

Perceived Firm-Specific Human Capital and Turnover: Stuck in their Heads?

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ABSTRACT

Drawing on human capital theory, strategy scholars have emphasized firm-specific human capital as a source of sustained competitive advantage. In addition to its role in value creation, FSHC is thought to limit rival imitation and rent appropriation by hindering worker mobility. In this study, we explore micro-foundations of firm-specific human capital by theoretically and empirically examining how employee perceptions of firm-specific skills relate to subsequent turnover – extant literature suggests that turnover would be significantly reduced for those who feel their skills are firm specific. However, this is inconsistent with recent findings that workers who perceive their skills to be firm specific tend to be dissatisfied with their jobs and uncommitted to their organizations. We test our hypotheses using two data sources from Korea and the United States. We find no evidence that perceptions of firm specific skills decrease the likelihood of turnover (if anything, it is associated with an increase in turnover). Furthermore, there does not seem to be a difference in wages for those who leave the firm who perceive that their skills are firm specific. That is, just because employees perceive their skills to be specific, does not necessarily mean that their actual external opportunities are substantially constrained. These findings suggest that perceptions of firm-specific human capital may drive behavior in ways not anticipated by existing theory. This, in turn, may challenge the assumed relationship between firm-specific human capital and competitive advantage.

Strategy scholars often stress the role of firm-specific human capital in competitive advantage (Chadwick and Dabu, 2009; Hatch and Dyer, 2004; Kor, 2003; Wang, He, and Mahoney, 2009). In theory, firm-specific skills, which are less valuable externally, impose a gap between workers' value in their current job and other options. Human capital theory suggests that such gains are shared between employees and firms (Becker, 1993). They also are assumed to hinder mobility as other firms offer lower wages. Thus firm-specific human capital may sustain advantages and allow firms to appropriate some of the resulting value (Coff, 1997).

This logic may be faulty in that it essentially requires labor markets to be informationally efficient – actors must have unbiased estimates of general and firm-specific human capital (Campbell, Coff, and Kryscynski, 2012; Coff and Raffiee, 2015b). In contrast, when we allow for market imperfections, perceptions of firm-specificity become a central issue and it is unclear whether such perceptions would be widely shared. For example, Raffiee and Coff (2015) found that perceptions of firm specific human capital are associated with a lack of organizational commitment and lower job satisfaction. Accordingly, such perceptions align closely with attitudes and may tend to be subjective in nature. If firm specificity is not objective and widely observable, it is unclear that it would constrain mobility in the fashion anticipated in extant theory.

We therefore contribute by exploring whether such perceptions are linked to turnover. That is, subjective employee perceptions may not be shared and may not therefore translate to actual mobility constraints. If so, a worker could be offered higher wages in other firms even if some of her the knowledge or skills are actually firm-specific. We also explore several wage-related implications of extant theory such as whether those who perceive their skills to be firm-specific receive smaller wage increases when changing jobs or when staying with their current employer.

This study of perceptions of firm specificity is essential to building micro-foundations of strategic human capital by theoretically and empirically exploring how employee perceptions are related to behaviors (Barney and Felin, 2013; Coff and Kryscynski, 2011; Foss, 2011). Since there has been little prior research in this area, we begin by offering hypotheses drawn from extant theory (i.e., assuming that labor markets are informationally efficient). This literature leads us to expect employee perceptions of firm-specificity to constrain their mobility.

We then draw on the cognitive psychology literature to develop theory about how employee *perceptions* of firm-specificity, under imperfect information, lead to different outcomes. Biases, such as cognitive dissonance, suggest a very different set of behaviors. We use two large samples, collected in Korea and the U.S., where workers reported perceptions of how firm-specific their skills were. These data are uniquely suited to address this question and the two independent samples strengthen the validity and reliability of our results (Goldfarb and King, 2014).

Our findings are inconsistent with assumptions in the extant literature – we find that turnover is positively related to employee perceptions of firm-specificity and no evidence that perceptions of firm specificity lead to lower wages (among movers or stayers). These results contradict existing strategy theory and may challenge the assumed role of firm-specific human capital as a source of competitive advantage. This study underscores the need for future research on how employee perceptions differ from those of other actors as well as how perceptions may drive behavior.

THEORY AND HYPOTHESES

Firm-Specific Human Capital (“FSHC”) and Competitive Advantage

Strategy researchers have argued that valuable resources and capabilities often take the form of FSHC (Coff, 1997; Hatch and Dyer, 2004; Kor and Leblebici, 2005) – knowledge, skills, and abilities that have limited value outside of a given firm. There are at least three reasons why FSHC

is central to the resource-based view. First, capabilities typically require valuable and rare idiosyncratic knowledge (Barney, 1991). That is, heterogeneous resources often require FSHC.

Second, FSHC may sustain an advantage by preventing imitation (Lippman and Rumelt, 1982). Human capital will only lead to a sustained advantage if other firms cannot acquire or imitate the resource. Since FSHC is less valuable outside of the focal firm, it is considered to limit mobility (Peteraf, 1993). This assumption is drawn from the classic human capital literature (Becker, 1993; Glick and Feuer, 1984; Jovanovic, 1979). 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.¹

The third reason FSHC is critical to resource-based theory revolves around rent appropriation (Coff, 1999). The focal firm may be able to retain workers 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. Thus, Bidwell (2011) found that, while outside hires often have stronger signals of general skills (e.g., education) and earned higher compensation, lower paid internal hires (with FSHC) were typically more productive.

Increasingly scholars have explored the dilemma that workers may avoid investing in FSHC over concerns that employers would act opportunistically by lowering wages once an investment is made (Kessler and Lulfesmann, 2006; Wang *et al.*, 2009; Wang and Wong, 2012). In this context, dissatisfied employees might have to accept even lower wages elsewhere. This problem is thought to be quite substantial, suggesting the need for extensive governance safeguards

¹ 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).

(Mahoney and Kor, 2015) or even justifying costly corporate diversification where FSHC can be leveraged across business units (Wang and Barney, 2006).

Perceived FSHC and Turnover

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 and Raffiee, 2015a). 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 is essential for FSHC to limit worker mobility and drive their reluctance to invest in FSHC. The coarse signals that employers rely on, like formal education, are observable and seem to meet this criterion. However, these do not capture nuance in what was learned that is general but hard to observe. The following hypotheses reflect strong (unbiased) information efficiency inherent in the strategy literature.

Reduced turnover if perceptions are accurate and aligned. As such, we begin by assuming perceptions are aligned with objective FSHC – when employees perceive their skills to be firm-specific, the skills are, in fact, less applicable in other firms. There is certainly evidence of such skills. For example, Bidwell (2011) found that external hires have lower initial performance than internal hires. Similarly, studies have found that individuals may suffer performance declines on moving to other workplaces (Campbell, Saxton, and Banerjee, 2014; Groysberg, Lee, and Nanda, 2008; Huckman and Pisano, 2006).

