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How Much is Work Worth to Firms? Essays on Value Creation and Value Capture from Human Capital.

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How Much is Work Worth to Firms? Essays on Value Creation and Value Capture from Human Capital.

ABSTRACT

My dissertation focuses on the relationship between human capital and firm performance. I investigate different ways in which the interactions between firms, individuals and markets shape how firms create and capture value through human capital resources. Specifically, I analyze some of the challenges that firms, and managers face when assessing the value of human capital. In the first chapter, I investigate the performance effects of the expiration of temporary contracts. In the second chapter, I investigate the relationship between variation in performance and variation in pay for managers below the executive level. Finally in the third chapter, I explore if, how and to what extent the need for firm-specific skills, at the job level, affects staffing decisions between internal and external candidates. With this dissertation, I intend to contribute to the strategic human capital and strategic human resources management literatures on the firm- and individual-level biases that affect the relationship between human capital and the firm competitive advantage. Overall, my studies suggest that the value of work to the firm, to the managers, and to the workers cannot be objectively and perfectly assessed ex-ante, even when the complexity of the jobs is low and requires moderate levels of knowledge, skills, and abilities.

INTRODUCTION

My dissertation focuses on the relationship between human capital (here defined as "a unit-level resource that is created from the emergence of individuals' knowledge, skills, abilities and other characteristics (KSAOs)" (Ployhart & Moliterno, 2011: 128)) and firm performance. I investigate different ways in which the interactions between firms, individuals and markets shape how firms create and capture value through human capital resources. Specifically, I analyze some of the challenges that firms, and managers face when assessing the value of human capital. Relatively to previous research on how firms garner rents from human capital (Castanias & Helfat, 1997, 2001), my work looks not only at how human capital rents are generated but also at how firms and managers capture them (Chadwick, 2017).

Increasing amounts of evidence show that human capital is a fundamental source of firm competitive advantage (Coff & Kryscynski, 2011). However, from a practical standpoint, organizations struggle to manage the heterogeneity of individual KSAOs and to balance different kinds of workers and interests to transform individual KSAOs into a "valuable unit-level resource" (Ployhart & Moliterno, 2011: 128). The broad question that I address in my work is how labor market frictions influence value creation and value capture from human capital, both on the demand and on the supply-side (Campbell, Coff, & Kryscynski, 2012). In my three dissertation papers, I study inefficiencies in both the internal and the external labor markets (e.g., underpaying or overpaying workers' productivity; underestimating the costs of workers' dismissals; overestimating the transferability of human capital; implementing practices to constraint employees' mobility). I focus on how these inefficiencies emerge from the interaction between managers' decisions and firms' policies (Coff & Raffiee, 2015) and

on their effects on the value of managers and subordinates' human capital to the firm (Chadwick, 2017).

In the first chapter ("Does losing temporary workers matter? Temporary worker turnover, replacements, and unit performance.", with Bonet, R., & Camuffo, A.), I investigate the performance effects of the expiration of temporary contracts. This paper aims to reconcile the contradictory predictions of collective turnover theory—that turnover of any type impairs organizational performance—and of contingent work research—that temporary worker turnover is beneficial for organizational performance because it provides flexibility. We argue and find that temporary worker turnover has an inverted U-shaped relationship with unit performance because of the combination of the benefits of flexibility and the disruption costs of turnover. We also analyze the moderating effect of the quantity and quality of replacements on the turnover-performance relationship. This study offers a more nuanced view about the pros and cons of using temporary workers and cautions managers to consider thoroughly all the direct and indirect costs and benefits of flexibility strategies. Contrary to the conventional view that temporary workers, especially in businesses characterized by seasonal peaks and low-skilled jobs, are disposable resources helpful in achieving numerical flexibility, we find that their departure also implies human capital depletion costs with negative effects on unit performance.

In the second chapter ("How much is a manager worth and to whom? Managers' abilities, unit performance and compensation.", with Bidwell, M., & Camuffo, A.), I investigate the relationship between variation in performance and variation in pay for managers below the executive level. The aim of this paper is to uncover the relationship between the value created and the value captured from general managerial human capital. Adopting a Mixed Model Specification, we compare the variance in middle managers'

contribution to performance and the variance in compensation to test to what extent differences in performance map into differences in pay. We find that the standard deviation of manager effects on performance is more than forty times the standard deviation of their effect on compensation. The notable size of this discrepancy between abilities and pay suggests that that the value generated by managers does not transfer into their compensation. This is consistent with the recent arguments that employers and employees do not objectively evaluate human capital and provides a rationale for firm-generated (i.e. demand-side, but with supply side spillovers) labor market frictions.

Finally in the third chapter, ("Questioning the Effect of Firm-Specific Human Capital on Staffing Decisions: An Experimental Approach.", with Camuffo, A., & Netchaeva, E.), I explore if, how and to what extent the need for firm-specific skills, at the job level, affects staffing decisions between internal and external candidates: does firm-specific human capital matter? We provide one of the first, at least to our knowledge, experimental study on the effects of firm specific human capital on staffing decisions. We test the validity of the predictions of transaction cost and personnel economics on the conditions in which firms should rely on internal labor markets. Moreover, we investigate the moderating effect of firm performance on the relationship between firm-specific human capital and hiring. With this paper, we aim to contribute to the debate on the managerial relevance of the distinction between firm-specific and general human capital. Moreover, we hope to shed clarity on the existing non-conclusive empirical findings on the relationships between firm-specific human capital and the selection of external over internal candidates.

In the first two chapters of my dissertation, I use a unique longitudinal database provided by a leading multinational company in the restaurant industry. I have access to matched employer-employee monthly data, from 2007 to 2014, from the company's sales

network (stores and restaurants), with very detailed information on the characteristics of the managers, the employees and the establishments. For each manager and worker in each store, the data-set contains: a) Individual characteristics such as gender, education, age; b) Wages and bonuses; c) Workers' contract characteristics such as starting and ending date of the relationship; d) Individual performance appraisals. For each store, data are available with regard to: a) Store characteristics (size, location, business category e.g. airport, highway); b) Absenteeism; c) Total number of worked hours; d) Financial and operational performance results. This allows me to estimate the value created and captured by human capital, while controlling for a set of variables that are likely to drive performance and compensation. Additionally, managers move across stores, allowing me to distinguish store and manager effects. In my third paper, I counduct a set of controlled lab-experiments involving students, MBAs, and HR managers.

With this dissertation, I intend to contribute to the strategic human capital and strategic human resources management literatures on the firm- and individual-level biases that affect the relationship between human capital and the firm competitive advantage (Campbell et al., 2012; Chadwick, 2017; Coff & Kryscynski, 2011; Ployhart & Moliterno, 2011). Overall, my studies suggest that the employment outcomes of managerial decisions (e.g., such as staffing, allocation of incentives, duration of contracts) are not necessarily maximizing the firm's profitability. They are "an endogenous consequence" of the organizational and labor market structures in which these decisions are made (Bidwell, 2012: 1623), as well as of the firm's strategy. Therefore, the value of work to the firm, to the managers, and to the workers cannot be objectively and perfectly assessed ex-ante (Coff & Raffiee, 2015), even when the complexity of the jobs is low and requires moderate levels of knowledge, skills, and abilities.

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CHAPTER 1

with Rocio Bonet and Arnaldo Camuffo

Does losing temporary workers matter? Temporary worker turnover, replacements, and unit performance.

ABSTRACT

This study reconciles the contradictory predictions of collective turnover theory—that turnover of any type impairs organizational performance—and of contingent work research—that temporary worker turnover is beneficial for organizational performance because it provides flexibility. We argue that temporary worker turnover has an inverted U-shaped relationship with unit performance because of the combination of the benefits of flexibility and the disruption costs of turnover. We test this argument using longitudinal monthly data from a leading multinational company in the food and beverage industry, and find support for our hypothesis. We also find that this relationship is moderated by the quantity and the quality of replacements. Replacements enhance both the benefits and the costs of temporary worker turnover: the higher the replacement rate, the more pronounced the U-shaped relationship between temporary worker turnover and unit performance. Furthermore, we find that novice replacements increase the disruption costs of turnover more than temporary workers who have worked for the company in the past. The study therefore suggests that firms can strategically plan temporary worker turnover and replacements to enhance the benefits of flexibility and to limit the costs typically associated with workforce change.

Keywords: collective turnover, temporary workers, replacements, rehires

INTRODUCTION

Organizations today increasingly rely on temporary workers because of the benefits of employment flexibility they bring (Davis-Blake & Uzzi, 1993; Houseman, 2001; Kalleberg, 2000, 2001). Temporary workers constitute 7.9% of the current U.S. workforce population (U.S. Government Accountability Office, 2015). Similar figures appear around the world, with temporary employment being 11.4% in OECD countries in 2016 (OECD Statistics, 2016). Differently from permanent employees, contingent or temporary workers do not have an explicit or implicit contract for long-term employment (Polivka, 1996) and can be dismissed without infringing on legal or psychological contracts (Matusik & Hill, 1998).

Existing research advocates that organizations use contingent workers because of the benefits of flexibility they bring. Due to the very specific nature of their contracts, the use of temporary workers allows organizations to adjust the number of workers to their needs (Cappelli & Keller, 2013; Kalleberg, 2000; Smith 1997). This might suggest that organizations benefit not only from hiring temporary workers, but also from dismissing them when their contracts expire (Cappelli, 2009; Cappelli & Neumark, 2004; Mangum, Mayall, & Nelson, 1985). Planning temporary worker turnover to adjust to fluctuations in demand allows the organization to reduce human resources in excess and, in turn, to cut labor cost (Lecuona & Reitzig, 2014).

If flexibility is valuable to the organization (Cappelli & Neumark, 2004), then units with high turnover of temporary workers should perform better than companies with low turnover of temporary workers. However, this prediction strikingly contrasts with the findings of an extensive turnover literature showing that workers' exits impair organizational performance (Hancock, Allen, Bosco, McDaniel, & Pierce, 2013; Hausknecht & Holwerda, 2013; Heavey, Holwerda, & Hausknecht, 2013; Nyberg & Ployhart, 2013; Park & Shaw,

2013). This raises an interesting conundrum: does that impairment limit or even offset the benefits of numerical flexibility?

Knowledge of how temporary worker turnover affects organizational performance is therefore important for a better understanding of the trade-offs of using contingent workers (for a recent review of potential trade-offs see Fisher and Connelly [2017]). If dispensing with contingent workers has a cost, firms should consider it—along with other factors—when they make decisions on how many contingent workers to hire and how to organize their work.

Researchers studying contingent work have mostly focused on the effects of the presence of contingent workers (Broschak & Davis-Blake, 2006; Davis-Blake, Broschak, & George, 2003; George, Chattopadhyay, & Zhang, 2012; Kesavan, Staats, & Gilland, 2014) and neglected the effects of their departure. Meanwhile, studies of the performance consequences of turnover in general have focused on the consequences of the turnover of permanent workers (Shaw, 2011). This paper investigates the effect of temporary workers' departure due to the expiration of their contracts on unit financial performance. Capacity theory (Hausknecht & Holwerda, 2013) and Context-Emergent Theory (Call, Nyberg, Ployhart, & Weekley, 2015; Nyberg & Ployhart, 2013) posit that the opportunity to plan replacement cycles in advance is one of the major reasons why planned turnover is less costly than unplanned ones (Call et al., 2015). Understanding the moderating effect of replacements is thus fundamental to understanding how turnover affects unit performance when exits are planned and used to achieve flexibility[1]. This study also investigates how the effect of temporary worker turnover varies with the rate of replacements (Call et al., 2015).

[1] The literature on downsizing has focused extensively on the use of turnover as a strategy to cut costs (Cascio, 2002; Trevor & Nyberg, 2008). However, the extinction of temporary contracts is a different type of planned turnover with distinct performance effects. Differently from downsizing, temporary worker turnover is not a permanent reduction of the workforce to a target level (Cascio, 2002). Therefore, it is not a severe negative shock to organizational

Drawing from existing research on contingent work (Cappelli & Neumark, 2004; Fisher & Connelly, 2017; Kesavan et al., 2014) and collective turnover (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013), this study aims to reconcile the contradictory predictions of collective turnover literature—that turnover of any type, impairs organizational performance—and of contingent work literature—that temporary worker turnover, being forecastable and functional in that it enables flexibility, has positive performance consequences. We predict and find an inverted U-shaped relationship between temporary worker turnover rate and unit performance. We posit that there are both benefits and costs associated with the turnover of temporary workers. The expiration of temporary contracts is beneficial because it allows the organization to adjust the workforce to fluctuations in demand and relieves it from paying wages for underutilized workers when demand drops. However, losing temporary workers is also costly for the organization because it increases, at least temporarily, work demands on the remaining workers, who will need to reallocate the tasks among themselves and/or retrain new contingent workers from scratch (Fisher & Connelly, 2017; Kesavan et al., 2014). We argue that beyond a certain level of turnover the costs of disruption outweigh the benefits of flexibility.

Furthermore, we theorize on how the quantity and the quality of replacements moderate the relationship between temporary worker turnover and performance. We analyze how the benefits and costs of replacing workers shape the relationship between temporary worker turnover and performance. On the one hand, replacements enhance the benefits of turnover because they allow the employer to more closely match demand fluctuations

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performance and to remaining employees (Trevor & Nyberg, 2008). Rather, because of the ease in hiring and dismissing temporary workers, temporary worker turnover can be a relatively frequent event with temporary workers being often replaced by other temporary hires.

(Cappelli, 2009). Employers face a tension between the need for downward flexibility (i.e., reducing the workforce when demand drops) and upward flexibility (i.e., expanding the capacity as demand rebounds). Employers who can replace temporary workers more readily, do not need underutilized workers during a demand downturn to buffer the potential increase in future demand. These employers can thus sustain higher rates of temporary worker turnover than those who are unable to replace workers as promptly as they do. On the other hand, replacements also increase the disruption costs of turnover because new hires require support and training from remaining workers to get up to speed (Hausknecht, Trevor, & Howard, 2009; Reilly, Nyberg, Maltarich, & Weller, 2014).

