.04)
OJT			-0.00 (0.01)		0.00 (0.01)	-0.03 (0.02)	-0.03 (0.04)
Job satisfaction				-0.15*** (0.04)	-0.15*** (0.04)	-0.40*** (0.02)	-0.39*** (0.03)
Firm size	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included
Location	Included	Included	Included	Included	Included	Included	Included
Year	n/a	n/a	n/a	n/a	n/a	Included	Included
Log likelihood	-2099	-2099	-2099	-2092	-2090	-13209 ^a	-4066 ^a
LR χ^2	213.72	214.39	213.76	230.99	231.77	1933.10 ^b	749.84 ^b
Pseudo R^2	0.048	0.049	0.048	0.052	0.053	0.093	0.103
N	2,438	2,438	2,438	2,438	2,438	16,580	5,474

Notes: Robust standard errors in parentheses (clustered by individual for models 14 and 15); *** $p < .001$, ** $p < .01$, * $p < .05$; † $p < .10$. All significance tests based on two-tailed tests. McFadden’s Pseudo R^2 reported.

^a Log pseudo likelihoods.

^b Wald χ^2 due to clustered standard errors. Coefficients and standard errors have been rounded to two decimal places; significance levels calculated using raw values.

of Table 5), we find that the coefficient for tenure is negative but it is statistically insignificant ($\beta = -.02$, $p = n.s.$). As such, while there is support for Hypothesis 1b in the KLIPS data, neither Hypothesis 1a or 1b is supported in the NLSY79. Accordingly, while we cannot conclude strong and generalizable support for Hypothesis 1b, we do find convincing evidence against a positive relationship between tenure and FSHC_{Perceived} as was predicted by Hypothesis 1a.

Hypotheses 2a and 2b predicted the relationship between OJT and FSHC_{Perceived}. In the KLIPS sample, results from column 3 of Table 4 provide initial support for Hypothesis 2b over 2a. That is, OJT appears to be negatively related to FSHC_{Perceived} ($\beta = -.06$, $p < .05$). However, the effect of OJT fails to remain statistically significant in column 5

($\beta = -.04$, $p = .11$), our fully saturated model. Thus, while we cannot strongly conclude that OJT is negatively related to FSHC_{Perceived}, as predicted by Hypothesis 2b, our results do provide limited evidence that OJT is *not* positively associated with FSHC_{Perceived}, as predicted in Hypothesis 2a.

In the NLSY79, OJT is unrelated to FSHC_{Perceived}. As demonstrated in column 11 of Table 5, the coefficient for OJT is negative but statistically insignificant ($\beta = -0.002$, $p = n.s.$). Thus, the NLSY79 does not provide support for either Hypothesis 2a or 2b. This finding coupled with the relatively weak and unstable negative relationship between OJT and FSHC_{Perceived} observed in the KLIPS suggests that OJT is not systematically related to FSHC_{Perceived}.

Hypotheses 3a and 3b predicted the relationship between organizational commitment and FSHC_{Perceived}.

Column 4 of Table 4 suggests support for Hypothesis 3b over 3a in the KLIPS sample—commitment is negatively related to $FSHC_{\text{Perceived}}$ ($\beta = -.38$, $p < .001$). In terms of marginal effects, a one-unit increase in commitment increases the probability of an employee perceiving their skills to be general by 14% ($p < .001$) and decreases the probability that the employee perceives their skills to be moderately or highly firm-specific by 10% ($p < .001$) and 4% ($p < .001$) respectively. Thus, we find support for Hypothesis 3b over 3a in the KLIPS data.

A similar result is obtained for the NLSY79. As indicated in column 12 of Table 5, organizational commitment (proxied with job satisfaction) is negatively associated with $FSHC_{\text{Perceived}}$ ($\beta = -0.15$, $p < .001$). This result holds in columns 14 ($\beta = -0.40$, $p < .001$) and 15 ($\beta = -0.39$, $p < .001$) of Table 5 where job satisfaction is used to proxy commitment with the KLIPS data. Taken together, our results from both samples offer strong generalizable evidence that organizational commitment is negatively associated with perceptions of firm-specificity.