Furthermore, in this case of relatively strong information efficiency, other firms would be aware that the skills do not transfer easily. As such, they would tend to offer lower wages for workers who have the skills. Indeed, they might actively weed them out of the applicant pools in

their hiring processes as they seek skills that can be easily applied. This would reduce the external opportunities available to employees who perceive that they have firm-specific skills.

Finally, this disparity in the value of the worker's skills might not be easy to reverse. That is, the individual would have a disincentive to leave the firm where the skills can be applied and the skills would tend to deepen over time. Common examples of FSHC include tacit knowledge (Polanyi, 1962) that focuses on idiosyncratic organizational routines (Grant, 1996), a firm's culture (Wang, Barney, and Reuer, 2003), or an organization's physical or social landscape (Lazear, 2009). This might crowd out learning oriented toward general skills such that the gap widens over time rather than dissipating.

Accordingly, as predicted in the extant literature, the risk of turnover might be reduced for employees who perceive their skills to be firm specific.

Hypothesis 1a: Turnover is less likely for workers who perceive their skills to be firm-specific.

Lower pay for those with FSHC who exit. Of course, extant theory does not anticipate that FSHC would eliminate all employee mobility. However, if workers change jobs and their skills are less applicable in the new job, extant theory suggests that the new wage would be adjusted to reflect lower productivity at the new firm. In some cases, one can anticipate that a worker would be sufficiently dissatisfied that the wage penalty for moving would be justifiable. This is especially true if some the anticipated hold-up problem is evident. In this way, it is possible that a worker might accept a lower wage upon moving but perceive the pay to be fair and equitable (Greenberg and Ornstein, 1983). Indeed, job satisfaction might even go up after moving and taking a lower wage. Accordingly:

Hypothesis 2: Workers who perceive that they have FSHC but change jobs anyway will accept lower pay increases.

Lower pay for those with FSHC who stay. As firms appropriate value that arises from FSHC, one might expect that the pay for individuals who stay at a given firm will increasingly diverge from those who retain their mobility to other firms. This need not result from an overt attempt to reduce wages after an individual has invested in FSHC. Rather, it may take the form of wage compression that occurs as new hires have broadly marketable skills and the firm is under less pressure to match the external market for workers who have invested in FSHC over time. This wage compression might be a much more gradual process and might not even be attributed to firm specificity. If this dynamic is in play, the average salary increase for those who stay at a given firm and have FSHC would tend to be lower. Accordingly:

Hypothesis 3: Workers who perceive that they have FSHC and stay in their same jobs will receive lower pay increases.

When perceptions of FSHC are subjective and not widely shared

Recent research has explored the possibility that employee perceptions of firm-specific human capital may be subject to imperfect information and biases. In particular, Raffiee and Coff (2016) found that, contrary to assumptions in the literature, perceptions of firm specific human capital were negatively related to organizational commitment, job satisfaction, and tenure in the organization. In this section, we relax the assumptions embedded in 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 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 and Pandian, 1992; Mahoney and Qian, 2013). Thus, the fact that informational

efficiency remains an implicit assumption regarding FSHC is a salient example of asymmetric assumptions within the strategy literature (Foss and 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, and Fox, 2011; Schwenk, 1984), yet the notion that employees and firms make unbiased assessments regarding FSHC has remained a key implicit assumption. 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, and Tversky, 1982; Mather, Shafir, and Johnson, 2000). This, in turn, allows us to develop a theory of *perceived* FSHC, even if such perceptions are inaccurate.

Cognitive bias and perceived FSHC. Indeed, it is possible that employee perceptions of firm specificity may be systematically biased. As discussed, extant theory assumes that employees are reluctant, *ex-ante*, to invest in FSHC (Mahoney and Kor, 2015). However, the fact that employees should prefer to *not* make firm-specific investments *ex-ante*, has important implications for how they are likely to perceive the specificity of their skills, *ex-post*. For example, upon reflection, employees may regret prior investment decisions if they feel they resulted in 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).

FSHC and the unfolding model of turnover. While this sort of dissonance between employee perceptions strongly contradicts theory in the strategy and human capital literatures, it is consistent with much of the thinking in the turnover literature. For example, the unfolding model of turnover does not assume that workers are aware of their outside opportunities (Lee, Mitchell, Wise, and Fireman, 1996). Rather, workers might become increasingly dissatisfied or have some specific event prod them into searching for outside opportunities.

Prior to initiating an external search, workers might be dissatisfied but feel “stuck” in their current jobs. This feeling of being stuck might lead them to perceive that their skills are not valuable to other firms – in other words, firm-specific. Such perceptions might often be inaccurate since they are not developed from a rigorous external search. The unfolding model suggests that, as dissatisfaction builds, individuals will seek information about other opportunities, which may disconfirm their initial perceptions. Indeed, it may be the dissatisfaction and feelings of being stuck that prod workers to initiate a search.

Thus, counter to the existing literature on FSHC, workers may often perceive their skills to be most firm specific just before they initiate a search to find other opportunities. Viewed this way, perceptions of firm specificity might be a key step in the process leading to turnover. This is a stark contrast to the current view of firm specificity as a critical mobility barrier that prevents turnover.

Taken together, these arguments suggest that, perceptions of firm specific human capital might actually increase the likelihood of turnover. Thus:

Hypothesis 1b: Turnover is more likely for workers who perceive their skills to be firm-specific.

Negative Interactions with Commitment and Satisfaction. Earlier research suggests that perceived FSHC is strongly correlated with attitudes like organizational commitment and job satisfaction (Raffiee and Coff, 2015). This highlights a distinct possibility that, some workers who perceive their skills to be firm-specific will be happy with their job and employer while others will not. According to the unfolding model, those who are dissatisfied will search for better alternatives and would ultimately be more likely to change jobs. If the perceptions are subjective, there may be little reason to believe that other employers would perceive their skills to be firm specific. Accordingly, we might expect an especially high likelihood of turnover for workers who are dissatisfied and uncommitted and who perceive their skills to be firm-specific.

In contrast, those who are satisfied with their current situation and committed to their employers would be unlikely to actively search for a better job or employer. As such, they may never unearth evidence that their skills are, in fact, valuable to other firms. They would be happy with their current employer and, arguably, not concerned about the question of whether other firms value their skills. In this case, we anticipate a significantly lower likelihood of turnover.