Accordingly, we hypothesize that the rate of replacements moderates the inverted U-shaped relationship between turnover and performance such that the relationship is stronger when replacements are high. We also argue that the moderation effect is more pronounced when the replacements are novice to the organization (Hausknecht & Holwerda, 2013) —that is, when they are hired for the first time vs. re-hired or transferred from other units. We contend that replacements who have worked in the unit in the past are more likely to have valuable firm specific human capital, to be more socially integrated, and to satisfy at least the minimum quality requirements of the employer. The analyses on the replacement rate extend our understanding of replacements as a moderator of the turnover effect on performance considering both the positive (Call et al., 2015; Reilly et al., 2014) and the negative (Hausknecht & Trevor, 2011; Hausknecht et al., 2009) effects of human capital inflows.

We test our predictions using longitudinal monthly data from 2007 to 2014 for the Italian units (bars and restaurants) of a leading multinational company providing food and beverage services to travelers.

This study has three major intended contributions. First, we extend collective turnover theory, bringing into it an aspect of the reality of work that this literature has largely neglected: the fragmentation of labor markets into multiple types of contractual arrangements. We extend one boundary condition of this theory by analyzing the performance consequences of turnover when exits are planned and used to achieve flexibility. We analyze to what extent and under what circumstances collective turnover research prediction (that turnover impairs performance), and the more optimistic prediction of the existing research on flexibility, hold. We bridge these predictions by hypothesizing and finding a non-linear relationship between temporary worker turnover and performance. In so doing, we respond to recent calls to investigate the effects of underexplored but important alternative types of turnover (Shaw, 2011). Second, we contribute to the collective turnover call to study inflows and outflows together rather than in isolation and to bridge the literature on turnover and on staffing (Call et al., 2015; Nyberg & Ployhart, 2013). We do so by developing a theoretical argument of how the quantity and quality of replacements shape the curvilinear relationship between turnover and performance. Finally, by analyzing the cost of contingent worker turnover, our study also contributes to the literature that has documented the negative consequences of using contingent workers (Broschak & Davis-Blake, 2006; Davis-Blake et al., 2003; Fisher & Connelly, 2017; George et al., 2012; Smith, 2001). Our findings suggest that firms should strategically deploy their temporary workers by coordinating contract expiration and staffing cycles to minimize the harm done by temporary worker turnover to unit financial performance.

THEORY AND HYPOTHESES

Collective Turnover and Temporary Work

Organizations seek numerical flexibility, or the ability to adjust the number of workers they use, in order to meet fluctuations in demand (Kalleberg, 2000). One approach firms usually follow to build this flexibility into their workforce is hiring temporary workers, or workers whose contracts have an expiration date (Cappelli & Neumark, 2004; Davis-Blake & Uzzi, 1993). The expiration of temporary contracts at the end of a period allows the employer to readjust the size of its workforce with the company needs and to eliminate underutilized capacity in the unit when demand shrinks. The organization can therefore avoid the costs of paying wages for workers in excess (Lecuona & Reitzig, 2014), without engaging in the costlier process of firing permanent workers. Moreover, reducing human resources slack can avoid inertia and rigidity in how workers perform their jobs and in how they respond to changes in demand (Mishina, Pollock, & Porac, 2004; Voss, Sirdeshmukh, & Voss, 2008). The increase in the workload and in the time pressures for the remaining workers, when moderate, can also improve efficiency (Kc & Terwiesch, 2009) and sales (Tan & Netessine, 2014).

On the one hand, we therefore expect temporary worker turnover to benefit employers because it provides them with greater flexibility and gives them the opportunity to reduce labor costs as well as organizational inefficiencies generated by slack human resources when demand falls. This type of flexibility can be particularly valuable in seasonal industries and in industries with more uncertain demand (Cappelli & Keller, 2013; Houseman, 2001).

On the other hand, while the collective turnover literature has not directly explored the performance consequences of losing temporary workers, we could expect that temporary worker turnover may be costly to the organization (Fisher & Connelly, 2017; Hausknecht & Holwerda, 2013). Collective turnover, defined as the “aggregate levels of employee departures that occur within groups, work units, or organizations” (Hausknecht & Trevor,

2011: 353) can significantly impair performance (Reilly et al., 2014); it depletes human and social capital resources from a unit or organization, generates coordination and communication breakdowns, slows down organizational learning, and destabilizes routines, consequently disrupting operations (Argote & Epple, 1990; Dess & Shaw, 2001; Kacmar, Andrews, Van Rooy, Steilberg, & Cerrone, 2006; Staw, 1980; Watrous, Huffman, & Pritchard, 2006). Its detrimental effects on profitability, productivity, customer service, and efficiency have been widely documented empirically (for recent reviews of this literature see Heavey et al. [2013], Park and Shaw [2013], and Shaw [2011]). Most of these studies have focused on the turnover of permanent workers, or at least have not separately identified the performance consequences of departing workers with different types of employment contracts (Shaw, 2011). Perhaps more related to our study, are the studies that analyze the performance consequences of the turnover of workers employed under "secondary systems," which emphasize labor cost reduction and efficiency, and low performance work practices (e.g., Batt & Colvin, 2011; Siebert & Zubanov, 2009). For example, Siebert and Zubanov (2009) found a significant negative effect of worker turnover on performance even when workers performed the simplest jobs in the unit, received little or no training, and worked part-time, only when there were peaks in demand, at least for moderate levels of turnover.

Similarly, we should expect the expiration of temporary contracts to be detrimental for organizational performance. First, reductions in demand may not be fully predictable, for example due to the bounded rationality of the manager or to unexpected shocks, so the expiration date of contingent workers' contracts is seldom synchronized with the actual changes in workload even in highly seasonal environments and may leave the unit understaffed (Kesavan et al., 2014). Thus, remaining workers may suddenly and unexpectedly need to perform jobs that the day before were taken care of by leaving contingent workers.

The resulting increase in the workload might exceed their capacity and thus lead to disruption in the remaining workers' day-to-day activities, resulting in poorer execution of the tasks (Reilly et al., 2014).

Furthermore, disruption may be present even in cases in which the demand shrinks and the daily workload per worker remains constant. Workers hired on a temporary basis often work alongside other workers in the unit. Thus, their departure will force the remaining workers to reorganize the way work is done in the organization and to find new routines to accomplish their tasks (Hale, Ployhart, & Shepherd, 2016). While adjusting to the new situation, the effectiveness of the new group in the unit may suffer (Heath & Staudenmayer, 2000). For instance, in restaurant and retail operations it is common practice for contingent workers to perform "back-room" activities while permanent ones focus on customer service (Kesavan et al., 2014). When contingent workers leave the unit, their permanent colleagues will have to divert time and attention from customer service to other activities such as filling the shelves or bringing food from the inventory to the kitchen (Kacmar et al., 2006). As a result, customer wait time typically increases with negative effects on quality (via reduced customer satisfaction) and sales (via lower table turnover). This is particularly problematic in our setting where being served on time is a crucial factor of success in the stores since the typical customers are time-pressed travelers.

Disruption costs are expected to increase with the turnover of temporary workers at an increasing rate. For low levels of turnover, units may be able to buffer the workers who are marginally more valuable, such as those in customer-facing tasks, from increases or changes in their work activities. However, at high levels of turnover, it is more likely that even those workers are asked to engage in new or more tasks and are thus affected by the departure of temporary workers.

The combination of these benefits and costs suggests a nonlinear relationship between temporary worker turnover and performance. Specifically, we propose an inverted U-shaped relationship between temporary worker turnover and performance. We expect that low to moderate levels of temporary worker turnover have a positive effect on performance. Some turnover is good because it allows the unit to adjust its number of workers to demand. The benefits of reducing the cost of pay-rolls and of slack resources outweigh the costs of losing low to moderate levels of temporary workers because permanent workers can adjust relying on the help of workers whose disruption may be relatively less costly, such as other temporary workers doing similar types of tasks as those of the leaving ones. Although the relationship between temporary worker turnover and performance is initially positive, we argue that it eventually turns negative. Beyond an optimal level of turnover, the costs of disruption and workload affecting even the most valuable workers in the unit will exceed the benefits of flexibility.

We therefore propose:

Hypothesis 1. The turnover of temporary workers has an inverted U-shaped relationship with unit performance.

Contingent Worker Turnover and Replacements

The costs and benefits of contingent worker turnover for a unit will vary with the rate of replacements. Achieving numerical flexibility means both, being able to reduce the workforce when demand falls (i.e. downward flexibility) but also being able to increase the workforce when demand rebounds (i.e. upward flexibility). Thus, using temporary worker turnover as a strategy to achieve numerical flexibility relies on the ability of the firm to replace the terminated workers with other temporary workers when demand rebounds. When an organization seeks to adjust to demand fluctuations with temporary workers, planning

staffing cycles to replace the temporary workers whose contracts expire is as important as planning the contract expiration dates (Cappelli, 2009). Research on collective turnover, such as the Context-Emergent Turnover (CET) (Nyberg & Ployhart, 2013) and the Capacity (Hausknecht & Holwerda, 2013) theories, conceptualize the effects of collective turnover on unit performance as the result of the dynamic interaction between inflows and outflows of human capital resources (Call et al., 2015; Hausknecht et al., 2009; Reilly et al., 2014). Building on this theoretical approach to the study of the consequences of turnover, we consider the quantity and the quality of replacements.

Quantity of replacements. We expect replacement rate to moderate the curvilinear relationship between temporary worker turnover and unit performance in two distinct ways, contingent upon the level of turnover.

On the one hand, we expect the benefits of flexibility (i.e., reductions of underutilized workforce) to be higher when the rate of replacements is high than when it is low. Employers plan the turnover of temporary workers by considering the ease and cost of replacing them (Fisher & Connelly, 2017; Kesavan et al., 2014). For instance, units may replace workers more easily if the manager and the workers in the unit developed routines to find and integrate new hires quickly or when the labor market conditions are such that there is a vast pool of potential replacements (e.g., high unemployment rate).

We argue that units that plan to have high replacement rate can reduce the slack of human resources in excess more than units with low replacement rate. The extent to which the unit can benefit from temporary worker turnover depends on the ability of the unit to synchronize the workforce reductions with the declines in demand. If demand falls less than expected or recovers earlier than expected, the unit may find itself understaffed, which leads to important disruption costs (Ton, 2010). One common tactic units use to buffer potential

mismatches between realized demand declines and the workforce capacity is to operate with some slack (i.e., keeping more temporary workers than forecasted to be needed). Units that plan high replacement rate do not need this slack because their staffing strategy allows them to adjust in a more timely way to the mismatches eliminating the need for the buffering slack (Hausknech & Holwerda, 2013; Lecuona & Reitzig, 2014; Nyberg & Ployhart, 2013).

As a consequence, we expect units with higher rate of replacement to benefit more from the flexibility provided by temporary worker turnover than those with lower rate of replacement. Units with high rate of replacement can afford higher rates of temporary worker turnover, benefit from lower labor costs for a period of time (e.g., few days or even weeks), and then promptly re-expand the productive capacity as soon as demand rebounds. Conversely, units with low rate of replacement may reap fewer benefits from flexibility because they are more conservative in setting expiration dates and, in turn, systematically operate with sub-optimal (lower than the optimal) levels of temporary worker turnover.

On the other hand, in line with previous research, we argue that replacements can also moderate the costs of temporary worker turnover (Hausknecht & Trevor, 2011; Hausknecht et al., 2009). Newly hired temporary workers need to start learning from scratch and will take some time to become productive (Hale et al., 2016; Stratman, Roth, & Gilland, 2004). Transferring explicit knowledge about food preparation procedures, which are written and standardized, is relatively easy. It is much harder to teach tacit knowledge about when to fry an additional batch of fries, when to start baking additional bread, or about how much mixing or chopping is “enough”. Such knowledge needs to be acquired by vicarious learning and collaborative practice, and takes time and effort from the existing workers (Kacmar et al., 2006). Furthermore, new hires need to be integrated and socialized in the unit (Van Maanen & Schein, 1979). Thus, when contingent workers leave and new workers come to replace

them, remaining workers may find themselves devoting a great deal of time to train replacements on how things need to be done in the organization—at the expense of their own core tasks and, ultimately, the unit's performance (Hausknecht et al., 2009). When temporary worker turnover is low, the remaining temporary workers can contribute to training and monitoring replacements, or at least can support permanent workers while they do it. When temporary worker turnover is high the group of remaining temporary workers who can share the tasks of socializing the replacements is eroded.

Consequently, the higher the rate of replacements, the higher the disruption faced by the workers in the unit, including those in the most valuable activities. In addition, when permanent and long-standing temporary workers in the unit develop routines to integrate and train replacements more efficiently (Hausknecht et al., 2009), high temporary worker turnover is likely to disrupt these routines. Therefore, the cost of integrating replacements is higher when the unit experiences high levels of turnover. Accordingly, we argue that the rate at which the costs of temporary worker turnover accrues to the unit increases with the quantity of replacements. In other words, the marginal cost of temporary worker turnover increases with the rate of replacements.

Because of these dynamics, we expect the relationship between temporary worker turnover and unit performance to be more pronounced for high quantities of replacements than for low quantities:

> *Hypothesis 2. The turnover of temporary workers and the quantity of replacements interact in predicting unit performance: the curvilinear relationship between the turnover of temporary workers and performance is stronger when the quantity of replacements is high.*

Quality of replacements. Collective turnover theories posit that the extent to which turnover erodes the unit human capital and, in turn, disrupts the unit performance, depends not only on the quantity but also on the quality of replacements (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013). Newcomers with high-quality human capital are more productive and learn at a faster rate being more readily able to perform their tasks without the support of remaining workers. The entry of high-quality replacements thus mitigates the rate at which turnover disrupts performance (Call et al., 2015). As a consequence, these entries contribute to buffer the negative consequences of turnover (Call et al., 2015; Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013).

Having worked for the company in the past is likely to increase replacements' quality. First, people accumulate skills by doing the job (Becker, 1962). While different types of experience can lead to skill learning, experience in the focal organization is arguably the most important source for increasing productivity (Goldsmith & Veum, 2002; Dokko, Wilk, & Rothbard, 2009). As individuals accumulate experience within a firm, they acquire firm-specific knowledge and gain familiarity with the organizational practices and routines (Groysberg, Lee, & Nanda, 2008; Huckman & Pisano, 2006). Furthermore, replacements with prior experience in the organization may have developed interpersonal relationships with workers in the unit, which can be useful for a faster integration (Reilly et al., 2014). In the absence of firm-specific knowledge and social ties, the socialization and training process of inexperienced replacements will demand more from remaining workers (Hausknecht et al., 2009). Therefore, replacements who are rehires or transfers (i.e., employees who were working for another unit) are expected to have a more positive effect on unit performance than new hires (Hausknecht & Holwerda, 2013; Reilly et al., 2014). In addition, when a worker is a rehire (someone who worked for the same organization in the past), the worker

likely satisfies a minimum level of quality. Low productivity workers are not likely to be hired again. In other words, the average quality of the replacements is expected to be higher for rehired workers than for novice ones.