Robustness Checks

We began by testing a series of models to ensure our results are robust to alternative specifications and the inclusion of additional controls. First, we estimated an ordered logit because it differs from the ordered probit regarding the assumed distribution of the error term (i.e., logistic versus normal) (Long, 1997). Second, using the “gologit2” command in STATA 12.1 (Williams, 2006), we estimated a generalized ordered logit which relaxes the proportional odds assumption implicit in ordered choice models. Third, given the panel structure of the KLIPS data we estimated a random effects ordered probit (using the “reoprobit” command [Frechette, 2001] in STATA 12.1) which accounts for the panel nature of the data and individual unobserved heterogeneity (Greene & Hensher, 2010). Fourth, to determine if our results varied with different types of jobs, we included fixed effects for the two-digit occupational codes as controls. Fifth, although pay is theoretically considered an outcome associated with investments in FSHC, we included pay as a covariate. Sixth, we controlled for union membership. Seventh, we included part-time and contract workers in our analysis. No material differences manifested from these tests—the main findings were robust and significant.

Next, we investigated the degree to which the negative relationship between $FSHC_{\text{Perceived}}$ and tenure was monotonic by including a squared term

for tenure in our analysis. While the inclusion of the squared term did not materially change the coefficients for tenure (unlogged), OJT, or organizational commitment, the coefficient for tenure squared was statistically significant and positive. We examined the implications of this finding by plotting the predicted probabilities for each category of $FSHC_{\text{Perceived}}$ against tenure. This revealed that the predicted probability of an employee reporting their skills to be firm-specific ($FSHC_{\text{Perceived}} = 3$) decreases until tenure reaches approximately 21 years, at which time the predicted probability of reporting firm-specific skills increases slightly. Likewise, the predicted probability of an employee reporting their skills to be general ($FSHC_{\text{Perceived}} = 1$) increases until tenure reaches approximately 21 years, at which time it decreases slightly. However, individuals with tenure of 21 years or greater are roughly 2.5 standard deviations above the sample mean for tenure, accounting for only a small fraction of the sample (approximately 4.4%). When we eliminate observations with tenure greater than 21 years, the coefficient for tenure squared remains positive and significant. However, the predicted probability of reporting firm-specific (general) skills no longer increases (decreases) at high levels of tenure, but rather continues to decrease (increase), albeit at a very slight decreasing rate. This is consistent with our findings in Table 4, which used logged tenure, thereby reducing the effect of extreme outliers.

In addition, since our goal was to develop generalizable theory we controlled for the potential influence of industry at the three-digit level and for occupation at the two-digit level. However, as an additional robustness check, we re-ran our analysis without industry controls and our results remained unchanged. This provides an initial indication that perceived FSHC may not be highly concentrated and that our results are not driven by workers in select industries. However, we further investigated this in supplementary analysis where we examined differences in reported $FSHC_{\text{Perceived}}$ by industry relative to the overall sample mean and across industries. Although, there were mean differences across industries, we were unable to observe any consistent patterns. While this may be somewhat surprising given that some industries are more knowledge-intensive than others, it further underscores the fact that perceptions of firm-specificity are subjective and may be closely linked with individual characteristics (such as tenure) and subjective beliefs (such as commitment), rather than objective FSHC.