Together, this suggests a negative interaction between perceived firm-specificity and organizational commitment. In addition, we anticipate a negative interaction between perceived firm specificity and job satisfaction. Accordingly:

Hypothesis 4a: There will be a negative interaction between perceived firm-specificity of skills and organizational commitment such that turnover is less likely for committed workers who perceive their skills to be firm-specific.

Hypothesis 4b: There will be a negative interaction between perceived firm-specificity of skills and job satisfaction such that turnover is less likely for satisfied workers who perceive their skills to be firm-specific.

Comparable pay for those with perceived FSHC. The unfolding model of turnover suggests a different wage outcome. To the extent that perceptions of FSHC reflect that the

worker has not searched for external opportunities, they do not necessarily imply that there are no such opportunities to be found. The unfolding model would suggest that, if opportunities are, in fact, limited, the worker might choose to remain at the firm. However, if a search reveals better opportunities elsewhere, the worker is likely to move. In other words, conditioned on moving to another firm, the unfolding model would lead us to expect that workers might subsequently find external opportunities that offer higher wages. Accordingly, those workers who move might have systematically higher wages. However, if the perceptions of firm specificity are not widely shared, we have no reason to believe that other employers would differentiate among them as they set wages. As such, workers who change jobs may tend to accept higher wages, but their wages will not be differentiated based on whether they perceived that their skills were firm specific or not.

Similarly, workers who perceive their skills to be firm specific but who do not change jobs would not necessarily face differential compensation from those who do not perceive their skills to be firm specific. If the focal firm and the external labor market do not perceive the firm specificity, it should not affect their wage setting decisions. This suggests that hypotheses 2 and 3 would not be supported but not that they would be significant in the opposite direction. As such, we cannot offer specific counter-hypotheses to these but we note that, under the assumptions of subjective perception, we would not expect to find significant differences in pay for those who stay or those who leave.

In sum, the predictions above contradict those derived from the existing strategy literature. Drawing on the turnover and cognitive psychology literature, we expect perceived FSHC to be positively related to turnover and unrelated to changes in wages.

METHODS

Data and Sample

Our study uses two samples derived from the national labor and employment surveys of two different countries. The first sample is from the annual Korean Labor and Income Panel study (KLIPS) which is publicly available and has been used to study issues in labor market settings in the past (e.g., Astebro, Chen, and Thompson, 2011). It is a longitudinal survey dataset that traces the labor market activities of individuals and households in South Korean urban areas, and contains respondents' demographic, socio-economic and employment data. Of the 17,000 initially surveyed respondents, our sample consists of 5,403 individuals who are employed full-time in for-profit organizations between 2000 - 2007. We exclude unemployed and self-employed individuals, part-time, contract and military workers as well as non-respondents on important variables. We have a balanced panel of 5403 individuals with 18,341 person-year observations.

Our second sample is derived from the 1979 United States National Longitudinal Surveys (NLSY79), a program of the U.S. Bureau of Labor Statistics that tracks the lives of a randomly selected sample of 12,686 individuals beginning in 1979, and has been used widely by management scholars to investigate a variety of organizational issues ranging from turnover to entrepreneurship (Raffiee and Feng, 2013). Like the KLIPS dataset, it collects detailed demographic, socio-economic, employment and labor market mobility information about respondents. We use the 1994 survey results because they capture responses to specific questions about employees' perceptions of skill firm-specificity, which are not included in other year surveys. Similar to the KLIPS, we include only full-time employees of for-profit organizations to yield a final cross-sectional sample of 1,561 individuals.

There are multiple benefits to using two datasets. First it guarantees the generalizability of our results both in Eastern and Western contexts, even though the labor market structure in South Korea and the United States are somewhat similar (Kim and Cheon, 2004). Also, although the two datasets share similarities in their design and structure, the KLIPS and NLSY79 data sets have some disparities that help compensate for the shortcomings in either data sources. Finally, obtaining similar results in two independent data sources decreases the probability of spuriousness, and enhances the reliability of the interpretations made from the results of our analysis (Goldfarb and King, 2014).

Dependent Variables:

Turnover. The KLIPS and NLSY79 datasets are both track the labor market activities of respondents over time. In both datasets, a turnover event is coded as 1 whenever a respondent changes employers. We are restricted to using just the 1994 survey in the NLSY79 however, because the perceived specificity of skills variable is measured only in this year but we observe turnover in the next survey year - 1996.

Wage Increase. This variable captures the change in wage that occurs when the respondent moves to a new employer. Using the wage data as provided in both datasets, we code this variable as the difference between the respondent's wage in year t and year t+1 divided by wage in year t as shown below:

$$\frac{W_{t+1} - W_t}{W_t} \times 100$$

Perceived firm-specific human capital (FSHC_{Perceived}). The KLIPS dataset includes a question that captures respondents' perception of how firm-specific their skills are. It asks "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?" A 4-point Likert scale was used

to measure responses: 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 include responses from the first three categories and exclude observations that select option 4. Option 4, which states that respondents did not learn any new knowledge or skills from their job, mixes up two constructs – whether or not any knowledge was gained and the specificity of knowledge gained. We create a dummy variable from the other 3 options in which option 3 is coded as 1 for perceived firm-specificity of skills while options 1 and 2 are coded as 0 representing perceptions of general skills that are useful at other firms. This approach is conservative, ensuring that the relationships we find in our analysis represents only those who really think their skills are hardly useful at other firms. Also, the KLIPS survey questionnaire uses the terms “job”, “workplace” and “employer” as synonyms. Therefore, rather than refer to job-specific skills at an organization, the responses refer to whether the knowledge they gained at their current employer would be valuable at another employer.

A similar approach is used in the NLSY79 to measure firm-specificity of skills, however, the NLSY79 first identifies those who were not able to carry out all of the obligatory job duties at the start of their employment. These set of respondents were then asked how they learned the necessary knowledge and skills. The options provided in this variable include informal training with supervisors and coworkers, company-sponsored training (seminars and classes), and self-guided instruction. The firm-specificity of their skills was then 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 SAME kind of work you are now doing for an employer other than your current employer?” Response options were a 5-item Likert scale which ran from 1= all or almost all of the skills (*low specificity*) to 5= none or almost none of the skills (*high specificity*). This approach

is important as it allow inference about the relative importance and value of the knowledge and skills gained since, without them, the employee would be unable to perform necessary job duties. Again, a dummy variable was created for this construct with options 1 – 4 coded as 0 to indicate perceptions of general skills and option 5 coded as 1 to indicate perceptions of firm-specificity in skills.

Organizational tenure. In both datasets, we measure firm tenure as the number of years a respondent was with an employer. We subtract respondents' job start date from the survey interview date. Since this variable was highly and positively skewed, we transformed it by taking its natural logarithm.