Similarly, we expect the relationship between temporary worker turnover and performance to vary with the firm-specific experience of replacements. Temporary workers are often re-hired by the same organization. A common practice in organizations that rely on temporary workers is to keep a network of on-call qualified temporary workers who have worked for them in the past and use that pool to hire (Smith, 2001; Smith & Neuwirth, 2009). This was also the case in our context, where several store managers reported keeping a list of known temporary workers that had worked for the store in the past.

Following the predictions of collective turnover research, we posit that the relationship between turnover rate and performance is more pronounced when replacements are novice to the organization than when they are not. When replacements are new to the organization, the disruption of turnover is stronger than when they are experienced, because training and supporting them requires a larger amount of remaining workers' time and attention. This reduces the remaining workers' pace and efficacy in performing their usual task. In addition, units that know they will be able to hire from a more qualified pool of candidates may afford to be more aggressive in their staffing policies, i.e., bear a higher risk of being understaffed. Therefore, we expect that, given a certain turnover rate, the disruption rate of turnover in units with novice replacements is higher than that in units with experienced ones. Therefore, we propose:

Hypothesis 3. The turnover of temporary workers and the firm-specific experience of replacements interact in predicting unit performance: the curvilinear relationship between the turnover of temporary workers and

performance is stronger when replacements are novice to the organization than when they have firm-specific experience.

METHODS

Research Setting

The setting for this study is a multinational company, one of the world's leading chains in food and beverage services for travelers, that agreed to provide annual personnel and performance data for its sales network in Italy. The company's major distribution channels are airports and motorways, followed by railway stations and by selected high streets, shopping centers, trade fairs, and museums. The unit of observation in our study is the store or point of sale.

A typical store employs, on average, 29 workers. Usually, a store workforce is composed of a manager who is responsible for managing the store and accountable for its performance, and a group of workers, referred to as the basic operators, who perform the activities necessary to sell food and beverages with good service. Workers' typical tasks include low-skill activities such as taking customer orders at the counter or table, preparing food and beverages (e.g., making sandwiches or preparing a cappuccino), serving as cashier, displaying goods, and store cleaning and maintenance. Store managers are in charge of managing operations and sales, staffing, training, and assigning jobs; they also oversee hygiene and goods display. Other decisions such as product offerings and marketing efforts are centralized in the headquarters of the organization and are therefore relatively homogeneous across stores.

The company has a general strategic guideline for using temporary workers to adapt to demand in order to save labor costs, but the decisions about how and how much to use temporary workers are largely decentralized; store managers choose the number of temporary workers they want to hire, the duration of their contracts, and the tasks to which they are

assigned. Managers also decide how and when to replace these workers selecting replacements through three major channels: external hires (42.90% replacement rate on average), rehires of workers who previously worked for the company (29.50% replacement rate on average), and transfers of workers from other units (0.01% replacement rate on average). In order to replace workers more readily, some managers keep lists of workers that worked in the store in the past and they contact them directly when they need to replace a worker. Transfers usually occur because the manager's need for an additional resource matches either the worker's desire to transfer or the need to reduce staff in the unit from which the worker transfers[2].

Store managers initiate the hiring process. If they believe the store needs an additional worker, they forward a hiring request to the manager of the geographical area in which the store is located. In the request, they indicate the type (temporary or permanent) and the length of the contract. If the regional manager approves the request (as is usual, depending upon the budget constraints imposed by headquarters), the store manager searches for the worker and hires her. The duration of temporary contracts and the replacements vary across stores depending on several factors, mostly due to managers' preferences, but also store-specific demand seasonality, and the availability of the existing permanent workers.

It is important to note that in this setting temporary workers are used as a way to achieve numerical flexibility, and not for other purposes such as screening candidates for permanent positions[3]. For example, if a worker takes a maternity or sick leave, a temporary

[2] Differences in managers, measured as managers fixed effects, explain 27.62% of the variance in the number of hours worked by temporary workers in the unit in one month, 14.06% of the variance in the turnover rate of temporary workers and 8.65% in the rate of replacements. In order to account for the variance in managers' style and abilities, we control for manager fixed effects in our analyses.

[3] Only 2% of the temporary workers in our sample transitioned to permanent positions.

worker will substitute for her during that period. Furthermore, because of the highly seasonal nature of the business, which peaks in the summer, staffing needs vary over the year.

Achieving this flexibility through temporary workers is particularly relevant in our context because of the strict labor market regulations in Italy, the country for which we have data. Italy has a dual labor market with high employment protection for permanent workers but not for temporary workers. Accordingly, in our setting the only sizeable source of turnover is the expiration of temporary contracts (5% of the total store workforce on average per month and 30% of the temporary store workforce on average per month), with voluntary and involuntary attrition for permanent workers being below 1% on average per month because of the rigidity of the national labor market and the high costs of dismissing permanent workers (with corresponding strong disincentives to hire them). Moreover, given their low-skill profile, permanent workers consider working for an industry-leading multinational company a "good" job that they are unwilling to leave.

Data

We use a matched unit-employee dataset with monthly personnel and performance records for the years 2007–2014 (96 months). Because we are interested in the performance consequences of the expiration of temporary contracts, we consider only basic operators, since managers are always permanent employees. Basic operators, both permanent and temporary, are employed directly by the firm. Our unit of analysis is the store-month-year. The original database includes 19,340 store-month-year observations, for 256 stores.

Measures

Dependent variable. *Unit performance.* We proxy unit performance with store profitability, measured as the logarithm of store net controllable profit in month t (Store Net Controllable Profit$_t$ = (Total Sales$_t$ – Cost of Goods Sold$_t$ – Labor Cost$_t$– Other Store Costs$_t$).

The company considers net controllable profit the fraction of a store's profit under managerial control and a "measure of the store managers' abilities in terms of waste and labor cost". This measure "captures latent positive financial benefit of turnover (i.e., decrease in payroll cost), while other measures such as unit sales do not" (Call et al., 2015: 1215) and is therefore particularly suitable to assessing the benefits of numerical flexibility. It has been used by previous turnover research (Call et al., 2015; Ployhart, Weekley, & Ramsey, 2009). For confidentiality reasons, the actual profits were multiplied by a decimal constant.

Independent variables. *Aggregate temporary worker turnover.* We measure aggregate temporary worker turnover as the number of temporary workers leaving the unit because of contract expiration in month (t-1) divided by the average number of temporary workers in the store in month (t-1). The average is computed as the average of the number of temporary workers at the beginning and at the end of month (t-1). On rare occasions, temporary workers were immediately (within the same month) rehired after their contract expired. Since these workers did not really leave the unit, we did not count them as turning over.

Replacements. We measure replacement rate as the total number of temporary workers entering the unit in month (t) divided by the average number of temporary workers in the store in month (t-1). Workers who enter the unit may be first-time hires, rehires (temporary workers who worked in the company in the past), and transfers from another unit.

Experienced replacements. We measure replacement rate of replacements with firm-specific experience as the total number of temporary workers entering the unit through either rehiring or transfer from another unit in month (t) divided by the average number of temporary workers in the store in month (t-1).

Novice replacements. We measure the replacement rate of novice replacements as the total number of first-time temporary hires entering the unit in month (t) divided by the average number of temporary workers in the store in month (t-1).

Controls. *Unemployment rate.* We control for the trimestral unemployment rate in month t-1 in the region where the store is located with data from the National Institute of Statistics to account for the effect of the local availability of labor (Nyberg, 2010; Trevor, 2001).

Store size. We control for store size with the total number of hours worked by temporary (*Worked hours by temporary workers*) and permanent workers (*Worked hours by permanent workers*) in the unit in month (t). This measure captures the number of employees in the store taking into account their contracted hours (Siebert & Zubanov, 2009).

Tenure of permanent workers. We control for permanent workers' tenure in the company in years in month (t-1) to account for permanent workers' firm-specific knowledge and also for their motivation (Veiga, 1981).

Store complexity. The company classifies stores on a scale of 1 (little complexity) to 6 (strong complexity) depending on floor space in square meters, daily traffic, and variety of products and services offered. We use this measure to control for different degrees of management complexity.

Analysis

Our data provide monthly observations for each store over a period of 8 years, which implies that the residuals for a given store may be correlated. Accordingly, we use store fixed effects models with standard errors clustered at the store level to test our hypotheses. We run store fixed effects models in order to hold constant time-invariant, unobserved characteristics of the store that could be driving both the expiration of temporary contracts and performance,

thus leading to biased estimates. Results from the Breusch and Pagan Lagrange Multiplier (LM) test and the Hausman test (Hausman, 1978) confirm the appropriateness of the choice of fixed-effects models rather than OLS or random effects specifications. We also control for year fixed effects in order to take into account environmental trends, such as changes in customer demographics or economic cycles, and for month fixed effects to account for seasonality. Moreover, we control for manager fixed effects to account for unobserved managerial characteristics that could be driving both how managers use temporary contracts as well as replacements, and the profitability of the store.

When estimating our models, we need to make an assumption about the speed at which we believe turnover is reflected into store performance. Following previous research on turnover, we use a one-month lag between the independent and the dependent variables (Reilly et al., 2014). We use a one-month lag between the aggregate temporary worker turnover and replacements because we are interested in investigating replacements that happen after turnover.

One potential concern is that our results may be driven by endogeneity of the expiration of contracts variable. Specifically, in making staffing decisions managers are likely to take into account the seasonal trends of sales for the month. If that is the case, then we may observe a relationship between expiration of contracts in a given month and performance in the later month, but only because an omitted variable—seasonal drop in demand—is affecting both factors. Controlling for month fixed effects should in part capture anticipated seasonal drops in demand, while manager fixed effects should capture the effect of managers' abilities to adjust to demand seasonality and design temporary contracts accordingly.

Nevertheless, we take a closer look at the trends in monthly revenues and in temporary worker turnover. Figure 1 shows the monthly average of sales revenues and temporary worker

turnover. While sales revenues peak in August, temporary worker turnover peaks in September. This trend is consistent across the eight years of observation (2007–2014).

Insert Figure 1 about here

The graphs suggest that the relationship between temporary turnover and unit performance is more likely to be driven by a seasonal drop in demand in September. In order to address this concern, we exclude observations in September from our analyses. The final database used in the analyses therefore includes 13,279 store-month-year observations, for 255 stores.

RESULTS

Descriptive Statistics

Table 1 provides means, standard deviations, and correlations for the main dependent and independent variables in the analysis, with store-month-year as the unit of analysis. Of particular interest is that the standard deviation of the temporary worker turnover is 0.52 and the standard deviation of the rate of replacements is 0.83, confirming that stores vary in how they use the expiration of contracts and replacements.

Insert Table 1 about here

Turnover of Temporary Workers

Table 2 presents our fixed effects analyses of the relationship between temporary worker turnover and unit performance. All the models in Table 2 include month and year fixed effects, store fixed effects, and manager fixed effects.

Insert Table 2 about here

Model 1 in Table 2 is the baseline model including all the controls. Model 2 tests the linear relationship between turnover of temporary workers and unit performance. The aggregate temporary worker turnover is negatively and significantly related to unit performance (b = -0.04, $p < 0.05$). Building on this finding, Model 3 includes both the temporary worker turnover and the temporary worker turnover squared to test Hypothesis 1—the turnover of temporary workers has an inverted U-shaped relationship to unit performance. We find that the temporary worker turnover has a positive and significant coefficient for unit performance (b = 0.10, $p < 0.05$), and that the temporary worker turnover squared has a negative and significant coefficient (b = -0.17, $p < 0.05$). These coefficients provide initial evidence of a curvilinear relationship.

In order to test for the actual presence of the inverted U-shaped relationship suggested by these coefficients, we follow the guidelines by Haans, Pieters, and He (2016). First, we examine the slopes of the curve. Consistently with an inverted U-shaped relationship, we find that the lower bound slope is positive (0.10) and significantly different from zero (t = 2.23; $p < 0.05$), and that the upper bound slope is negative (-6.16) and significant (t = -3.22; $p < 0.001$). Second, we examine the optimal point. We find that temporary worker turnover has a positive relationship to store performance up to 29.21%. For values of turnover beyond that point, the costs outweigh the benefits and the relationship turns negative. Importantly, the turning point is well within the range of values of temporary worker turnover in the data (mean = 0.30; s.d. = 0.52).

Overall these tests provide support for Hypothesis 1. Figure 2 provides a graphical representation of the curve.

Insert Figure 2 about here

To gain additional insights into the shape of the curvilinear relationship between turnover and performance, we analyze the marginal effects on unit performance of different levels of temporary worker turnover. We find that an increase in temporary worker turnover from a low level (0, minimum value) to the optimal level (0.29) will increase the value of the logarithm of store net controllable profit by 0.02 (4.01 – 3.99). This increase equals an improvement in store net controllable profit (transformed by a decimal constant) by 2.02%. The magnitude of the percentage change has practical significance and equals 0.02 standard deviations of store net controllable profits. However, when turnover increases beyond the optimal level, from the optimal (0.29) to a high level (0.82, one standard deviation above the mean), the value of the logarithm of store net controllable profit falls by 0.05 (3.96 – 4.01). This reduction equals a decrease in store net controllable profit (transformed by a decimal constant) by 4.88%. Therefore, when temporary worker turnover is higher than 29.21%, the costs of losing temporary workers outweigh the benefits of numerical flexibility. The practical size of this effect is 0.04 standard deviations of the store net controllable profit.

Interaction Effects

Table 3 presents our fixed effects analyses of the interaction between temporary worker turnover and replacements. All the models in Table 3 include month and year fixed effects, store fixed effects, and manager fixed effects.