Finally, we conducted two sets of analyses to address the possibility that the relationship between organizational commitment and $FSHC_{\text{Perceived}}$ is driven by a mechanical survivorship bias—the tendency of uncommitted employees who perceive their skills to be general to self-select out of the firm early on and therefore be unobserved in our sample. This would be quite different from the cognitive mechanisms we have proposed. First, we limited our analysis to workers with tenure of less than one year. While this does not completely eliminate the potential for survivorship bias, it should reduce its influence. That is, by focusing on newly employed workers, there is less time for a selection process to take place. In both samples (KLIPS and NLSY79), the coefficient for organizational commitment remained negative and significant. Second, we sought to address survivorship concerns by estimating a fixed-effects regression in the KLIPS sample using ordinary least squares, thereby treating our ordinal dependent variable as continuous. While doing so has limitations, it does allow us to examine how within-individual changes in organizational commitment relate to within-individual changes in $FSHC_{\text{Perceived}}$. Consistent with our results above, we find strong support for a negative relationship between within-individual changes in organizational commitment and $FSHC_{\text{Perceived}}$. Again, while this may not rule out survivorship bias, it does suggest that it is not the sole mechanism driving our results. That is, since this specification reflects within- rather than between-individual changes (e.g., comparing employees to themselves), our results indicate that as an employee becomes more (less) committed, she tends to report lower (higher) $FSHC_{\text{Perceived}}$.

Common method variance (CMV). Although research has suggested that the effects of common method variance (CMV) may be overstated (Spector, 2006) and rarely strong enough to invalidate the statistical significance of research findings (Doty & Glick, 1998), we examined a number of CMV-related aspects to ensure the validity of the results reported, particularly with regards to the relationship between organizational commitment (job satisfaction) and $FSHC_{\text{Perceived}}$. First, it is important to note that the questions in the KLIPS and NLSY79 used multiple anchoring points and reverse-scored items, which reduces the likelihood of CMV (Podsakoff, MacKenzie, & Podsakoff, 2012). Second, results from Harman's single factor test indicated that the majority of variance was not explained by a single factor. Third, after partialling out the correlation due to CMV by using a theoretically unrelated marker

variable as recommended by Lindell and Whitney (2001), our results were unchanged. Thus, while such tests cannot completely rule out the presence of CMV, they do suggest that CMV is unlikely to have a significant impact on our results.

That said, CMV is typically associated with self-reported (subjective) criteria that may tend to correlate with one another as opposed to objectively observable phenomena. The prior literature has treated firm-specificity as objectively observable by all actors and thus is less at risk of CMV. The possibility that perceptions of FSHC may be linked to individual beliefs and attitudes is a critical departure from the existing literature and a key contribution of this article.

DISCUSSION

This study has examined when employees perceive their knowledge and skills to be firm-specific. We explicated the implicit assumptions embedded within the strategy literature regarding FSHC (i.e., informational efficiency) and developed hypotheses based on this logic. We then relaxed these assumptions and developed a competing set of hypotheses theoretically rooted in the cognitive psychology literature, which highlights the role of biases in human judgment. In general, our empirical analysis of two independent samples of employees in Korea and the United States provided support for the hypotheses derived from the cognitive psychology literature. Below, we explore what we can and cannot conclude from this analysis, theoretical contributions, limitations, and implications for future research.

What can we Conclude About Perceived Firm-Specific Human Capital?

The counter-intuitive findings raise two types of possibilities. First, perceptions of FSHC may be incorrect. Second, it may be that perceptions are accurate but the assumed theoretical drivers of FSHC are incorrect. We explore these possibilities for each finding below.

Tenure and perceived FSHC are misaligned with the prior literature. In the KLIPS sample, we found a negative relationship between tenure and perceived FSHC. In the NLSY79, the negative coefficient for tenure was insignificant. This may be due to the wording of the item, which focused on training, or the smaller sample size with less statistical power. Nevertheless, we cannot conclude that

there is consistent evidence for this negative relationship. Importantly, however, there was no empirical support for the widely assumed positive relationship.