Organizational commitment. Using an approach similar to the Mowday, Steers, and Porter's (1979) Organizational Commitment Questionnaire (OCQ), the KLIPS survey measures organizational commitment using a set of five questions. We took the mean value of these five items which were measured on a 5-point Likert scale (1=strongly disagree, 5=strongly agree) to create a single measure for organizational commitment (Cronbach's $\alpha = .91$). The NLSY79 survey reports only job satisfaction, therefore we could not test the organizational commitment hypothesis (4a) in this dataset.

Job Satisfaction. Similar to organizational commitment, the KLIPS survey also measures job satisfaction using a set of five questions that were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). We took mean values of these five items and used it as a single measure for job satisfaction. Similar to organizational commitment, a test for internal consistency amongst the five items yielded a Cronbach's alpha value equal to 0.91.

The NLSY79 measures job satisfaction using a single item measure, which asks the question "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)?” This variable was reverse coded to make straightforward to interpret and consistent with the KLIPS data.

Control Variables

We include demographic and socio-economic control variables that are usually incorporated into statistical models in the human capital literature to rule out other plausible explanations. Table 1 describes our measures, which include Gender, Age/Age squared, Education, Wage Residuals and Work Experience. We account for fixed effects due to Firm size, Industry, Location, and Year by including dummies for each of these variables.

Insert Table 1 about here

Estimation Strategies

Survival Analysis: The panel structure of the KLIPS data allow us to apply a Cox survival model to estimate the hazard of turnover. Let T indicate the time to turnover of an individual worker. Then $S(t) = \Pr[T > t]$, the probability that an individual will stay on the job longer than t time units, is called the survivor function. The distribution function of time to failure is given by $F(t) = 1 - S(t)$ and the density function is $f(t) = -S'(t)$. While the distribution of time to turnover could be described in terms of $F(t)$ or $f(t)$, it is more commonly characterized by the hazard function:

$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{P[t < T < t + \Delta t | T > t]}{\Delta t} = \frac{-S'(t)}{S(t)}$$

The hazard, $h(t)$, is the probability of failure in the next instant, given that the employee was still with an employer at time t . $h(t)$ is also called the force of mortality in actuarial statistics, and its reciprocal is called Mill's ratio in economics.

The present work is concerned with modeling the hazard function for worker turnover. There are several technical advantages in estimating $h(t)$ rather than $F(t)$ or $f(t)$; these are discussed in

Cox and Oakes (1984, p.16). Of course, once an estimate of $h(t)$ has been obtained, estimates of $f(t)$ and $F(t)$ are readily available from

$$F(t) = 1 - \exp \int_0^t h(u) du$$

and $f(t)=F'(t)$.

We make the assumption that the proportional hazards model (PHM) provides the appropriate form for the hazard function of employee turnover. Assuming $h(t|z)$ denote the hazard function at time t for a worker with explanatory variable vector z . Under the PHM, $h(t|z) = \psi(z)h_0(t)$, where $\psi(z)$ is some function of z such that $\psi(0)= I$ and $h_0(t)$ is the underlying hazard, i.e. the hazard function of a worker with $z=0$. If the explanatory variables have been centralized, so that a worker with $z=0$ has values equal to population means, then $h_0(t)$ can be thought of as the hazard function for an 'average' worker in the population. Thus, the primary assumption underlying the PHM is that the effect of the explanatory variables is to multiply the hazard of an average worker, $h_0(t)$, by some function, $\psi(z)$, of the deviations of the explanatory variables from their mean values. This assumption, which is supported by ample empirical evidence in multiple fields of research (Cox and Oakes, 1984), is also necessary for many technical reasons. PHM can accommodate right - censored data; that is, it is able to include observations in which the time to failure / exit is not known in its analytical process. Also, it has a straightforward solution for a typical model's statistical estimation and inference problems even when $h_0(t)$ is arbitrary.

Proposed by Cox (1972), the Cox proportional hazards model is a special case of the PHM in which $\psi(z)=\exp(\beta'z)$, where β is a vector of regression coefficients. The hazard function is therefore:

$$h(t|z)= \exp(\beta'z)h_0(t) \tag{1}$$

The primary reason for choosing an exponential function for $\psi(z)$ is that such a choice greatly simplifies the estimation of the regression coefficients β (Cox and Oakes, 1984). In terms of the present study, the vector z corresponds to some set of time varying factors that may affect the hazard of turnover at a given time (perceived firm specificity, commitment, wage, etc.), and t corresponds to the time a given worker is employed at a given firm. The survivor function to be estimated here is

$$S(t|z) = S_0(t)^{\exp(\beta'z)}$$

Where the survivor function corresponding to the baseline hazard function $h_0(t)$ is:

$$S_0(t|z) = \exp\left[-\int_0^t h_0(u)du\right]$$

Binomial Logistic Regression: For the NLSY79 sample, we use a binomial logistic regression estimation method to calculate the likelihood of turnover. This is because this sample is cross-sectional in nature with only one observation per person. Turnover is a dichotomous categorical variable where 1 indicates a change in employment and 0 indicates no change. We estimate the likelihood of turnover given our vector of independent variables using a logistic function that estimates the probability of binary dependent variables by modeling their log odds as a linear combination of a vector of independent variables.

A binomial logistic regression has a structural model that is shown as:

$$Y_{it} = \begin{cases} 1 & \beta_0 + \beta x_{it} + \varepsilon_i > 0 \\ 0 & \text{else} \end{cases}$$

where y_{it} is the result of a random dependent variable Y_{it} , which takes the value of failure = 0 or success = 1 with probabilities $1 - \pi_{it}$, and π_{it} respectively. β is a vector of regression coefficients for the various predictors in vector x_i and ε_i is the error term. We use the *logit* command in Stata (version 14) to model the odds that a worker will turnover given their

perception of the specificity of their skills while controlling for demographic and socio-economic factors as well as other applicable sources of fixed effects.

We also use this estimation method as a robustness check for the KLIPS sample using the *xtlogit* command in Stata (version 14). *Xtlogit* takes the nested structure of our data into consideration and accounts for the presence of both random and fixed effects due to the clustering of yearly observations within persons (Leckie, 2010) .

Multi-Level Mixed Effects Linear Regression. Our second dependent variable – percentage wage increase is a continuous variable and is estimated using multi-level mixed effects linear regression in the KLIPS sample. This estimation strategy accounts for the nested nature of the data and allows one or more of the estimated regression coefficients to vary by groups. It estimates a group mean regression coefficient (fixed effects) and allows us to estimate between-group variance and group-to-group deviations (random effects) for the various groups, taking into account the dependency between observations in each group. Because the KLIPS sample is grouped, multi-level data, we use STATA’s *xtmixed* command, which fits this linear mixed effects model to our data.