Insert Table 3 about here

Model 1 in Table 3 includes the replacement rate. We find a positive and significant relationship of replacements to unit performance ($b = 0.03$, $p < 0.001$). This finding confirms the argument that human capital inflows have a positive relationship to unit performance because they increase the stock of human capital resources and, in turn, the unit productive capacity (Call et al., 2015; Nyberg & Ployhart, 2013; Reilly et al., 2014). Model 2 in Table 3 introduces the interaction effects between temporary worker turnover and replacements. We find a positive and significant coefficient for the interaction ($b = 0.04$, $p < 0.05$). Model 3 adds the interaction between temporary worker turnover squared and replacements to test Hypothesis 2—the curvilinear relationship of turnover of temporary workers to unit performance is stronger when replacements are higher. We find a significant negative coefficient for the interaction between replacements and temporary worker turnover squared ($b = -0.17$, $p < 0.01$), suggesting that the curvilinear relationship between temporary worker turnover and unit performance is steeper for units with high replacements than for those with low replacements. Therefore, replacement rate increases the marginal benefits of turnover for low turnover rates and increases the marginal costs of turnover for high turnover rates. Our findings support Hypothesis 2. Interestingly, we also find a positive and significant interaction between replacement rate and temporary worker turnover ($b = 0.18$, $p < 0.01$). This suggests that the optimal level of temporary worker turnover beyond which the relationship between temporary worker turnover and performance turns negative is higher for units with high replacement than for those with low replacements. Replacements not only affect the rate at which the benefits and costs of temporary worker turnover accrue to the unit (i.e., the

steepness of the curvilinear relationship between turnover and performance) but also the optimal turnover level after which the costs outweigh the benefits. Units with high replacements can afford higher levels of temporary worker turnover than those with low replacements before the relationship to performance becomes negative. However, beyond this optimal level, turnover will harm the performance of these units at a faster rate.

To probe this interaction further, we look at the marginal effect of the turnover of temporary workers at both low (0, minimum value) and high (1.27, one standard deviation above the mean) values of the replacement rate (see Figure 3). In accord with our Hypothesis 2, an increase from a low level of turnover (0, minimum value) to the optimal level of turnover (0.29) and an increase from the optimal (0.29) to a high level (0.82, one standard deviation above the mean) have different marginal effects on unit performance depending on the replacement rate (Figure 3).

Insert Figure 3 about here

When the replacement rate is high, an increase from low to optimal turnover increases the value of the logarithm of store net controllable profits (transformed by a decimal constant) by 0.05 (4.06 – 4.01). This increase in store net controllable profit (transformed by a decimal constant) equals to 5.13%, which equals 0.04 standard deviations of store net controllable profit.

However, when the replacement rate is low, the performance effect of the increase from low to optimal turnover is not significant ($p > 0.05$). The turnover of temporary workers significantly benefits unit performance when the replacement rate is equal or higher than 70% and turnover is below the optimal level (29.21%).

Conversely, when turnover is beyond 29.21%, the expiration of temporary contracts can disrupt unit performance. When the replacement rate is high, an increase from the optimal to a high level of turnover decreases the value of the logarithm of store net controllable profits (transformed by a decimal constant) by 0.06 (4.06 – 4.00). This loss in store net controllable profit (transformed by a decimal constant) is equal to 5.83%. Practically, the magnitude of this loss is 0.05 standard deviations of store net controllable profit. However, when the replacement rate is low, the performance effect of the increase from optimal to high turnover is not significant ($p > 0.05$). The turnover of temporary workers significantly harms unit performance when the replacement rate is equal or higher than 70% and turnover is above the optimal level (29.21%).

In order to more accurately understand the nonlinearity in the interactions between replacements and the aggregate temporary worker turnover, we use a two-part spline, split at the optimal value of temporary worker turnover (29.21%) (Haans et al., 2016). The spline generates two variables for the aggregate temporary worker turnover: one taking the values of temporary worker turnover up to the optimal level (*Temporary worker turnover low*) and the other the values higher than the optimal turnover level (*Temporary worker turnover high*). *Temporary worker turnover low* equals temporary worker turnover for all observations with turnover less than or equal to the optimal turnover level and zero for the others. *Temporary worker turnover high* equals temporary worker turnover for all observations with turnover higher than the optimal turnover level and zero for the others. The sum of the two variables equals the aggregate temporary worker turnover. This test allows us to identify the different moderating effects of replacements quantity and experience at different levels of temporary worker turnover (Haans et al., 2016; Smith, 1979). It is therefore particularly suitable to test our prediction that replacements increase the marginal benefits of turnover for low turnover

rates and increase the marginal costs of turnover for high turnover rates. Model 4 in Table 3 uses a two-part spline to provide an additional test of Hypothesis 2. We find that the coefficient of the interaction between replacements and the first spline variable (turnover up to the optimal level) is positive and significant ($b = 0.24$, $p < 0.001$). Conversely, we find that the interaction between replacements and the second spline variable (turnover higher than the optimal level) is negative and significant ($b = – 0.08$, $p < 0.05$). Overall, these findings provide additional support to Hypothesis 2 and clearly show that the moderating effect of replacements depends on the level of turnover.

In Models 5 and 6 in Table 3 we consider the quality of replacements analyzing experienced and novice replacements separately. Model 5 includes the rate of experienced and of novice replacements. We find a positive and significant relationship between the replacements with firm-specific experience and the unit net controllable profit ($b = 0.02$, $p < 0.05$). We fail to find a significant effect of novice replacements on store net controllable profit. While the coefficient of novice replacements has a positive sign, it is only marginally significant ($b = 0.04$, $p < 0.10$). Model 6 includes the interactions of novice and experienced replacement rate with temporary worker turnover rate and temporary worker turnover rate squared. We do not find significant coefficients for the interactions between experienced replacements and temporary worker turnover rate and temporary worker turnover rate squared, respectively. We find a negative and significant coefficient for the interaction between novice replacement rate and temporary worker turnover squared ($b = -1.30$, $p < 0.05$). This suggests that the higher the rate of novice replacements, the steeper the inverted U relationship between temporary worker turnover and unit performance. Moreover, we find a positive and significant coefficient for the interaction between novice replacement rate and temporary worker turnover ($b = 1.28$, $p < 0.05$), suggesting that the optimal level of

temporary worker turnover beyond which the relationship between temporary worker turnover and performance turns negative is higher for units with a high novice replacement rate than for those with a low one.

To better investigate this interaction effect, we look at the marginal effect of the turnover of temporary workers at both low (0, minimum value) and high (0.28, one standard deviation above the mean) values of the novice replacement rate. When the novice replacement rate is high, an increase from low to optimal turnover increases the value of the logarithm of store net controllable profits by 0.07 (4.08 – 4.01). This increase in store net controllable profit (transformed by a decimal constant) equals 7.25%, which represents 0.06 standard deviations of store net controllable profit. When the novice replacement rate is high, an increase from optimal to high turnover decreases the value of the logarithm of store net controllable profits (transformed by a decimal constant) by 0.07 (4.01 – 4.08). This loss in store net controllable profit (transformed by a decimal constant) equals 6.76%, that is 0.06 standard deviations of store net controllable profit. However, when the novice replacement rate is low (below 0.1), the performance effect of an increase in turnover is not significant ($p > 0.05$).

In order to test Hypothesis 3—the curvilinear relationship between temporary worker turnover and unit performance is stronger when replacements are novices than when they are experienced—we use a Wald test (Engle, 1984) to compare the coefficients of the interactions of temporary worker turnover rate squared with novice and with experienced replacement rates in Model 8. The difference in coefficients is in the expected direction (1.25) and the test suggests that we can reject the hypothesis that the two coefficients are equal at the 5% confidence level ($F(1,254) = 5.13$; $p < 0.05$). Hypothesis 3 is therefore supported.

Model 7 in Table 3 uses a two-part spline to gain additional insights in how the experience of replacements moderates the costs and the benefits of temporary worker turnover. Interestingly, while in Model 6 we did not find any significant interaction between experienced replacement rate and temporary worker turnover, the two-part spline shows a more detailed test of nonmonotonicity than the squared turnover specification (Bidwell & Briscoe, 2009; Smith, 1979). Consistently with Model 6, we do not find a significant coefficient for the interaction between experienced replacement rate and temporary worker turnover for levels of turnover higher than the optimal point ($p > 0.05$). However, we find a positive and significant coefficient for the interaction between experienced replacements and low temporary worker turnover ($b = 1.15$, $p < 0.05$). This suggests that for low levels of turnover, the unit benefits from temporary worker turnover more when experienced replacements are high than when they are low. This finding is consistent with the argument from collective turnover research that high-quality replacements mitigate the negative externalities of turnover (Call et al., 2015). Model 7 confirms and clarifies the results of Model 6 about the interaction between novice replacements and temporary worker turnover. We find a positive and significant coefficient for the interaction between novice replacement rate and temporary worker turnover for levels of turnover less than or equal to the optimal point ($b = 1.77$, $p < 0.01$) confirming that, at least for low levels of turnover, the quantity of novice replacements contributes to restoring the productive capacity of the unit (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013) while benefitting from flexibility. However, when turnover is greater than the optimal level, the interaction between novice replacements (who are likely to need more training and supervision than experienced ones) and temporary worker turnover has a negative and significant coefficient ($b = – 0.76$, $p < 0.01$).

Supplementary Analyses

In this section we provide further evidence of the mechanism underlying the interaction between the costs of replacements and turnover. The costs of integrating replacements will vary with how much disruption they cause in the unit's operations, which in turn depends largely on the extent to which those who remain and those who leave (and therefore those who replace them) perform similar tasks. Segregating workers into different types of tasks could make the training of replacements more problematic. For instance, in restaurant and retail operations it is common practice for contingent workers to perform "back-room" activities while permanent ones focus on customer service (Kesavan et al., 2014). When contingent workers leave the unit, the remaining workers will have to divert time and attention from customer service to other activities such as filling the shelves or bringing food from the inventory to the kitchen (Kacmar et al., 2006). As a result, customer wait time typically increases, with reduced customer satisfaction and lower sales because of slower table turnover. In addition, permanent workers will be less able to teach replacements tasks in which they themselves do not usually engage, and new temporaries will be mostly exposed to other temporaries, so there is less learning by observation. Therefore, if our argument about the costs of integrating replacements holds we should observe that high replacement rates make the relationship between turnover and performance more negative in stores that are highly segregated vs. low segregated ones.

Our setting provides us with the opportunity to explore this argument further by analyzing the distribution of temporary and permanent workers across tasks. There are several tasks that workers need to perform in the unit[4] and managers decide how workers (both temporary and permanent) are assigned to them. Some managers may prefer to assign temporary workers to tasks that require less store-specific knowledge, such as cleaning the

[4]16 tasks (e.g., barista, cook, cashier).

kitchen and restrooms, and use permanent workers for customer service tasks. Others may need to use both temporary and permanent workers for the same types of tasks. For example, if a store has to increase table turnover to respond to higher demand, both permanent and temporary workers may be assigned to clear and clean tables during peak periods. In our setting units thus vary in terms of the segregation of temporary and permanent workers across different tasks.

Accordingly, we measure workers' segregation across tasks with a measure derived from the Duncan Segregation Index (Duncan & Duncan, 1955). The index ranges from 0 (= no segregation, temporary and permanent workers perform exactly the same tasks) to 1 (= maximum segregation, temporary and permanent workers perform completely different tasks). First, we calculate for each task in each store the ratio of hours worked in that task by temporary workers to the total number of hours worked in that store by temporary workers, and repeat this calculation for permanent workers.[5] Second, for each task in each store, we calculate the difference in absolute value of the two ratios. Finally, we divide the sum of the differences by two.

Analytically, for each store-month-year observation we calculate

$$\frac{\sum_{i=1}^{N} \left| \frac{t_i}{T} - \frac{p_i}{P} \right|}{2},$$

where i is the job; t_i is the number of hours worked by temporary workers in task i; p_i is the number of hours worked by permanent workers in task i; T is the total number of hours worked by temporary workers; and P is the total number of hours worked by permanent workers. This index allows us to account for the number of temporary and permanent workers

[5] While the Duncan Segregation Index is typically calculated using the number of people in each group, we prefer to use the number of hours in each task to capture the variation in the hours contracted for different workers.

in the store. For each store, we averaged the monthly index for the whole period and classified stores according to whether they had high or low task segregation.

In Models 1 and 2 in Table 4, we re-estimate Model 3 of Table 3 for two sub-samples: units with high levels of average segregation (75^{th} percentile) and units with low levels of average segregation (25^{th} percentile) respectively. The results show that the coefficient of the interaction between replacements and temporary worker turnover is not significant in units with low levels of segregation ($p > 0.05$) but it is negative and significant in highly segregated units ($b = – 0.45$, $p < 0.01$). These results provide support for our argument that training and integrating replacements create disruption for remaining workers.

Insert Table 4 about here

DISCUSSION

Using a sample of 13,279 store-month-year observations for 255 stores, we find that (a) the turnover of temporary workers has an inverted U-shaped relationship with unit performance and (b) the quantity and quality of replacements in the unit moderate this curvilinear relationship. Specifically, the replacement rate increases the marginal benefits of turnover for low turnover rate and increases the marginal costs of turnover for high turnover rate. The increase in the marginal costs is higher for novice replacements.

Theoretical Implications

Our paper reconciles the contradictory predictions of the collective turnover literature—that turnover of any type, representing a human capital resource loss, impairs organizational performance—and of the contingent work literature—that temporary worker turnover, being forecastable and functional in that it enables flexibility, should have positive

performance consequences. We find the effect of temporary worker turnover to be positive for low levels of turnover. This is consistent with other researchers' assertions about the use of temporary workers to gain numerical flexibility (Cappelli & Neumark, 2004; Osterman, 1987, 1988). However, when temporary worker turnover goes beyond an optimal point we find its effect on performance to be negative, suggesting that it is disruptive to the unit productive capacity (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013). Even when turnover involves temporary workers and is fully decided by the managers of the unit, it may negatively affect the remaining workers and with that, the performance in the unit.

This study expands existing theories on the performance consequences of collective turnover by considering a specific type of planned turnover: temporary worker turnover. Researchers have speculated that planned turnover should be less costly than unplanned ones (e.g., voluntary turnover) (Hausknecht & Holwerda, 2013) because the organization can adjust to it more easily (Price, 1977). Differently, we argue and find that there are also benefits of planned turnover and that this type of turnover affects unit performance differently than other types of turnover because it poses a unique challenge to the organization: balancing the benefits of flexibility and the costs of turnover.