Is it plausible that tenure is negatively associated with (objective) firm-specificity? It may be that both firm-specific and general human capital increase with tenure. However, if general human capital accumulates faster, the relative share of firm-specific human capital would be smaller for long-tenured workers. This distinction between share of skills that are firm-specific and the absolute level of firm-specificity has not been a focus in the prior literature. The notion that the share or mix of human capital may become more general over time especially makes sense given that the extant literature has confounded specificity with tacitness (i.e., assuming FSHC is tacit) (cf. Coff, Coff, & Eastvold, 2006). It is often assumed that firm-specific knowledge is tacit and requires individual absorptive capacity that new employees lack. As such, it is assumed that workers gain firm-specific knowledge later in their careers. However, new employees must acquire a great deal of firm-specific knowledge that is clearly not tacit—ranging from knowing where the bathrooms are to how to complete an expense report. Furthermore, tacit knowledge need not always be firm-specific. As such, prior work on firm specificity may need to be refined to distinguish whether or not firm-specific knowledge is tacit.

In addition, it is worthwhile to note that the bijection between organizational tenure and FSHC commonly assumed in the extant literature may be predicated on faulty logic. Indeed, even if we assume that FSHC is developed over time within a firm (Dierickx & Cool, 1989), then this would suggest that an employee who has high FSHC will have high tenure but it would not necessarily imply that an employee with long tenure would have substantial FSHC. In other words, tenure would be a necessary but not sufficient condition for FSHC, especially if employees are reluctant to make firm-specific investments as the extant literature has assumed.

These explanations for why tenure may exhibit a negative (or insignificant) association with *objective* FSHC may have important theoretical implications. Would workers be reluctant to invest in FSHC early in their careers as human capital theory implies? The socialization literature suggests just the opposite—new workers actively seek idiosyncratic knowledge of their workplace (Morrison, 1993). Similarly, if the *share* of firm-specific knowledge declines as the absolute amount increases, to what

extent does FSHC function as an isolating mechanism? Do longer tenured workers face discounted wages as a result or do other firms view their stability as a desirable attribute? Will employees be reluctant to switch firms due to the loss of FSHC if it only represents a trivial share of their overall human capital portfolio, which may be comprised of mostly general skills? In short, assumptions in the extant literature should be revisited.

OJT is unrelated to perceived FSHC. Of course, we cannot draw strong conclusions from insignificant results. While it is clear that OJT can be general in nature, it is assumed that OJT is a key means to acquire FSHC (Dierickx & Cool, 1989). If so, there may be a similar share issue where both general human capital and FSHC accumulate and the relative share is indeterminate. This may raise similar issues to the share discussion above. That is, even if this is a means for accumulating FSHC, it may lack the strategic properties implied in the literature if it is outpaced by general skills. Indeed, our lack of evidence that OJT is positively associated with perceived FSHC is consistent with the finding that employees *and* employers view the majority of skills developed via OJT to be applicable elsewhere (Loewenstein & Spletzer, 1999). Perhaps the most important observation here is the difficulty in obtaining objective measures of FSHC.

Organizational commitment is lower for those who perceive they have FSHC. This strong and robust finding also cuts against assumptions in the extant literature. We suggested that a negative relationship might result if workers view FSHC in a negative light. As such, those who perceive that they have FSHC may feel stuck and regret their prior decisions. This would be reflected in lower affective organizational commitment and job satisfaction. Others may perceive their skills to be more general but it may mean that they are ignoring evidence to the contrary to avoid focusing on earlier decisions that they may otherwise regret. Since these people would not feel stuck, they may exhibit greater commitment and satisfaction toward the organization—they are choosing to stay as opposed to being forced to stay by a lack of external opportunities.

While the finding is quite robust, we cannot fully confirm specific cognitive biases as the mechanism—a number of possibilities remain. In addition, survivorship bias may play a role in our results if uncommitted employees who perceive their skills are general quickly exit the firm leaving only uncommitted employees who feel they have few external opportunities. Our robustness checks

provide evidence that a cognitive mechanism remains in play but this warrants further study. As such, the strong correlations with commitment and job satisfaction suggest an attitudinal driver as opposed to the traditional relationship assumed in the literature.