For the NLSY79, we simply use a multiple linear regression method to estimate the percentage wage increase since the data is cross-sectional.

RESULTS

Tables 2a and 2b provide descriptive statistics and correlations for the KLIPS and NLSY79 datasets respectively. In the KLIPS, all Variance Inflation Factor values are less than 10 with a mean of 1.70 and a maximum value of 3.64, while the NLSY79 has a mean of 1.23 and a maximum value of 1.70 (Neter, Wasserman, and Kutner, 1983; Wooldridge, 2002). Participation in the labor market changes as individuals get older and as such we included Age and Age-

squared in our analysis even though they are strongly correlated. This is typical in human capital studies (Bartel and Borjas, 1977; Topel and Ward, 1988). Results from both datasets are robust to dropping the quadratic functions of the Age variable.

Insert Tables 2 and 3 about here

In the KLIPS data (Table 2a), we find very strong correlations between job satisfaction and organizational commitment (0.76). This is consistent with the prior literature and, accordingly, we do not include both constructs in any model. As expected, we also find relatively strong correlations between several variables – Wage and Tenure (0.49), Age and Tenure (0.39) and Wage and Education (0.41). Education and Age however, are negatively and moderately correlated (-0.34) but this is not unusual in the South Korean context as there has been a remarkable increase in higher education attainment among younger people in South Korea compared with other country members of the Organization for Economic Cooperation and Development (OECD, 2012).

Table 2b provides the descriptive statistics and correlations for the NLSY79. In terms of direction, we find correlations that are largely similar to that of KLIPS, although the strength of these correlations differ, possibly due to the smaller sample size and the cross-sectional nature of the data. Tenure and Turnover have a stronger negative correlation (-0.62) compared with KLIPS (-0.12) but the direction of the relationship remains consistent. This is not unexpected though, since the likelihood of turnover decreases the longer people stay at a job and employee mobility appears to be more common in the United States (Arthur & Rousseau, 2001).

Table 3 displays results from the Cox Proportional Hazards Survival Analysis of the KLIPS sample for Hypotheses 1a, 1b, 4a and 4b. The direction of the estimated regression coefficients shown in models 1 - 5 is monotonic and indicates an increase in the relative hazard of turnover

when positive. Model 1 reflects only the control variables while model 2 shows the results for hypotheses 1a and 1b. Models 3 and 5 shows the results for hypothesis 4a and 4b respectively.

Table 4 shows results from the binomial logistic regression analysis using the NLSY79 sample for Hypotheses 1a, 1b, and 4b. The NLSY79 data has no organizational commitment measure, therefore we could not test hypothesis 4a. The estimated regression coefficients indicate the change in the log odds of turnover for a unit change in the predictor variables.

Insert Tables 3 and 4 about here

Results from both samples are directionally consistent. In the controls-only models (1 and 6), we find that education has a negative relationship with the likelihood of turnover, males are less likely to leave their employment, and high earners are less likely to change jobs. Consistent with extant literature, older employees are less likely to leave their jobs until a certain age after which the likelihood of turnover increases. Employees who are satisfied with their jobs or committed to their organizations are also less likely to change jobs. However, due to its smaller sample size, some of these relationships are not significant in the NLSY79.

The second column on both tables (models 2 and 7) show the results for Hypotheses 1a and 1b, which predict the main effect of firm-specificity on the likelihood of turnover. We do not find support in either datasets for Hypothesis 1a which, drawing on extant human capital theory, predicted a decrease in turnover for those who perceive their skills to be firm-specific. Instead we find support for Hypothesis 1b in the NLSY79 showing that employees who perceived their skills to be firm-specific were more likely to change jobs compared with those who perceived their skills to be general ($\beta= 1.878, p < .05$). KLIPS shows a positive but insignificant coefficient ($\beta= 0.0102, n.s.$), echoing the positive relationship found in the NLSY79.

Model 3 in Table 3 (KLIPS sample) addresses hypothesis 4a which predicts a decreased likelihood of turnover among committed workers who perceive their skills to be specific. We find a significant negative interaction between organizational commitment and perceptions of firm-specificity ($\beta = -0.0632, p < .05$), with significant main effects for both perceived skill specificity ($\beta = 0.1797, p < .05$) and organizational commitment ($\beta = -0.0322, p < .001$). This hypothesis is supported, and as graphically shown in the Figure 1, organizational commitment moderates the relationship between perceptions of firm-specificity in skills and the likelihood of turnover. The relative hazard of turnover amongst uncommitted workers who perceive their skills to be firm-specific is almost 45% higher than that of uncommitted workers who perceive their skills to be general.

Insert Figure 1 about here

Model 5 in Table 3 (KLIPS) and model 8 in Table 4 (NLSY79) present the results for hypothesis 4b, which predicts a negative interaction between perceived firm-specificity and job satisfaction². This hypothesis is supported in the KLIPS sample ($\beta = -0.0752, p < .05$) since the likelihood of turnover is lower for satisfied workers who perceive their skills to be firm-specific. Figure 2 below presents a graph that helps explicate this relationship. The relative hazard of turnover for workers who are unsatisfied and perceive their skills as firm-specific is almost 63% higher than unsatisfied workers who perceive their skills as general. Although the main effect of job satisfaction is negative and strongly significant in Table 4 (NLSY79), we do not find support for the interaction posited in hypothesis 4b. In sum, we find support for hypothesis 4a (interaction with organizational commitment) and mixed support for hypothesis 4b (interaction with job satisfaction) since it was not evident in the NLSY79 sample.

Insert Figure 2 about here

² Model 4 in Table 3 (KLIPS) simply shows the main effect of job satisfaction in the model.

Table 5 presents the results of Hypotheses 2a and 2b for both the KLIPS and NLSY79 samples. Hypothesis 2 makes predictions about pay increases for those who perceive their skills to be firm-specific depending on whether or not they change jobs. We anticipated that those who perceive their skills as firm specific would receive smaller pay increases whether they stay or change jobs. Those who stay, we posited, might be subject to greater wage compression as external equity might become less of a factor in determining their pay. Those who change jobs were predicted to receive less pay than those who changed jobs but perceived their skills to be more general. We find no support for either hypothesis since the coefficients for the main effect of perceived firm specificity and for its interaction with turnover were insignificant in both samples. We do find in both data samples though, that pay increases for all workers who turnover is smaller compared with all workers who do not turnover. This is perhaps due to a larger proportion of involuntary turnover being represented in the data samples.

Robustness Checks

In order to rule out alternative explanations, we test our model using other estimation strategies. We test the KLIPS sample using STATA *xtlogit*, which conducts a binomial logistic regression on panel data while accounting for the dependency that exists between observations due to the clustered nature of the data. Our results remained consistent with the survival analysis.