While the literature has mentioned that in certain cases turnover may be beneficial for the organization (Glebeek & Bax, 2004; Shaw, Gupta & Delery, 2005; see Shaw [2011] for a review of these studies), the common explanations are unlikely to apply to the case of temporary worker turnover. The majority of these studies argue that voluntary turnover has a revitalizing effect on performance (Shaw et al., 2005), that is, that low levels of turnover benefit the unit by improving "workforce innovation, flexibility, and adaptability (Abelson & Baysinger, 1984; Dalton & Todor, 1979)" (Shaw, 2011: 202). Alternatively, Siebert and Zubanov (2009) propose a "discharge-rate" argument: when the organization does not invest

in the selection of workers, then it needs some turnover to fire those who ex-post exhibit poor performance and lack of fit. Both the revitalization and the discharge rate arguments are insufficient to explain the nonlinear relationship between the benefits and costs of temporary worker turnover. For instance, when the temporary contracts of servers in a restaurant expire, the remaining workers are more likely to be overworked than revitalized in performing their relatively standardized tasks. Similarly, since the expiration dates of temporary contracts are set ex-ante, temporary workers leave the restaurant irrespectively of their actual performance and fit. The benefits of firing bad matches who were not carefully selected are distinct from those of the carefully planned expiration of contracts.

We also extend the literature on the role of replacements in explaining the performance consequences of turnover by exploring both the positive and the negative moderation effects of the replacement rate in the unit (Hausknecht & Trevor, 2011). Prior studies on the moderator effect of replacements only focused on the positive moderating effect of replacements (Call et al., 2015), arguing the replacements should help to decrease the burden of overload suffered by the remaining workers in the unit and to restore the productive capacity of the unit after the turnover event (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013). Differently from prior studies, we argue and find that the replacement rate can moderate the effects of turnover beyond the pure capacity argument, by introducing even more disruption in the organization for high levels of turnover. Our finding that the moderation effect of replacements was stronger for novice than for experienced replacements also support previous research predictions that not only the quantity but also the quality of replacements is important in determining how the outflows and inflows jointly affect performance in the organization (Hausknecht & Holwerda, 2013). Moreover, integrating curvilinearity in our test of the moderating effects of replacements, we extend our knowledge

on how replacements moderate the relationship between turnover and organizational performance when this is not linear.

Finally, by analyzing the cost of contingent worker turnover, our study also contributes to the literature that has documented the negative consequences of using contingent workers (Broschak & Davis-Blake, 2006; Davis-Blake et al., 2003; Fisher & Connelly, 2017; George et al., 2012; Kesavan et al., 2014; Smith, 2001). This literature has found that the presence of temporary workers can disrupt unit operations, increase conflict, and worsen the attitudes and behaviors of permanent workers. Our study reveals an additional cost, at least for moderate to high levels of turnover: the performance losses units incur when temporary workers leave because their contracts expire. While it may be true that such scheduled exits avoid the costs of breaching contracts (Matusik & Hill, 1998), they do have other costs. Moreover, our finding that the performance consequences of turnover and replacements vary depending on the extent to which temporary and permanent workers were blended in the unit (i.e., doing the same type of jobs) suggests that firms can strategically deploy their permanent and temporary workers in order to minimize the harm done by temporary worker turnover to unit financial performance.

Managerial Implications

Managerial implications can also be derived from our study. First, managers hiring temporary workers should consider the cost of losing them. They should carefully examine alternative combinations of employment relations and properly estimate the total cost associated with holding a diversified portfolio of contractual arrangements. A thorough assessment of the performance implications of temporary worker turnover becomes critically important for line managers and human resource departments (see also Fisher and Connelly [2017]).

Second, organizations should help managers and remaining employees to counter disruptions. Our findings suggest that managers can strategically replace temporary workers in order to minimize the negative effects of the departure of temporary workers on performance, and more generally, the negative consequences of using temporary workers (for related findings see also Broschak and Davis-Blake [2006], and Lautsch [2002]). While managers may mitigate some of the negative effects of turnover by replacing temporary workers, they should also avoid overstaffing their units with new replacements after high rates of temporary worker turnover, since this may increase the disruption costs in the unit.

The practical significance of our results may seem negligible because of the relatively small magnitude of the effect of temporary worker turnover on unit performance. However, this effect may be relatively important given our research setting. Interviews with the top management of the company revealed their beliefs that the main factors driving sales in the stores were location and seasonality, and that there was little leverage for managers and workers to make a difference in performance. Interestingly, when we shared our results with the top management in the organization they were surprised that the staffing of temporary workers could make such a difference and decided to revise their staffing policies.

Limitations and Future Research

This study also has several limitations that need to be addressed in future research. The specific characteristics of our research setting limit the generalizability of our findings. First, we use data from only one company in only one country, Italy, which is characterized by high employment protection regulation for permanent workers. Our context was ideal to identify the effects of temporary worker turnover because the labor market regulation made other types of turnover almost unfeasible. However, this also limited our ability to study how this type of turnover interacted with other types of turnover that could be happening

simultaneously. In contexts where there is less protection for permanent workers and a more flexible labor market, the company may be able to use other strategies (such as dismissing and replacing permanent workers or incentivizing voluntary exits) instead of only focusing on temporary workers. Future research in contexts in which other types of turnover are more common could advance our knowledge in this area.

Second, the company analyzed gives unit managers little autonomy in managing the job security of permanent workers, their compensation, or their incentives (Tsui, Pearce, Porter, & Hite, 1995; Tsui, Pearce, Porter, & Tripoli, 1997). These human resource practices, which help shape how permanent workers behave, are defined at the corporate level. We therefore could not investigate how other discretionary, unit-level human resource practices might moderate the effects of temporary worker turnover on unit performance. These practices might determine the reactions of permanent workers to both exits and replacements in the unit (Batt & Colvin 2011; Hausknecht et al., 2009), and should be investigated in future research. For example, permanent workers may react differently to temporary worker turnover and replacement depending on the climate in the unit (Nyberg & Ployhart, 2013). Future research should also consider the effect of managers and their discretion on how temporary and permanent workers interact and how turnover affects organizational performance (Smith, 1997).

Third, the jobs performed by the basic operators at this company are all low skilled. In situations where the jobs require more skills and therefore more training, the departure of temporary workers could disrupt operations even more. Thus, our results provide a conservative test of the effects of turnover of temporary workers on performance (Shaw et al., 2005). Hiring and training new, short-term employees for jobs requiring more skills might be more costly than having permanent workers temporarily cover some jobs when temporary workers leave. Future studies could investigate whether our results generalize to other

contexts in which there is more complex knowledge work. This line of inquiry is particularly relevant given that today contingent workers can be found in a broad variety of high skill-level jobs and occupations such as engineers, IT professionals, software developers and programmers, and even managers (Bidwell, 2009).

Apart from the boundary conditions that limit its generalizability, our study also has some empirical limitations. Our data were archival; we do not have direct measures either of operational disruption or of remaining workers' reactions to being overworked or to the need to train replacements. Since we suggest that these are the main drivers of the negative effects of turnover on performance, we also have to acknowledge that we cannot directly test the mechanisms of the performance effects we observe. Getting access to data about operations disruption and remaining workers' reactions would require a longitudinal survey with data for each turnover event in every unit.

Finally, our study is not experimental, so we cannot completely rule out the possibility that our findings suffer from omitted variable bias. We tried to address endogeneity, limiting our analyses to months in which falls in demand are harder to forecast. Furthermore, our data allowed us to control for seasonality effects and for manager fixed effects, therefore implicitly controlling for unobserved managerial ability to predict demand fluctuations and set temporary contract expiration dates accordingly.

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TABLE 1
Descriptive Statistics and Correlations [a, b, c]

	Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Unit performance	79.80	71.72	1												
2.	Unemployment rate	.08	.04	-.19***	1											
3.	Worked hours by temporary workers	283.52	575.99	.44***	-.07***	1										
4.	Worked hours by permanent workers	1964.40	2025.85	.68***	-.11***	.31***	1									
5.	Tenure of permanent workers	10.28	3.81	.09***	.19***	.01	.05***	1								
6.	Store complexity	3.76	1.26	.43***	-.01	.15***	42***	.07***	1							
7.	Aggregate temporary worker turnover	.30	.52	-.05***	.25***	-.01	-.06***	.15***	.02*	1						
8.	Temporary worker turnover low	.12	.13	.09***	.15***	.12***	.01	.10***	.06***	.68***	1					
9.	Temporary worker turnover high	.17	.44	-.08***	.24***	-.05***	-.07***	.14***	.01	.97***	.49***	1				
10.	Replacements	.44	.83	.04***	.15***	.04***	-.03***	.10***	.02	.22***	.17***	.20***	1			
11.	Novice replacements	.05	.23	-.03***	.01	-.03***	-.05***	.02**	-.04***	.15***	.03***	.16***	.51***	1		
12.	Experienced replacements	.28	.62	.01	.21***	.02	-.04***	.13***	.03**	.26***	.21***	.25***	.84***	.13***	1	
13.	Job segregation	.27	.12	-.16***	-.02*	.04***	-.08***	-.34***	-.06***	-.09***	-.04***	-.10***	-.07***	-.04***	-.07***	1

[a] $^{*}p < 0.05$
$^{**}p < 0.01$
$^{***}p < 0.001$
[b] Unit of analysis is the store-month-year.
[c] n = 13,279

TABLE 2
Fixed Effects Estimation: Unit Performance in Month t [a, b]

Variables	Model 1 Unit Performance $_t$	Model 2 Unit Performance $_t$	Model 3 Unit Performance $_t$
Unemployment rate $_{t-1}$	-5.57***	-5.55***	-5.52***
	(1.10)	(1.10)	(1.10)
Tenure of permanent workers $_{t-1}$	-0.03**	-0.03**	-0.03**
	(0.01)	(0.01)	(0.01)
Store complexity $_{t-1}$	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)
Worked hours by temporary workers $_t$	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)
Worked hours by permanent workers $_t$	0.00**	0.00**	0.00**
	(0.00)	(0.00)	(0.00)
Aggregate temporary worker turnover $_{t-1}$		-0.04*	0.10*
		(0.02)	(0.05)
Aggregate temporary worker turnover squared $_{t-1}$			-0.17**
			(0.05)
Constant	4.39***	4.41***	4.40***
	(0.12)	(0.12)	(0.12)
Observations	13,279	13,279	13,279
R-squared	0.44	0.44	0.44
Store FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Manager FE	Yes	Yes	Yes

[a] * $p < 0.05$
** $p < 0.01$
*** $p < 0.001$
[b] Standard errors are in parentheses and are clustered by store (n = 255).

TABLE 3
Fixed Effects Estimation: Interaction Effects [a, b]

Variables	Model 1 Unit Performance t	Model 2 Unit Performance t	Model 3 Unit Performance t	Model 4 Unit Performance t	Model 5 Unit Performance t	Model 6 Unit Performance t	Model 7 Unit Performance t
Unemployment rate $_{t-1}$	-5.68***	-5.66***	-5.65***	-5.66***	-5.59***	-5.58***	-5.58***
	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.10)	(1.10)
Tenure of permanent workers $_{t-1}$	-0.03**	-0.03**	-0.03*	-0.03*	-0.03**	-0.03**	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Store complexity $_{t-1}$	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Worked hours by temporary workers $_{t}$	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)
Worked hours by permanent workers $_{t}$	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)
Replacements $_{t}$	0.03***	0.02***	0.02**	0.02**			
	(0.01)	(0.01)	(0.01)	(0.01)			
Aggregate temporary worker turnover $_{t-1}$	0.11*	0.10*	0.02		0.10*	0.03	
	(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	
Aggregate temporary worker turnover $_{t-1}$ X Replacements $_{t}$		0.04*	0.18**				
		(0.02)	(0.06)				
Aggregate temporary worker turnover squared $_{t-1}$	-0.19**	-0.21***	-0.11		-0.18**	-0.13	
	(0.05)	(0.06)	(0.07)		(0.05)	(0.07)	
Aggregate temporary worker turnover squared $_{t-1}$ X Replacements $_{t}$			-0.17**				
			(0.06)				
Temporary worker turnover low $_{t-1}$				-0.00			-0.00
				(0.05)			(0.05)
Temporary worker turnover low $_{t-1}$ X Replacements $_{t}$				0.24***			
				(0.06)			
Temporary worker turnover high $_{t-1}$				-0.10**			-0.11**
				(0.04)			(0.04)
Temporary worker turnover high $_{t-1}$ X Replacements $_{t}$				-0.08*			
				(0.03)			

TABLE 3
(Continued)

Variables	Model 1 Unit Performance t	Model 2 Unit Performance t	Model 3 Unit Performance t	Model 4 Unit Performance t	Model 5 Unit Performance t	Model 6 Unit Performance t	Model 7 Unit Performance t
Experienced replacements $_t$					0.02*	0.02	0.01
					(0.01)	(0.01)	(0.01)
Novice replacements $_t$					0.04	0.02	0.02
					(0.02)	(0.02)	(0.02)
Aggregate temporary worker turnover $_{t-1}$ X Novice replacements $_t$						1.28* (0.52)	
Aggregate temporary worker turnover squared $_{t-1}$ X Novice replacements $_t$						-1.30* (0.53)	
Aggregate temporary worker turnover $_{t-1}$ X Experienced replacements $_t$						0.08 (0.06)	
Aggregate temporary worker turnover squared $_{t-1}$ X Experienced replacements $_t$						-0.05 (0.07)	
Temporary worker turnover low $_{t-1}$ X Experienced replacements $_t$							0.15* (0.07)
Temporary worker turnover high $_{t-1}$ X Experienced replacements $_t$							-0.03 (0.04)
Temporary worker turnover low $_{t-1}$ X Novice replacements $_t$							1.77** (0.57)
Temporary worker turnover high $_{t-1}$ X Novice replacements $_t$							-0.76** (0.25)
Constant	4.39***	4.40***	4.40***	4.40***	4.41***	4.42***	4.42***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Observations	13,279	13,279	13,279	13,279	13,191	13,191	13,191
R-squared	0.44	0.44	0.45	0.45	0.44	0.44	0.44
Store FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