Overall interpretation: Perceived FSHC may not be linked to objective FSHC. The findings should be interpreted together as opposed to being considered in isolation. While it is plausible that tenure and objective FSHC are negatively associated, this would not necessarily explain our organizational commitment findings. As we hypothesized, this could be a result of cognitive bias in that workers believe that their skills are more general than perhaps is actually the case. Indeed, after interviewing investment analysts, Groysberg (2010: 193–194; emphasis in original) suggested that there may be “very little correspondence between actual individual portability and one’s *perception* of one’s portability.” Here, we have developed theory about why and when this might be the case. The possibility that perceptions of FSHC may differ from objective FSHC is a significant departure from extant strategy theory.

Given this, a fruitful line of inquiry might explore what influences perceptions of firm-specificity. It is unclear how often workers pause to assess the firm-specificity of their skills (Coff & Raffiee, 2015). That said, even when workers assess their human capital, it seems likely that they may focus on hard skills that tend to be more general. Hence, our study may suggest that, even when workers evaluate specificity, they may ignore firm-specific softer skills—which could explain potential discrepancies between objective and subjective FSHC. Indeed, this may be reflected in the strong negative relationship between commitment and perceived FSHC—workers may feel especially trapped when they perceive that their hard skills are firm-specific.

Theoretical Contributions and Implications for Further Inquiry

This study raises a number of important theoretical questions. If perceived FSHC may be distinct from objective FSHC, what are the implications for theory? We view the contribution as opening the door for a wide range of new inquiries. Below we examine implications for human capital theory, the resource-based view, and TCE.

Perceptions and human capital theory. Market frictions have been introduced into human capital theory in a limited sense but the predominant

treatment is one of information efficiency (cf. Campbell et al., 2012). This departure from traditional theory prompts myriad questions about the links between perceptions and objective FSHC, as well as resulting behaviors, and the extent to which perceptions are aligned across actors.

One might start by exploring how perceptions differ from objective measures of specificity. Since it has been assumed that firm-specificity is objective, this question has not been raised (see Groysberg [2010] for an exception). However, the usual measures applied in this study show how hard it might be, in practice, to develop objective measures. One possibility might be that objective firm-specificity could be manipulated in a controlled experimental setting. This might help researchers establish causality regarding biases that affect perceptions of firm-specificity.

Human capital theory is ultimately about behaviors and it is unclear whether individuals and firms would act on perceptions of firm-specificity as extant theory predicts. Do perceptions of firm-specificity drive employee decisions to acquire skills as is assumed in the theory? Such perceptions may be biased and, thus, not strongly correlated with objective firm-specificity. Furthermore, workers and firms may not even consider specificity carefully in making many key decisions (Groysberg, 2010). Thus, a satisfied worker who hopes to stay at a given firm may not perceive skills as firm-specific and may not, therefore, consider specificity when investing in new skills. Likewise, if firms could observe FSHC (and recognize its importance), we would expect them to use internal promotion ladders to advance workers for jobs deemed to require such skills. However, upon examining hiring practices of a large service firm, Bidwell and Keller (2014) concluded that this was not the case. This could reflect biased employer perceptions.

Human capital theory would also benefit from exploration of whether perceptions are aligned across stakeholders. Coff and Raffiee (2015) offer a theoretical discussion about how alignment of perceptions may influence theoretical outcomes such as whether FSHC functions as an isolating mechanism or under-investment in firm-specific skills. For example, they suggest that the risk of under-investment may be most critical when workers perceive skills to be specific but employers do not (since the investments will not be compensated). This further underscores the fact that firms are comprised of individual managers who may also be subject to cognitive biases.