Next, we identified and eliminated observations that were likely to be retirements and tested both dependent variables using this reduced sample. The results of the analysis remained the same with that obtained with the full sample. To further rule out other plausible explanations, we eliminate jobs with less than a year's tenure to create a sub-sample of observations with more than a year's tenure. We find similar result patterns.

Given that we rely on survey data, Common Method Variance (CMV) might be considered to be a problem. However, the dependent variables used in this study – turnover and percentage wage change are both objective measures provided in KLIPS and NLSY79, therefore CMV, whose effects has been shown to be generally overstated in management literature, (Spector, 2006) should not be an issue. Two key predictor variables, however, are subjective – Organizational Commitment and Job Satisfaction. Both variables are self-reported, and are measured using a 5 – item scale in the KLIPS, the mean of which were taken and used in our analysis. CMV should, however, have little to no impact on the statistical significance of our results (Doty and Glick, 1998) because first, none of our analysis included these two variables simultaneously, second, our dependent variable is objective, and third, the KLIPS dataset generally uses several anchoring points and reverse-scored items, minimizing the likelihood of this phenomenon.

DISCUSSION

This study has developed a theory of how perceived firm specific human capital affects turnover. 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 and turnover literatures, which highlights the role of biases in human judgment. Our empirical analysis of two independent samples of employees in Korea and the United States provided support for hypotheses derived from the psychology literature. There was no evidence that perceptions of firm specificity hinder turnover. In fact, if anything, findings suggest higher rates of turnover among workers who feel their skills are firm specific.

Furthermore, there was no observable wage penalty for those who felt that their skills were firm-specific. This was true both for those who changed jobs or for those who stayed in a given

firm. While we cannot make much of the fact that there were no significant results with respect to wages, this is the central mechanism posited to limit mobility for workers with FSHC. If that mechanism is not evident, it is perhaps unsurprising that turnover is not reduced for such workers.

In the following sections, 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 worker perceptions of FSHC may be incorrect. Second, it may be that employee perceptions are accurate but this information is not observable in the labor market. We explore these possibilities for each finding below.

Incorrect employee perceptions. The results did not suggest that perceived FSHC actually constrains turnover as one would expect from the extant literature. If anything, perceived FSHC even seemed to be associated with increased turnover. This could mean that workers were incorrect in their perceptions that their skills were hard to apply in other firms. This would be consistent with the unfolding model of turnover which suggests that workers would not necessarily be familiar with their external options until they are prompted to search (Lee *et al.*, 1996; Lee, Gerhart, Weller, and Trevor, 2008).

Search may be prompted by events on or off the job or an increasing level of dissatisfaction. This implies a window where dissatisfaction is building but an external search has not been initiated. During this time, it may be natural for workers to perceive that their skills are not valuable to other firms. This feeling of being stuck may correspond to perceptions of firm specificity. However, these perceptions may be incorrect since they have not been tested in the labor market.

Subsequent search may reveal that the workers' prior perceptions were incorrect and that their skills are, in fact, applicable in other firms. In this case, the initial perceptions would be inaccurate but they would be updated and corrected through the search activities.

One might imagine that perceptions of firm specificity, alone, could hinder mobility. Search requires effort and workers may not exert the effort if they are convinced that their skills are not valuable to other firms. This points to a need for new theory that integrates employees' confidence in their perceptions. An uninformed perception may not engender sufficient confidence that the worker chooses not to exert effort to search and verify their initial expectation. We found that satisfied workers who perceive their skills to be firm specific were especially unlikely to leave their jobs. This is consistent with the idea that workers only exert the effort required for a search when they are sufficiently dissatisfied (or uncommitted).

A question, then, is whether actual search is the only thing that would engender confidence in perceptions of firm specificity. If there are other means, it may be possible for firms to sway employees into believing that their skills are firm specific such that they choose not to search for outside alternatives. In this case, even incorrect perceptions might prove to be an effective mobility barrier.

What if employee perceptions are correct? It is also possible that workers' initial perceptions of firm specificity were correct. That is, they may have had firm specific skills but still chose to move to another job. Again, there is ample evidence that sometimes worker productivity drops when they change employers (Bidwell and Keller, 2014; Groysberg *et al.*, 2008). Then the question becomes whether other firms were aware of the firm specific skills or not.

If they were aware, this does not necessarily imply that firms would not be interested in hiring the workers. Rather, human capital theory suggests that firms might reduce the wages that they

offer for such workers to avoid paying for skills that they could not effectively deploy (Becker, 1993; Hashimoto, 1981). While this discounted wage might discourage some workers from moving, others might be sufficiently dissatisfied that they are willing to accept the wage penalty. Another possibility might be that firms are aware of firm specific skills but value workers who are willing and able to make such investments. They might actively seek such workers if they need people who will make such investments at their organization (Campbell *et al.*, 2012; Morris, Barney, Alvarez, and Molloy, 2016).

Again, we found no evidence of discounted wages for workers who perceived that their skills were firm specific and changed jobs anyway. This should not be interpreted to imply that firms never discount wages in this way. However, it suggests that, on average, such discounts do not appear to be prevalent.

It is also possible that other firms are not aware what skills might transfer and what skills might not. This is consistent with the view that labor markets are fraught with imperfect and incomplete information (Berg, 2003 {1970}; Spence, 1973). As such, individuals who correctly perceive that they have firm specific skills might not face a wage penalty when they seek to change jobs. If this is the case, firm specific knowledge and skills might not impose the mobility barriers that are central to the strategic human capital literature.

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 transaction cost economics.

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 (2015a) 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 also may be subject to cognitive biases.

Perceptual variance among stakeholders may also exhibit temporal differences. For example, when considering investments in firm specific human capital, there may be an important 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. For example, is it possible that employee perceptions of firm-specificity are less prone to bias ex-ante investment yet systematically biased towards generality ex-post. 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, and 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, and Wright, 2011; Wright, Coff, and 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 antecedes of “continuance commitment” in Meyer and Allen’s (1991) three-factor model of commitment (see also Lee, Burch, and Mitchell, 2014). Interestingly, while this literature generally concludes that continuance commitment has a modest effect reducing turnover, it also concludes that continuance commitment is associated with *lower* employee performance (Meyer, Stanley, Herscovitch, and 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 and Raffiee, 2015a). 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 transaction cost economics. Our findings also contribute to the growing body of work that has augmented transaction cost economics (TCE) with the cognitive psychology literature (Weber and Mayer, 2011, 2014; Weber, Mayer, and 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 of 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 endemic in much of the strategy literature (Molloy, Chadwick, Ployhart, and 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.