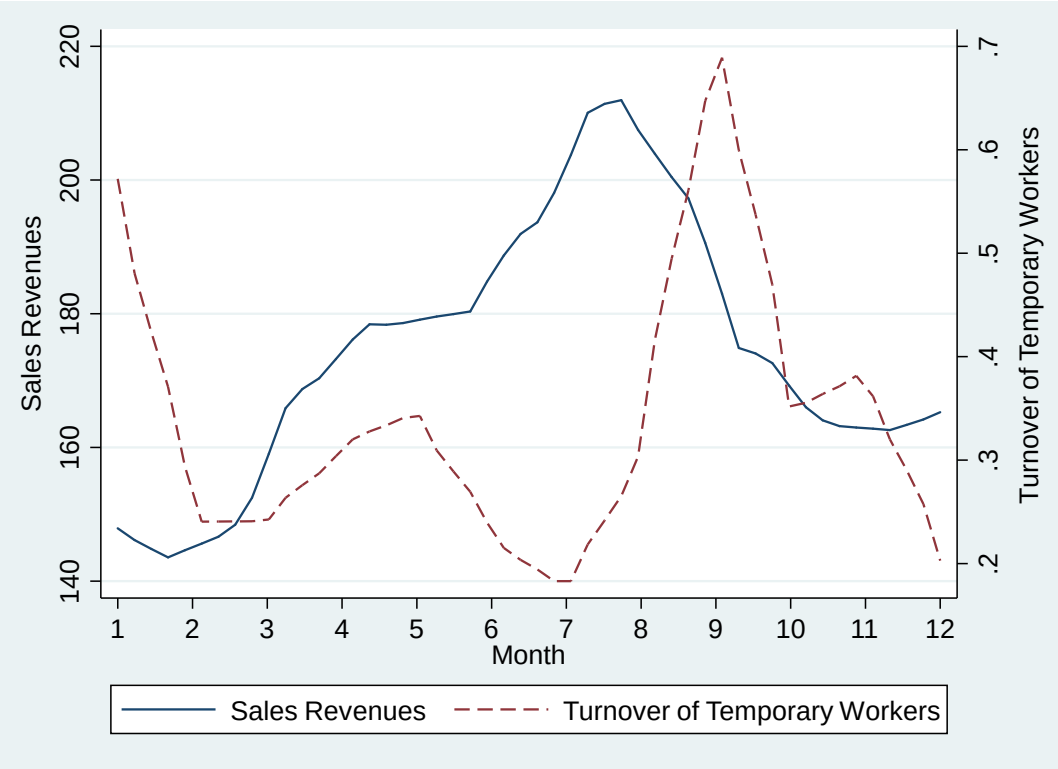
[a] * $p < 0.05$
** $p < 0.01$
*** $p < 0.001$
[b] Standard errors are in parentheses and are clustered by store (n = 255).

TABLE 4
Fixed Effects Estimation: High vs. Low Segregation [a, b]

Variables	Model 1 Unit Performance $_t$ High Segregation (n=54)	Model 2 Unit Performance $_t$ Low Segregation (n = 70)
Unemployment rate $_{t-1}$	-5.76	0.26
	(3.02)	(1.70)
Tenure of permanent workers $_{t-1}$	0.00	-0.06**
	(0.02)	(0.02)
Store complexity $_{t-1}$	0.05	-0.01
	(0.03)	(0.01)
Worked hours by temporary workers $_t$	0.00*	0.00**
	(0.00)	(0.00)
Worked hours by permanent workers $_t$	0.00***	0.00
	(0.00)	(0.00)
Replacements $_t$	0.03	0.02
	(0.02)	(0.02)
Aggregate temporary worker turnover $_{t-1}$	-0.06	0.26*
	(0.15)	(0.10)
Aggregate temporary worker turnover $_{t-1}$ X Replacements $_t$	0.44**	0.08
	(0.15)	(0.11)
Aggregate temporary worker turnover squared $_{t-1}$	-0.06	-0.29*
	(0.21)	(0.11)
Aggregate temporary worker turnover squared $_{t-1}$ X Replacements $_t$	-0.45**	-0.07
	(0.16)	(0.11)
Constant	3.28***	4.24***
	(0.28)	(0.21)
Observations	2,904	2,776
R-squared	0.32	0.52
Store FE	Yes	Yes
Time FE	Yes	Yes
Manager FE	Yes	Yes

[a] * $p < 0.05$
** $p < 0.01$
*** $p < 0.001$
[b] Standard errors are in parentheses and are clustered by store

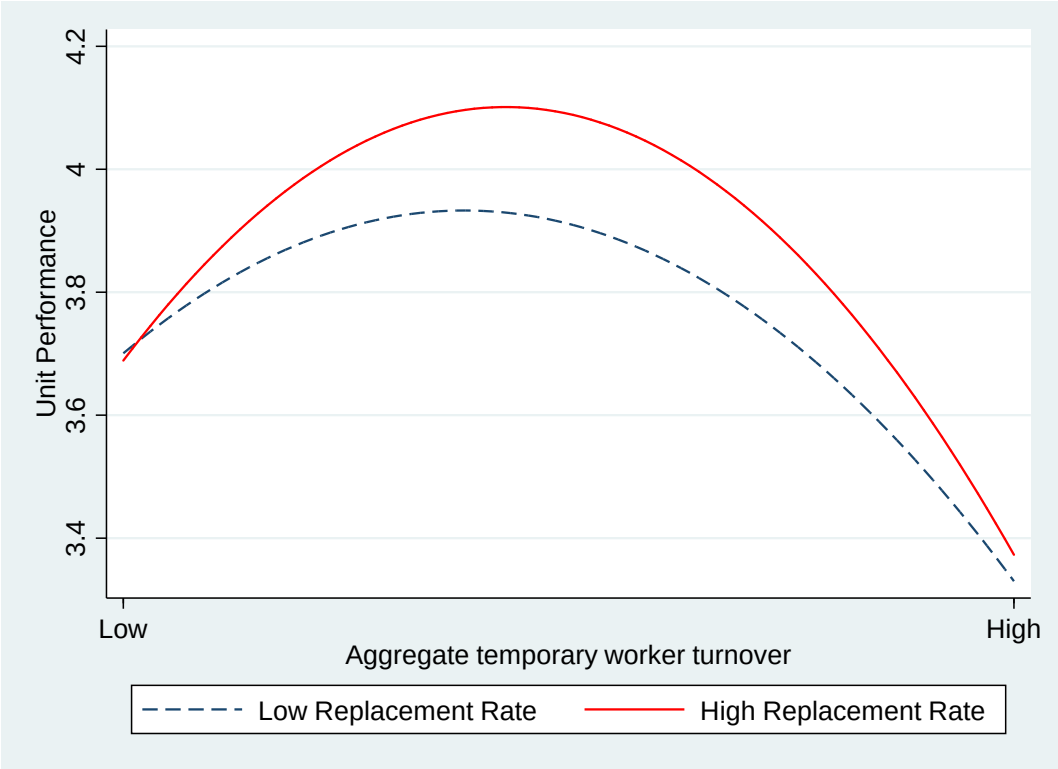
FIGURE 1
Turnover of Temporary Workers and Sales Revenues (in Euros) over Time (monthly average)



Note: Sales revenues are multiplied by a decimal constant (the same used for the transformation of unit performance) for confidentiality reasons.

FIGURE 2
Inverted U-shaped relationship between Aggregate Temporary Worker Turnover and Unit Performance (Hypothesis 1)

FIGURE 3
Moderating Effects of Aggregate Temporary Worker Turnover and Replacements (Hypothesis 2)



CHAPTER 2

with Matthew Bidwell and Arnaldo Camuffo

How much is a manager worth and to whom? Managers' abilities, unit performance and compensation.

ABSTRACT

Increasing amounts of evidence demonstrate that different managers provide very different contributions to firm performance. Is this heterogeneity in managers' performance reflected in their pay? We investigate the relationship between variation in performance and variation in pay for managers below the executive level. Using an original and unique longitudinal data-set from a world's leader in the restaurant industry, we explore if and to which extent differences in managerial ability to generate value explain differences in compensation. We find that differences in managerial pay are significantly smaller than differences in managerial performance even when managerial skills are general and transferrable across employers. Our major contribution is providing, at least to our knowledge, one of the first studies on the relationship between managers' individual contribution to value creation and managers' pay for managerial positions below the C-level.

Keywords: managers, human capital, value capture, value creation

INTRODUCTION

Increasing evidence in the strategy literature shows that managers in the same position differ in the value that they create (Bertrand & Schoar, 2003; Mollick, 2012). Studies in this area, by exploiting managers' moves across positions and firms, have been able to isolate the variation in between- (Bertrand & Schoar, 2003; Mollick, 2012) and within- (Lazear, Shaw, & Stanton, 2015) firm performance that is attributable to differences in managers' contributions. While this body of research initially focused on CEOs and other top managers (e.g., Bertrand & Schoar, 2003), more recent work has studied middle managers (Mollick, 2012) and supervisors (Lazear et al., 2015), showing that managers matter at all levels and confirming that they do differ in their individual contributions to value creation.

However, no clear evidence exists on how these differences in the value that managers generate transfer into differences in pay among them (Lazear et al., 2015). Consequently, we do not know if, for example a manager who consistently generates twice as much value as another manager, in the same position, is paid twice as much. We believe that assessing managers' ability to capture the extra value that they create is important because not only it allows to understand how differences in individual managerial abilities map onto performance and eventually managerial pay, but also it determines the extent to which firms might benefit from differences among managers and capture value from their human capital. This paper aims to address this question by uncovering the magnitude of the difference in the value that non-executive managers create and the value they capture through pay.

Theoretical predictions on the extent to which managers capture the value that they generate do not provide a unique answer to our focal question. On the one hand, a vast body of the literature on managerial human capital builds on the assumption that differences in

managers' general human capital[6], as embodied in the value they create for their employer, are fully reflected in differences in their pay (Becker, 1964; Campbell, Coff, & Kryscynsky, 2012: 377). Therefore, according to this assumption, a manager whose general knowledge, skills and abilities create twice as much value as those of another one is paid twice as much (Castanias & Helfat, 2001). Along the same line, studies on CEO's pay-for-performance theorize that pay increases with firm performance to solve the agency problem emerging from the conflict of interest between the managers and the firm (Hall & Liebman, 1998). Firms decide the optimal incentive structure so that, under condition of uncertainty, managers exert the optimal level of effort to achieve the company goals, given their ability. Moreover, managers leading larger firms are expected to create and capture more value, with pay increasing in both the size and the market capitalization of the firm (Hall & Liebman, 1998).

On the other hand, the most recent theoretical developments on strategic human capital challenge this assumption and question how firms and managers share the value created through managerial human capital (Campbell et al., 2012; Chadwick, 2017; Coff & Raffiee, 2015). This stream of conceptual work proposes that high performing managers are not always able to extract the extra value that they create through their general human capital because of labor market imperfections (Campbell et al., 2012). On the demand-side, firms may imperfectly value human capital through their performance management systems, which leads to differences between the value that managers create and what they capture through pay. On the supply side, managers may either lack outside options or prefer to stay by their current employer (Campbell et al., 2012), accepting pay that does not fully reflect their value. Under these conditions, high-performing managers might be willing to give up part of the

[6] Knowledge, skills, abilities and other characteristics that are readily applicable outside the focal firm (Campbell et al., 2012).

value that they create and to accept salaries below the value of their general human capital. Similarly, firms might be able to compress managerial pay relative to managers' abilities (Acemoglu & Pischke, 1999) and reduce the organizational cost deriving from social comparison and perceived fairness. Indeed, the literature on the social costs of pay-for-performance suggests that organizations may decouple employees' pay from the value that they create to manage equity tensions within the firm (Larkin, Pierce, & Gino, 2012; Nickerson & Zenger, 2008).

To date, the existing empirical evidence on how managers create and capture value is not sufficient to resolve this theoretical conundrum for two major reasons. First, recent studies that accurately identify managers' contribution to performance lack compensation data (Lazear et al., 2015; Mollick, 2012). Second, the studies documenting pay compression across jobs and levels of activities (Akerlof & Yellen, 1990; Gartenberg & Wulf, 2017), while using rich and detailed data on compensation, are less accurate in identifying the value created by managers. The majority of these empirical studies proxy managers' contribution to value creation with the managers' performance appraisals scores (Zenger, 1992) or with the firm's market value (Gabaix & Landier, 2008) and/or business unit financial performance (Gartenberg & Wulf, 2017). While these measures are potentially correlated with the value generated by managers, they do not measure it directly and are not helpful in comparing the actual value created by the managers and the amount of their compensation. Bertrand and Schoar's (2003) work on how CEOs affect firm performance and behaviors represents a notable exception, as it exploits top managers' mobility across firms to obtain an accurate measure of the value they create, and then study whether those differences are correlated with pay. Although they are able to show a positive correlation between managerial ability and pay, their work does not examine how the magnitude of the value created compares to the

magnitude of the pay that they receive, leaving open the question of how much of their value managers are able to capture. Moreover, Bertrand and Schoar's (2003) paper focuses on executive managers only, raising the question of how their findings would extend to lower-level managers, whose performance is typically harder to isolate from the influence of their senior managers, subordinates, and the local competition (Wooldridge, Schmid, & Floyd, 2008).

This study aims to fill this empirical gap isolating the variation in performance unambiguously attributable to the variation among non-executive managers (Lazear et al., 2015) and matching it to differences in pay.

In order to explore and test how differences in managers' ability to generate value map into differences in their pay, we use a unique database provided by a leading multinational company in the restaurant industry. We analyze matched manager-store monthly data, from 2007 to 2014, from the company's sales network (stores and restaurants). Three features of the setting are particularly suitable to our study. First, our data provide detailed information on store profitability as well as on managers'[7] compensation allowing us to measure value creation and value capture accurately. Second, managers' move across stores, allowing us to distinguish store and manager influences on performance (value creation) and compensation (value capture). Third, managerial human capital in this setting is general as broadly applicable outside the focal firm. Consequently, this setting is ideal to study whether managers capture value from their general human capital in full, as the traditional human capital theory would predict (Becker, 1964). Adopting a Mixed Model Specification (Lazear et al., 2015), we compare the standard deviation of the restaurant managers' effects on

[7] We refer to managers as the stores and restaurants directors who occupy a middle level position in the hierarchy of operations management.

performance and on compensation to test to what extent differences in contribution to performance map into differences in pay. Then, we explore the demand-side and the supply-side labor market mechanisms that might account for misalignment explaining why managers might capture more or less than the value that they create and under which conditions firms, or other organizational actors within them, can appropriate the rents deriving from general managerial human capital.