Perceptual variance among stakeholders may also exhibit temporal differences. We have highlighted the distinction between ex-ante and ex-post perceptions of firm-specificity. Since much of the existing literature has assumed informational efficiency, there has been no exploration of how perceptions change over time. Most of our arguments about cognitive bias are explicitly ex-post in nature. Thus, ex-ante perceptions of FSHC may be quite different than ex-post assessments. For example, is it possible that employee perceptions of firm-specificity are less prone to bias ex-ante investment yet systematically biased toward generality ex-post, as our findings might suggest? On the other hand, this relationship may be opposite for firms and hiring managers. That is, do hiring managers overestimate the generality of employee skills (or their own ability to utilize employee skills) ex-ante hiring, and come to realize their mistakes, ex-post, only when they perhaps observe lower employee performance than anticipated? Indeed, this may help explain why star employees often destroy value and undermine competitive advantage when moving to new firms (Groysberg, Nanda, & Nohria, 2004)—managers may overestimate the transferability of the star employee's skills and therefore overpay for their services. Ultimately, differentiating between ex-ante and ex-post perceptions of firm-specificity opens up a number of interesting questions for future research.

Such perceptual differences across stakeholders, raises the question of whether actors may seek to manipulate perceptions of firm-specificity. For example, what would be the outcome if a worker perceived her skills to be firm-specific but misrepresented them to another firm? More broadly, how malleable are perceptions and do actors (firms and workers) seek to manipulate others' perceptions? In this way, both investment behaviors and labor market outcomes from objective FSHC might differ from those portrayed in neoclassical human capital theory.

The resource-based view and perceptions of firm specificity. Human capital holds a critical place in the strategy literature as a potential source of sustained competitive advantage—largely drawing on logic imported from human capital theory. Our findings, that FSHC may be associated with a lack of organizational commitment, pose a significant challenge. It is hard to imagine a sustained advantage arising from dissatisfied employees who lack commitment.

This underscores the need to incorporate micro theory into the resource-based view. In this sense,

our study responds to recent calls to integrate macro and micro literatures to better understand how and when human capital might be linked to competitive advantage (e.g., Molloy, Ployhart, & Wright, 2011; Wright, Coff, & Moliterno, 2014). Indeed, while FSHC is a central construct in the strategy literature, it has been of little focus in the micro literature on employee retention (Ployhart, 2012). However, the notion that “side-bets”—factors that increase the costs of leaving a firm—reduce employee mobility has long been acknowledged in the organizational commitment literature (Becker, 1960). Such costs, including the development of skills that are not transferable to other firms, are theoretical antecedents of “continuance commitment” in Meyer and Allen's (1991) three-factor model of commitment (see also Lee, Burch, & Mitchell, 2014). Interestingly, while this literature generally concludes that continuance commitment has a modest effect in reducing turnover, it also concludes that continuance commitment is associated with *lower* employee performance (Meyer, Stanley, Herscovitch, & Topolnysky, 2002).

Such findings, which are largely overlooked by strategy scholars, are in stark contrast with the assumptions in the strategy literature. A workforce steeped in firm-specific knowledge but dragging their feet at every juncture may be a source of competitive *disadvantage*. In terms of Hirschman's (1970) seminal framework, employees who perceive their skills to be firm-specific may represent *neglect* if they feel bound to a firm but unmotivated and dissatisfied. Again, however, this logic requires that employee perceptions of their FSHC are efficient.

How, then, might human capital be linked to competitive advantage? One possibility might be that firms must manage perceptions of the nature of their employees' skills (Coff & Raffiee, 2015). Can they take advantage of biases by creating an environment where satisfied workers invest in firm-specific skills that they perceive to be general? Can they do this while simultaneously fostering external perceptions that employees are steeped in proprietary knowledge (that would not be valuable to other firms)? This might be analogous to Apple's strategy in defending their intellectual property so the proprietary knowledge is harder to apply at other firms. And yet, Apple employees may feel that their skills are in high demand. It seems, then, that there are many potential avenues of fruitful inquiry to better understand the links between human capital and competitive advantage.