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 the extent to which employees who perceive their human capital to be firm-specific are likely to exit the firm. 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 turnover and cognitive psychology literatures

– perceived firm specific human capital is not associated with a reduced likelihood of turnover as extant theory suggests. Our findings suggest that strategy researchers may need to re-think the role of firm-specific human capital for creating and sustaining competitive advantage since firm-specific human capital, as perceived by employees, may drive behavior in ways quite different from what extant theory predicts.

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TABLE 1: Description of Measures

Measure	KLIPS (n=18,341)	NLSY79 (n=1,561)
<u>Dependent Variable</u>		
Turnover	We measure turnover using a dummy variable. A change to a new employer in a survey year is coded as 1 for turnover while remaining at the same employer as the previous survey year is coded 0.	We measure turnover using a dummy variable. A change to a new employer in a 1996 is coded as 1 for turnover while remaining at the same employer as 1994 is coded 0.
% Wage Increase	We measure percentage wage increase by subtracting wage in year ‘t’ from wage in year ‘t+1’ and then divide that by wage in year ‘t’. $\frac{W_{t+1} - W_t}{W_t} \times 100$	We measure percentage wage increase by subtracting wage in 1994 from wage in 1996 and then divide that by wage in 1994. $\frac{W_{1996} - W_{1994}}{W_{1994}} \times 100$
<u>Independent Variables</u>		
Perceived Firm-specific human capital (FSHC _{Perceived})	“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?” (1) Useful as much as in the current workplace (2) Partly useful (3) Hardly useful I did not learn any special knowledge or skills from this job	“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?” (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 None or almost none of the skills
Organizational commitment	To what extent do you agree with the following statements about your organization (1=strongly disagree, 5=strongly agree): 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" 5. "I hope to continue working at this company if other things remain the same"	n/a
Job satisfaction	<i>Measure 1:</i> To what extent do the following statements describe your feelings about your job (1=strongly disagree, 5=strongly agree): 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 be personally rewarding" 5. "I want to continue this job if other things remain the same"	<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)?”

Measures 2 and 3:

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).

Organizational tenure	Organizational tenure in years (log)	Organizational tenure in years (log)
<u>Control Variables</u>		
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
Wage Residuals	Residuals from predicted mean wage using xtmixed - Ordinary Least Squares regression for panel data which takes into account the dependency amongst observations	Residuals from predicted mean wage using Ordinary Least Squares regression
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 US 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)

Table 2a. Descriptive Statistics and Correlations (KLIPS)

	Mean	S.D.	-1	-2	-3	-4	-5	-6	-7	-8	-9
-1 Turnover	0.1	0.3	1								
-2 FSHC _{Perceived}	0.08	0.27	0	1							
-3 Wage Change	0.12	0.35	-0.14	-0.01	1						
-4 Education	13.15	2.99	-0.03	-0.13	0.04	1					
-5 Gender	0.63	0.48	-0.02	-0.03	0.01	0.14	1				
-6 Wage	178.7	105.6	-0.1	-0.11	-0.15	0.41	0.34	1			
-7 Age	37.26	10.34	-0.08	0.1	-0.06	-0.34	0.14	0.14	1		
-8 Organizational Commitment	3.35	0.64	-0.05	-0.17	-0.01	0.26	-0.05	0.33	-0.02	1	
-9 Job Satisfaction	3.49	0.61	-0.02	-0.15	-0.01	0.23	-0.04	0.28	-0.03	0.76	1
-10 Tenure	5.43	6.23	-0.12	-0.03	-0.01	0.09	0.16	0.49	0.39	0.23	0.18

Notes: n = 18,341 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 2b: Descriptive Statistics and Correlations (NLSY79)

	Mean	S.D.	-1	-2	-3	-4	-5	-6	-7	-8	-9
-1 Turnover	0.37	0.48	1								
-2 FSHC _{Perceived}	0.02	0.14	0.08	1							
-3 Wage Change	0.24	0.91	0.03	-0.01	1						
-4 Education	13.14	2.27	-0.09	-0.05	0.07	1					
-5 Gender	0.58	0.49	-0.02	0	-0.01	-0.02	1				
-6 Wage (1994)	1224.05	791.48	-0.17	-0.03	-0.12	0.41	0.16	1			
-7 Age	32.76	2.22	-0.07	-0.01	0.03	0	0	0.06	1		
-8 Job Satisfaction	3.32	0.7	-0.09	-0.02	0	0.01	0.01	0.1	0.05	1	
-9 Tenure	264.01	250.32	-0.62	-0.06	-0.07	0.03	-0.01	0.18	0.11	0.01	1

Notes: n = 1,561 Variables are in original metrics (unlogged). Firm size, industry, location, and year are omitted.

Table 3. Hazard of Turnover: Cox Proportional Hazards Survival Analysis (KLIPS)

VARIABLES	(1)	(2)	(3)	(4)	(5)
Education	-0.0269* (0.0115)	-0.0269* (0.0115)	-0.0272* (0.0115)	-0.0290* (0.0114)	-0.0292* (0.0114)
Gender = 1	-0.0041 (0.0654)	-0.0039 (0.0655)	-0.0041 (0.0654)	0.0030 (0.0655)	0.0029 (0.0654)
Wage Residuals	-0.2719*** (0.0736)	-0.2715*** (0.0735)	-0.2723*** (0.0736)	-0.3079*** (0.0733)	-0.3089*** (0.0735)
Age	-0.0123*** (0.0008)	-0.0123*** (0.0008)	-0.0123*** (0.0008)	-0.0123*** (0.0008)	-0.0123*** (0.0008)
Age Squared	0.0005*** (0.0000)	0.0005*** (0.0000)	0.0005*** (0.0000)	0.0005*** (0.0000)	0.0005*** (0.0000)
Organizational Commitment	-0.0354*** (0.0078)	-0.0353*** (0.0078)	-0.0322*** (0.0080)		
FSHC _{Perceived}		0.0102 (0.0932)	0.1797* (0.0877)	0.0273 (0.0933)	0.2390* (0.0982)
FSHC _{Perceived} X Org Commit			-0.0632* (0.0296)		
Job Satisfaction				-0.0087 (0.0090)	-0.0041 (0.0094)
FSHC _{Perceived} x Job Satisfaction					-0.0752* (0.0303)
Observations	18,341	18,341	18,341	18,341	18,341
Firm Size Dummies	Included	Included	Included	Included	Included
Occupation Dummies	Included	Included	Included	Included	Included
Industry Dummies	Included	Included	Included	Included	Included
Location Dummies	Included	Included	Included	Included	Included
Log pseudo likelihood	-14559	-14559	-14558	-14567	-14565
Chi Square	988.1	988.2	994.7	962.2	966.2
Pseudo R-squared	0.0347	0.0347	0.0348	0.0342	0.0343

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10

All significance tests based on two-tailed tests.