We find that the standard deviation of manager effects on performance is more than forty (41.57) times the standard deviation of their effect on compensation. The notable size of this discrepancy between abilities and pay suggests that that the value generated by managers does not transfer into their compensation. When investigating why managers are not appropriating value from their general human capital, we find evidence of demand-side and supply-side labor market conditions allowing the firm to capture such value (Campbell et al., 2012). On the demand-side, our findings raise questions about how much of the managers' contribution to performance is recognized. Indeed, neither managers' performance appraisals correlate with unit performance nor the firm strategically assigns managers to jobs according to their abilities. On the supply-side, we find no effect of managers' ability on managers' voluntary turnover. Overall, our study shows that the assumptions underlying human capital theory overestimate the ability of managers to appropriate the value generated by their general human capital.

THEORY

Managerial human capital and value creation

This paper investigates the link between the differences in the value that managers create and the differences in the value that they capture through pay. In so doing, we build on the strategic human capital and strategic human resources management literatures on how

human capital (knowledge, skills, abilities, and other characteristics) leads to value creation and capture (Cambpell et al., 2012; Chadwick, 2017; Coff, 1997, 2002; Jiang, Lepak, Hu, & Baer, 2012; Ployhart & Moliterno, 2011). Research in these areas has found that differences in individuals' knowledge, skills, abilities, and other characteristics explain variation in multiple dimensions of operational and financial performance, such as productivity, quality, innovation, and revenues (Jiang et al., 2012; Crook, Todd, Combs, Woehr, & Ketchen, 2011; Hitt, Bierman, Shimizu, & Kochhar, 2001). Individuals differ in their ability to create value, and these differences affect performance above and beyond the processes and practices that the firm implements to motivate and develop human capital (Jiang et al., 2012; Mollick, 2012).

Within these literatures, the studies focusing on managerial human capital converge on the finding that managers matter and differ in their ability to create value (Bertrand & Schoar, 2003; Holcomb, Holmes, & Connelly, 2001; Mollick, 2012). However, these studies adopt different approaches to identify this ability (Bertrand & Schoar, 2003; Holcomb et al., 2001; Mollick, 2012) - that is they either use the managers' cumulated skills or the managers' moves.

Some studies conceptualize managerial ability as the human capital accumulated by managers over their career histories, and operationalize it using proxies like experience (job and company tenure, diversity of functional background), education (year, number and type of degrees, filed/discipline diversity), and past performance (Carpenter & Fredrickson, 2001; Holcomb et al., 2001). They aim at identifying the managerial skills and processes that are more relevant to value creation (Holcomb et al., 2001) and empirically test which managerial abilities are positively related to firm performance (e.g., Finkelstein & Hambrick, 1996; Miller & Shamsie, 2001). Their findings show that managers differ in their contribution to value creation because of the differences in abilities such as using and recombining firm

resources (Holcomb et al., 2001), and managing relationships with subordinates, and customers (Hitt et al., 2001).

Other studies aim at identifying and estimating the marginal contribution of managers to value creation (Bertrand & Schoar, 2003), beyond contextual factors such as the firm processes (Mollick, 2012), and the subordinates' characteristics (Lazear et al., 2015). These studies identify managers' marginal contribution to performance by observing the effect of managers' moves across (Bertrand & Schoar, 2003) and within (Lazear et al., 2015; Mollick, 2012) organizations. Bertrand and Schoar (2003) find that when executives move from one firm to another, they significantly affect the financial performance and the investment behaviors of the firm. Mollick (2012) also finds that individual differences in middle managers explain part of the variation in firms' revenues. Finally, Lazear and colleagues (2015) show that when retail supervisors move across teams they have a significant impact on subordinates' productivity. In line with these studies, this paper exploits managers' mobility across units to identify and compare the differences in the manager marginal effects on performance and pay (Mollick, 2012; Lazear et al., 2015).

Managerial human capital and managers' compensation

While researchers agree that managers differ in their individual contribution to value creation (Mollick, 2012), how these differences affect differences in pay is more controversial.

One strand of the literature on strategic human capital gives us reasons to expect a close correspondence between the differences in managers' ability to create value and the differences in their pay (Becker, 1962, 1964, 1994; Castanias & Helfat, 2001). According to this literature, wages reflect differences in individuals' marginal contribution to firm performance, namely in their marginal productivity across employers (Becker, 1962). The

next best wage that the manager can receive by other employers equals her marginal productivity outside the focal firm (Mahoney & Kor, 2015). The firm thus pays wages equal to (or higher than) this next-best offer (Chadwick, 2017; Mahoney & Kor, 2015).

The correlation between the differences in the individual contribution to performance and the differences in pay emerges from a dynamic process of wage negotiation between the managers and the firm over time (Chadwick, 2017). If a manager compensation is below her next-best offer, she will leave unless the focal firm adjusts the compensation upward to reflect the manager's outside option. Conversely, if a manager compensation is above her value, the firm will be able to renegotiate the pay downward. Thanks to this adjustment process the firm can capture value from managerial human capital, and motivate managers to remain in the firm and to invest (or co-invest) in the development of firm-specific skills (Chadwick, 2017).

Therefore, if two managers differ in the value that they create, their next-best offer and in turn their compensation would differ (Harris & Helfat, 1997). The differences in managers' marginal contribution to firm performance thus correlate with differences in their pay (Bertrand & Schoar, 2003; Castanias & Helfat, 2001). For example, consider the cases of two managers, A and B whose marginal productivity is observable and generalizes across employers. Manager A creates value for $100 while manager B for $200. Employers outside the focal firm will thus offer $100 for Manager A, and $200 for Manager B. Therefore, Manager B's pay will be twice that of Manager A (Mahoney & Kor, 2015).

However, the boundary conditions of this prediction are relatively unclear. First, existing studies do not test the relationship between managers' marginal contribution to performance and compensation directly (Bertrand & Schoar, 2003; Harris & Helfat, 1997) and thus do not provide a test of how much of the value created by general human capital is captured by managers (Campbell et al., 2012). Second, this prediction relies on two

assumptions that have been recently challenged by new theoretical developments in the strategic human capital literature (Campbell et al., 2012; Chadwick, 2017), that is that "general human capital has a constant value across firms" (Campbell et al., 2012: 378) and that managers capture the value from their general human capital through compensation (Becker, 1962, 1964; Harris & Helfat, 1997).

This recent stream of work argues that the value of human capital does not generalize across employers because they are sometimes unable to observe and assess the next-best marginal productivity of human capital objectively (Coff & Raffiee, 2015). This asymmetry of information affects the next-best offer that managers can receive by another firm and, in turn, their wage in the focal firm (Campbell et al. 2012). As a result, managers might be unable to capture the full value of their general human capital through pay because the firm is able to capture part of it (Campbell et al., 2012). The relationship between individual contribution to value creation and pay is thus looser than predicted by the literature on managerial human capital (Bertrand & Schoar, 2003; Lazear et al., 2015) because of the frictions in the labor market (Campbell et al., 2012), and of the firm capability to extract value from human resources (Chadwick, 2017).

Campbell and colleagues (2012) posit that frictions can arise both on the firms' (demand) and on the managers' (supply) side of the labor market for managerial human capital. These supply-side and demand-side frictions will prevent managers from capturing the marginal productivity of their general skills through pay. Therefore, the extent to which differences in ability transfer into differences in pay may be smaller than the traditional argument that wages equal marginal productivity would suggest (Campbell et al., 2012).

On the demand-side, firms can underestimate the value of the manager's general human capital (Campbell et al., 2012). If potential employers cannot observe the marginal

productivity of the manager's general skills perfectly, they will be unable to assess it and to differentiate between good and bad managers (Akerlof, 1970). In order to address this information problem, they will offer wages below the marginal productivity of good managers (Lazear & Shaw, 2007). The focal firm will thus be able to retain good performers at wages below their next-best marginal productivity because they lack attractive outside options (Campbell et al., 2012). Moreover, the focal firm itself might be unable to perfectly assess the marginal productivity of managers and to differentiate pay accordingly (Campbell et al., 2012) because managerial work is characterized by a certain degree of complexity and ambiguity. As a result, differences in the marginal contribution of managers to performance will be larger than differences in the value they capture through pay.

On the supply-side, managers may also be unaware of the value of their general skills outside the focal firm (Campbell et al., 2012). If they lack information on their next-best offer and if it is hard for them to acquire this type of information on the labor market, they will not bargain with their employer to adjust their wages to their marginal productivity over time (Campbell et al., 2012). Moreover, some managers may be unwilling to leave her current employer and might thus accept to remain in the firm at a wage below their next-best offer (Campbell et al., 2012). Managers' lack of accurate information on their value and managers' individual preferences will thus broaden the gap between differences in managers' marginal productivity and differences in their pay.

Beyond labor market frictions, employers may also decouple differences in managers' marginal contribution to performance and differences in pay for strategic purposes, such as reducing the financial cost of human resources (Chadwick, 2017) and reducing perceived inequity (Nickerson, Silverman & Zenger, 2007). Some firms may develop human resource management capabilities enabling them to "reduce the costs that they pay to acquire and

retain human capital, such as by striking good bargains with workers over wages" (Chadwick, 2017: 504). In addition to the financial and administrative costs of wages, attaching pay to performance can exacerbate the costs of social comparisons among managers, such as the negative effect of envy and perceived unfairness on managers' satisfaction, and effort (Larkin et al., 2012; Obloj & Zenger, 2017). Therefore, the firm may compress managers' pay relatively to the market value of their abilities to mitigate these psychological costs (Gartenberg & Wulf, 2017; Nickerson & Zenger, 2008).

Whether managers capture the value of their marginal contribution to performance thus remains an open question. Does a manager who creates twice as much value as another also earn twice as much (Lazear et al., 2015; Castanias & Helfat, 2001)? Our study aims to address this question by identifying and comparing the magnitude of the manager specific effects on unit performance and pay, net of time and unit-level effects. Our goal is understanding by how much the differences in managers' individual contribution to value creation transfer into differences in pay when managerial human capital can generalize outside the focal firm. After assessing the magnitude of the relationship between these differences, we investigate the demand- and the supply-side labor market frictions that explain our findings.

METHODS

Research setting

The setting for this study is a Multinational Company providing food and beverage and retail services, which agreed to provide annual personnel data for its Italian Sales Network (stores and restaurants). Airports and motorways are the Group's major channels, followed by railway stations and a selective presence in high streets, shopping centers, trade fairs and museums.

The stores/restaurants, though different in size, have similar organizational structures. Store managers in this context are typical line managers, located at the second hierarchical layer of the company's organizational structure. All workers in the store directly report to the store manager who, in turn, reports to the head of the regional area in which the store is located. Conditional upon the achievement of the store-level objectives, managers receive a cash bonus at the end of each trimester. Once a year, for developmental purposes, they undergo a performance review, done by their area manager.

This setting is suitable to investigate the relationship between general managerial human capital and compensation for managers below C-levels for three major reasons. First, the knowledge, skills and abilities held by these managers are general, transferrable and readily applicable in other firms in the restaurant, hospitality and retail industries. Interviews with the company's HR director confirmed the portability of the store managers' human capital. Additional evidence is constituted by the fact that store managers' training almost exclusively focuses on issues like store management accounting, store hygiene legislation and quality standards. Second, the company tends to rotate Store Managers every two years -on average- to allow the internal transfer of knowledge and skills. This cross-store mobility makes it possible, with the appropriate statistical methods, to isolate the individual manager effects on profitability, disentangling it from the store effects. Third, detailed data on both store-level profitability (value creation) and store manager compensation (value capture) are available. Importantly to the purpose of this study, managers are directly accountable for the stores' economic performance and have a significant amount of discretion in affecting store profitability. Indeed, at the store level, they are responsible for managing operations and sales, for staffing, training and allocating workers to jobs and for the store hygiene and display. This

facilitates the identification of their individual contribution to the store performance and, in turn, to the firm value creation.

Data

We use monthly personnel records for all store managers (417 managers) for the years 2007-2014 (96 months). We eliminate 285 manager-month-year observations in the first lowest percentile of the total pay distribution. These observations correspond to the month following the exit of a manager from the organization and are due to ex-post compensation adjustments for tax and accounting reasons. For similar reasons, we eliminate additional 277 manager-month-year observations (the first-lowest percentile of the distribution of the hours worked in the store). These observations correspond to the month following a store closure and represent ex-post adjustments for accounting purposes. The final database includes 28,580 manager-month-year observations.

For each manager in each store, the data-set contains: a) Individual characteristics such as gender, education, age; b) salaries and bonuses; c) employment contract characteristics such as starting and ending date of the relationship; d) Individual performance evaluations.

For each store, data are available with regard to: a) Store characteristics (size, location); b) Total number of worked hours; c) Financial and operational performance results.

Overall, we have access to a matched establishment-employee dataset with very detailed information on the characteristics of the managers and of the establishment. This allows us to estimate the value created and captured by store managers, while controlling for a set of variables that are also likely to drive store performance and store managers' compensation.

We manually matched the data with regional-level data from the Italian National Institute of Statistics (ISTAT) containing important macroeconomic indicators such as the unemployment rate and the number of firms in the various regions.

Analytical approach

The primary goal of this paper is to explore whether managers are actually paid according to the value they create for the company. In order to quantify this relationship, we compare the manager-level variance in performance and pay, which we estimate with mixed effects regressions of store profitability and store manager's compensation (Lazear et al., 2015). The unit of analysis is manager i in store j at month-year t.

The equation for a mixed effect regression for store profitability is:

$$Y_{ijt} = \alpha + \beta X_{ijt} + \gamma m + \theta_{1j} + \theta_{2j} m + \varphi_i + \varepsilon_{ijt}$$

Where Y is the outcome variable (profitability of store j with manager i at time t), X_{ijt} is a vector of control variables, m is a linear growth term controlling for store performance trends over the 96 months of observation, θ_{1j} represents a random effect that takes different values for different stores j (random intercept for each store), θ_{2j} m represents a random effect that takes different values for different stores j and that is nested within the linear growth trend of the store performance over time (random slope for each store), φ_i represents a random effect which takes different values for different managers i, and ε_{ijt} represents and error term which takes different values for each unique combination of manager, store, and time.

The equation for a mixed effect regression for the manager's pay is:

$$Y_{it} = \alpha + \beta X_{ijt} + \gamma m + \theta_{1j} + \theta_{2j} m + \varphi_i + \varepsilon_{ijt}$$

Where Y is the outcome variable (pay of manager i at time t), X_{ijt} is a vector of control variables, m is a linear growth term controlling for store performance trends over the 96 months of observation, θ_{1j} represents a random effect that takes different values for different stores j (random intercept for each store), θ_{2j} m represents a random effect that takes different values for different stores j and that is nested within the linear growth trend of the store performance over time (random slope for each store), φ_i represents a random effect which

takes different values for different managers i, and ε_{ijt} represents and error term which takes different values for each unique combination of manager, store, and time.