New perceptual frontiers in TCE. Our findings also contribute to the growing body of work that has augmented TCE with the cognitive psychology literature (Weber & Mayer, 2011, 2014; Weber, Mayer, & Macher, 2011). Here, it is assumed that buyers and suppliers have accurate and shared perceptions regarding what constitutes a firm-specific or transaction-specific investment, and, when firm-specificity is high, transactions are internalized through vertical integration (Williamson, 1975). While the degree of firm-specificity for tangible investments (e.g., automotive steel dies) may be more quantifiable than investments in human capital, our results do point to the fact that managers may be subject to cognitive biases and/or influenced when assessing firm-specificity. For example, Weber and Mayer (2011) and Weber et al. (2011) describe how framing contracts can influence ongoing relationships. Such framing effects could also influence a supplier perception of firm-specificity.

These perceptual issues may lead to predictions contrary to those generated from TCE. For example, if buyers can influence the suppliers' perceptions so a particular investment seems more broadly applicable (general), buyers might choose market arrangements rather than vertical integration, even where a high degree of specificity is needed. Indeed, since our findings suggest that perceived FSHC may differ from objective FSHC, questioning when or how managers perceive firm-specificity of other investments opens up a number of avenues for future inquiry.

Limitations and Future Research

Our study is not without limitations. While we obtained similar results across two data sources from two countries, our data are not perfect. As discussed above, our study lacks an objective measure of FSHC. As a result, it remains unclear as to whether employee perceptions of FSHC are inaccurate or if the measures used in prior studies (e.g., organizational tenure, OJT) are not actually associated with objective FSHC. Thus, a limitation of our study, and one that is endemic in much of the strategy literature (Molloy, Chadwick, Ployhart, & Golden, 2011), is the challenge of operationally and objectively measuring intangible resources. We have alleviated some of this concern by theoretically differentiating between *ex-ante* and *ex-post* evaluations of firm-specificity and drawing on the cognitive literature to theorize about drivers of *perceptions* under imperfect

information. As such, we cannot make claims about how accurate perceptions are. Future research using measures of objective FSHC to perceived FSHC would be valuable.

Second, our measures of perceived FSHC in both the KLIPS and NLSY79 capture the share (i.e., percentage) rather than the stock (i.e., absolute value) of total knowledge and skills the employee perceives to be firm-specific. As described above, the literature is silent regarding this distinction. Research that measures share versus absolute levels of FSHC and identifies their impacts on employee perceptions and behaviors is a new and promising area for future work.

Third, our measures of perceived firm-specificity in the KLIPS capture how useful employees believe the knowledge and skills would be if they switched to a different employer. However, it does not explicitly capture how useful they believe their skills are at the current firm. Employees could believe their skills lack value to any firm. However, since the NLSY79 measure explicitly focuses on skills required to perform the employee's job, we can safely assume such knowledge and skills are valuable to the employer. Still, this begs a broader question that employees may perceive some skills as valueless, unnecessary and/or redundant. The fact that government employees, often immersed in bureaucratic procedures and yellow tape, perceive their skills to be more firm-specific lends some credence to this possibility.

Fourth, it is possible that the observed relationship between organizational commitment and perceived FSHC may be driven by survivorship bias as uncommitted employees who perceive their skills to be transferable quickly exit the firm. While our robustness checks suggest that this is unlikely to be the sole driver of our results, research that explicitly examines perceived firm-specificity and turnover behavior is an important avenue for future research.

Finally, given the structure of the NLSY79, we could only use a small subset of the sample who reported that they lacked some job skills when hired. This reduced our statistical power and made some of our conclusions more conservative than they might otherwise have been.

CONCLUSION

In this study, we examined when employees are most likely to perceive their human capital to be firm-specific. We developed hypotheses based on the extant strategy literature, which implicitly

assumes informational efficiency and unbiased perceptions, and the cognitive psychology literature, which highlights the role of biases in human judgment. Our results largely support the hypotheses developed from the cognitive psychology literature—longer tenured and more committed employees tend to perceive their human capital as *less* firm-specific. OJT, a common measure and theoretical source of FSHC, was not significantly associated with perceived firm-specificity. Our findings suggest that strategy researchers may need to re-think the role of FSHC for creating and sustaining competitive advantage since FSHC, as perceived by employees, may drive behavior in ways quite different from what extant theory predicts.

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