Table 4. Binomial Logistic Regression on Turnover (NLYSY79)

VARIABLES	(6)	(7)	(8)
Education	-0.023 (0.057)	-0.007 (0.057)	-0.006 (0.057)
Gender	-0.906*** (0.267)	-0.929*** (0.269)	-0.922*** (0.270)
Wage Residuals (1994)	-0.163 (0.276)	-0.185 (0.277)	-0.177 (0.278)
Age	-0.031 (1.512)	0.132 (1.515)	0.109 (1.516)
Age Squared	0.000 (0.023)	-0.002 (0.023)	-0.002 (0.023)
Job Satisfaction	-0.602*** (0.163)	-0.611*** (0.164)	-0.641*** (0.167)
FSHC _{Perceived}		1.878* (0.735)	-1.149 (3.247)
FSHC _{Perceived} X Job Satisfaction			0.874 (0.917)
Tenure	-4.333*** (0.281)	-4.384*** (0.286)	-4.396*** (0.287)
Constant	7.649 (24.875)	4.952 (24.930)	5.418 (24.958)
Observations	1,561	1,561	1,561
Firm Size Dummies	Included	Included	Included
Occupation Dummies	Included	Included	Included
Industry Dummies	Included	Included	Included
Location Dummies	Included	Included	Included
Log pseudo likelihood	-290.9	-287.8	-287.4
Chi Square	1481	1487	1488
Pseudo R-squared	0.718	0.721	0.721

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0

All significance tests based on two-tailed tests.

Table 5. FSHC_{perceived} and % Wage Increase (Ln)

VARIABLES	KLIPS			NLSY79		
	(9)	(10)	(11)	(12)	(13)	(14)
FSHC _{Perceived}		-0.0047 (0.0043)	-0.0047 (0.0047)		0.0079 (0.0637)	0.0716 (0.1031)
TurnOver	-0.0696*** (0.0034)	-0.0696*** (0.0034)	-0.0696*** (0.0035)	-0.0566† (0.0295)	-0.0568† (0.0295)	-0.0544† (0.0297)
FSHC _{Perceived} x TurnOver			0.0004 (0.0117)			-0.1031 (0.1311)
Education	0.0010* (0.0005)	0.0011* (0.0005)	0.0011* (0.0005)	0.0094* (0.0047)	0.0094* (0.0047)	0.0094* (0.0047)
Gender	0.0032 (0.0026)	0.0031 (0.0026)	0.0031 (0.0026)	0.0029 (0.0208)	0.0029 (0.0208)	0.0024 (0.0208)
Wage Residuals	-0.1321*** (0.0033)	-0.1322*** (0.0033)	-0.1322*** (0.0033)	-0.3414*** (0.0223)	-0.3413*** (0.0223)	-0.3417*** (0.0223)
Age	-0.0010*** (0.0001)	-0.0010*** (0.0001)	-0.0010*** (0.0001)	-0.0630 (0.1249)	-0.0622 (0.1250)	-0.0620 (0.1251)
Age Squared	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0010 (0.0019)	0.0010 (0.0019)	0.0010 (0.0019)
Job Satisfaction	0.0115*** (0.0020)	0.0113*** (0.0020)	0.0113*** (0.0020)	0.0246† (0.0130)	0.0246† (0.0130)	0.0245† (0.0130)
Tenure (Logged)	-0.0044** (0.0016)	-0.0044** (0.0016)	-0.0044** (0.0016)	-0.0198† (0.0107)	-0.0198† (0.0107)	-0.0197† (0.0107)
Constant	0.6509*** (0.0114)	0.6519*** (0.0114)	0.6519*** (0.0114)	0.7880 (2.0563)	0.7746 (2.0598)	0.7753 (2.0601)
Observations	12,928	12,928	12,928	1,560	1,560	1,560
Firm Size Dummies	Included	Included	Included	Included	Included	Included
Occupation Dummies	Included	Included	Included	Included	Included	Included
Industry Dummies	Included	Included	Included	Included	Included	Included
Location Dummies	Included	Included	Included	Included	Included	Included
Log pseudo likelihood	8676	8676	8676	-553.8	-553.8	-553.5

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10.

All significance tests based on two-tailed tests.

Figure 1: Relative Hazards of Turnover Moderated by Organizational Commitment (KLIPS)

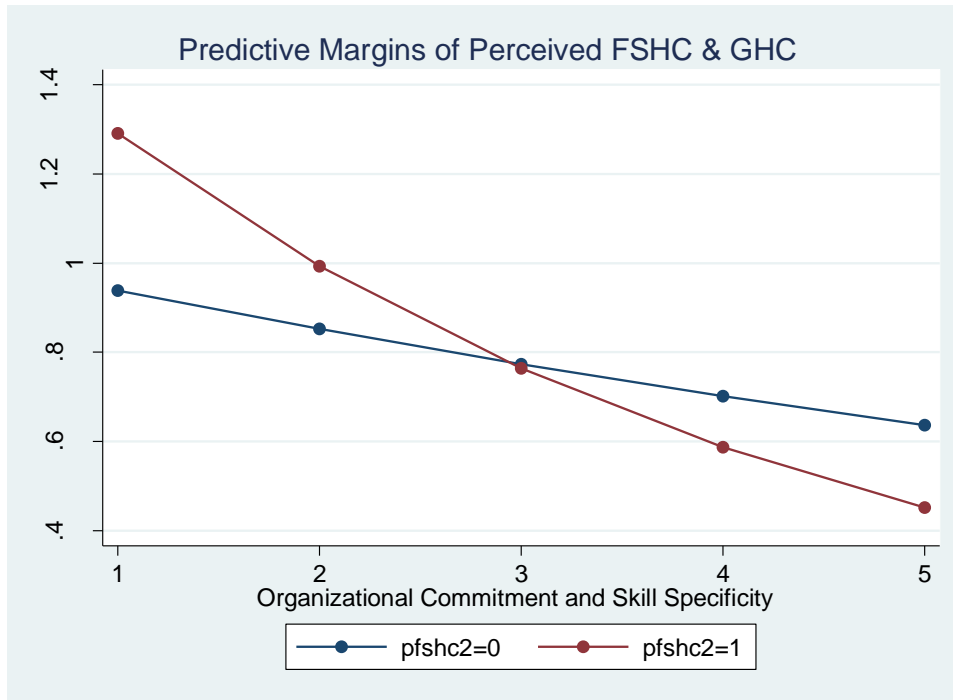


Figure 2: Relative Hazard of Turnover Moderated by Job Satisfaction (KLIPS)