Mixed effect models include both fixed and random effects but estimate them differently. The models estimate separate values of the controls X_{ijt} for each manager i in store j at time t. Conversely, individual values of random effects are not estimated. Instead, it is assumed that each of those values are distributed normally with a mean of 0 and a standard deviation of σ. The models estimate this standard deviation (Rabe-Hesketh & Skrondal, 2008; Baayen, Davidson, & Bates, 2008). These estimates do not hinge on specific assumptions on the correlation of the fixed effects and the random effects of the store, the manager and the store-manager match.

This analytical approach is particularly suitable to measure the value created and captured by managers. Indeed, it is able to estimate which proportion of the variation in performance and compensation can be attributed to the manager controlling for store-level sources of variation. Specifically, we are interested in comparing the magnitude of the standard deviations of φ_i, (the random effects at the manager level) in the two models. The standard deviations of the manager random effects in the two models allow us to estimate by how much managers differ in their contribution to store profitability and in their pay. If there is no systematic difference across managers, then σ_φ should not be significantly different from zero. The more that managers differ systematically in their contribution to store profitability and in their pay, the greater should be the values of σ_φ in the mixed effect regressions for store profitability and for manager's pay respectively. Comparing the standard deviation of random effects in the two models for profitability and pay enables us to assess the extent to which managers systematically differ in their pay by as much as they do in their contribution to the unit profitability.

As described above, the models control for the store and the manager characteristics that vary over time and month-year fixed effects to account for linear and non-linear time trends. However, two additional factors might confound the estimate of the manager-level variation in store profitability and pay. First, time-invariant store characteristics might drive both value creation and value capture. In order to address this concern, we include θ_{1j}, which allows different intercepts for each store. Second, when managers move across stores, the variation in managers' contribution to performance might be confounded by the differences in the performance trends between the store of origin and that of destination. In order to address these concerns, we also include the θ_{2j} m a store-level random effect nested within the linear trend of unit performance over time. This allows different slopes for different stores. In so doing we estimate different intercepts for different stores, but also, different slopes for each store, conditional upon the store trend over time. This separately accounts for: a) the store-specific effect (different baseline effects for each store); and b) the effect of the interaction between the store's characteristics and time (different stores are subject to different trends over time).

Measures

All measures refer to the manager-month-year level of analysis.

Dependent variables. *Unit performance.* We measure unit performance with the store net controllable profit (in Euros) in month t [($Sales_t$ – Operating $Costs_{t)}$ X decimal constant]. Net controllable profit is the fraction of the store profits under managerial control. For confidentiality reasons, we multiply the actual profits by a decimal constant (x/1000).

Total Pay. Managers' total compensation is the sum of base salary and bonus. Since base salaries vary on a yearly basis (the company conducts yearly salary reviews) and bonuses vary on a trimestral basis, we measure total pay (in Euros) as the average monthly compensation of

a manager in a given year. This time unit allows comparability with the unit of analysis of Unit performance (manager-month-year). We calculate the total yearly compensation of the manager and then divide it by 12 to obtain the monthly average. For comparability purposes, we also multiply the actual salary by the same decimal constant (x/1000) used to transform the store net controllable profit.

Base salary. Managers' base salary vary on a yearly basis since the HR department performs salary revisions once a year. Therefore, for comparability with the unit of analysis of the other measures (manager-month-year), we measure Base salary (in Euros) as the average monthly salary of a manager in a given year. For comparability purposes, we multiply the actual salary by the same decimal constant (x/1000) used to transform the store net controllable profit.

Bonus. Managers receive pay-for-performance incentives every three months, contingent upon the achievement of the performance objectives for each trimester. Therefore, financial bonuses vary on a trimestral basis. For comparability purposes, we measure the variable component of the manager's compensation as the monthly average of the financial bonuses (in Euros) received by the manager in a given year (multiplied by the already used decimal constant x/1000).

Controls. *Gender.* Dummy variable equal to 1 if male and 0 if female.

Age. Managers' age in years.

Tenure. Managers' tenure within the company in months.

Unit strategic relevance. Company classification of stores strategic relevance (size, location, business volume) from 1 (low importance) to 6 (high importance).

Unit quality. We use the Customer Service Quality score of the store as a measure of store quality. This measure is a "Mystery Client" score, attributed on a quarterly basis, based on the

store audit conducted by a company employee who pretends to be a random customer. The score includes operational KPIs such as store hygiene level and service speed.

Worked hours. Total number of hours worked in the store in month t.

Regional unemployment rate. Trimestral unemployment rate in the region where the restaurant is located.

Competition. Number of competing restaurants and retail stores in the province according to the 2011 National Census data. The average province size is 2739 km^2 with a population of 551,505 inhabitants.

We account for the seasonality of the business by including month-year dummy variables in all models (month-year fixed-effects).

Manager contribution to performance and pay. *Manager effect on performance.* We measure the manager's contribution to performance as the manager random effects on unit performance (φ_i). We estimate the standard deviation σ_ϕ of manager random effects to measure systematic differences across managers in value creation.

Manager effect on compensation. We measure the manager's effect on pay as the manager random effects on total pay (φ_i). We estimate the standard deviation σ_ϕ of manager random effects to measure systematic differences across managers in value capture.

RESULTS

Descriptive statistics

Table 1 provides means, standard deviations, and correlations for the main dependent and independent variables in the analysis, with manager–month-year as the unit of analysis. Of particular interest is the relationship between the distribution of unit performance and pay. The standard deviation of unit performance is 73.6 (S.D. / mean = 1.06), while that of managers' pay is 0.44 (S.D. / mean = 0.18). Moreover, the correlation between performance

and compensation is below 40%. Therefore, variation in performance is by far larger than variation in pay and only partially reflected in it. This is not surprising since, although managers might matter to store level profitability, for sure not all of the profits are attributable to them. Also interesting is the minimal correlation between managers' assignment to higher impact positions, with 198 cases (25% of all internal moves), and the other store and manager characteristics. This suggests the absence of a systematic pattern in the store-manager matching by the firm.

Insert Table 1 about here

Managers' value generation

Table 2 presents our mixed effects analyses of the manager effect on unit performance and pay. Models 1 to 4 estimate manager random effects and store random effects within the time (store random intercepts and time random slopes for each store) on performance. All models include time fixed effects. The time unit is the month-year.

Both the managers' and the units' heterogeneity explain variation in performance. In order to estimate the standard deviation of the manager effects, accounting for store-level variation, Model 1 is a baseline models including the unit strategic relevance and controls of time-invariant and time-variant store characteristics. The standard deviation of managers' effects in Model 1 is 6.42, which equals 8.71% of the standard deviation of the unit performance. However, managers' productivity may also depend on managers' individual characteristics. For this reason, in Models 2 we control for managers' demographic characteristics and tenure. The standard deviation of managers' effects when including these controls is 6.76. The estimate is thus in the same range as in Models 1 and the change is not significant. None of

the individual-level controls seems to significantly explain performance. Managers matter and differ in their managerial practices. This variation in practices may partially explain variation in performance. In our setting, by making decisions on the staffing level and designing the shifts, store managers have discretion over their subordinates' work schedule and directly affect customers' waiting time. Moreover, managers vary in how they organize the store display and enforce the hygiene guidelines from the company, with direct consequences on the quality of the service and the customer satisfaction. In Model 3, we add unit quality and worked hours to account for the heterogeneity in what managers do in the store. The standard deviation of manager effects remains in the same range (6.69). From our model, it emerges that stores working for larger number of hours, generally larger stores, generate more value, while unit quality does not have a statistically significant effect on profitability. Finally, in Model 4 we control for the labor market conditions by including the regional unemployment rate and the density of competing restaurants and retail stores in the province. When including this control, the standard deviation of managers' effects increases to 8.74 but the change is not statistically significant. Among the controls, we find that stores that are strategically more relevant are the most profitable. We lack to find a statistically significant relationship between labor market conditions and unit performance.

Overall, the key finding in Models 1 to 4 of Table 2 is that managers differ in their underlying ability to generate value and matter to store performance. The models show that the standard deviations[8] of the manager effects is statistically different from zero (p-value < 0.01), meaning that managers create value to the firm and that this value is relatively large.

[8] The standard deviation of manager effects is calculated as the standard deviation of the manager random coefficients.

This confirms extant evidence that individual differences among managers, below the C-level, explain variance in performance (Lazear et al., 2015; Mollick, 2012).

Insert Table 2 about here

Managers' value capture

Models 5 to 8 in Table 2 estimate manager random effects and store random effects within time (store random intercepts and time random slopes for each store) on pay. All models include time fixed effects. The time unit is the year. In order to grant data confidentiality, we multiply profits and pay by the same decimal constant, thus converting their values to the same arbitrary scale. This enables us to compare the manager effects on both performance and pay.

The complexity and the nature of the managers' job vary with the stores. Therefore, variation in pay should reflect differences across stores. In order to control for time-variant and time-invariant store characteristics, we estimate the baseline Model 5 controlling for store random effects and for the unit strategic relevance respectively. The estimated standard deviation of the manager effects in Model 5 is 0.76. This is significantly lower, 8.45 times less, than the standard deviation of the manager effects on performance estimated in Model 1 in Table 2 (6.42). In Model 6, we include gender, age and tenure to account for the variation in pay explained by individual characteristics and experience. The standard deviation of the manager effects decreases to 0.58 in Model 6, less than 11.66 times the standard deviation of the manager effects on performance estimated in Table 2 in Model 2 (6.76). The standard deviation of the manager effects decreases to 0.15 in Model 7, when controlling for heterogeneity in managerial practices, in terms of store quality and amount of worked hours.

The standard deviation of the manager effect in Model 7 is 44.6 times less than that of the manager effect on performance in Model 3 of Table 2 (6.69). This result suggests that managerial practices are an important source of heterogeneity in managers' pay. The number of hours worked in the store have a positive and statistically significant effect on managers' compensation, probably because stores working for longer hours are generally larger, and generate more value. Unit quality also has a positive and statistically significant effect on pay. Finally, in Model 8 we include the unemployment rate and the density of potential alternative employers to control for the availability of outside options faced by the managers in their geographical area. The standard deviation in manager effects in Model 8 is 0.21, less than 41.57 times the standard deviation of the manager effect on performance in Model 4 (8.73). Model 8 thus confirms the results of Model 7 on the size of the mismatch between variation in managers' productivity and pay.

In synthesis, Models 5 to 8 in Table 2 demonstrate that the variance in compensation is significantly lower than variance in performance, meaning that managers do not capture the full value that they create through compensation. The portion of the variance in managers' compensation that can be attributed to managerial abilities is smaller than the portion of profits that they generate, with the standard deviation of manager effects on compensation more than forty times smaller than that of the manager effects on performance. This suggests that performance differences do not show up in pay to any substantial extent.

Table 2 analyzes the manager effects on the aggregate compensation including both base salary and bonus. However, different components of the managers' pay have different sensitivities to performance (Hall & Liebman, 1998). Therefore, in order to assess through which component of the compensation value accrues to managers, in Table 3 we separately analyze the manager effect on the base salary (Model 1) and on the bonus (Model 2). The two

models estimate manager random effects and store random effects within time (store random intercepts and time random slopes for each store) and include time fixed effects. Reflecting the time range over which base salary and bonuses vary, the time unit of Model 1 is the year, while that of Model 2 is the trimester-year. We convert base salary and bonus to the same arbitrary scale used for the total pay.

Insert Table 3 about here

Models 1 analyzes the manager effect on the base salary. Model 2 focuses on bonus as the dependent variable.

The models show that the standard deviation of the manager effect on the base salary is almost three times the standard deviation of the manager effect on bonus. Variation in bonuses is attributable to the store to a bigger extent than to the manager. This result suggests that the managers capture value through their base salary.

Finally, Table 4 compares the standard deviations of the manager effects on performance and pay using both mixed and fixed effects estimation. The standard deviation of the manager fixed effects on performance is equal to 9.94, while the standard deviation of the manager fixed effects on compensation is 0.44. Table 4 shows that these values are not significantly different from the standard deviations of the manager random effects on performance and pay respectively, thus reassuring that our estimates are robust to different estimation approaches. The correlation between the manager fixed effects on performance and the manager fixed effects on total pay is 19% ($p<0.05$) and provides additional evidence of the relatively moderate magnitude of the relationship between differences in managers' abilities and their pay.

Insert Table 4 about here

MECHANISMS

This paper investigates how much of the differences in the value that managers create transfer into their pay when managerial abilities generalize across employers. The above results suggest that differences in the marginal contribution of managers to performance show up in pay to a small extent: the standard deviation of the manager effect on pay is less than 41.57 times the standard deviation of the manager effect on performance.

This finding raises questions on the boundary conditions of the equation between the marginal productivity of human capital and wages when skills are general and have the same value across employers. While a large body of the strategic human capital literature would predict that managers capture the full value of their general human capital through pay, our findings support the counterargument that demand-side and supply-side frictions in the labor market might impair managers' ability to capture value from their general skills (Campbell et al., 2012).

We thus focus on these frictions to explain the mechanisms underlying our finding. On the demand-side, we test one potential explanation to why differences in performance do not transfer into pay: the focal firm lacks information on the marginal contribution of managers to performance (Campbell et al., 2012). On the supply-side, we test whether the gap between pay and performance is sustainable because of managers' unwillingness to leave their employer (Campbell et al., 2012). We find support for both the considered mechanisms.

Demand-side mechanisms

One potential explanation to why managers do not capture the value of their general human capital is that their performance is ambiguous and hard to observe for the employer (Akerlof, 1970). Therefore, the focal firm is unable to identify managers' individual contribution to performance and to differentiate pay accordingly (Lazear & Shaw, 2007). The firm will thus set wages at the marginal productivity of low-performance managers because of the inability to distinguish good and bad performers (Campbell et al., 2012).

To validate this argument, we analyze the correlation between the performance appraisals that managers receive and the manager marginal contribution to performance. Firms use performance appraisals to evaluate employees and to distribute rewards (Pichler, 2012). Therefore, if the firm has sufficient information to recognize managers' contribution to performance and to differentiate between high- and low- performing managers, we would expect a high and statistically significant correlation between the manager's performance appraisal and her marginal effect on performance.

In our setting, the company evaluates managers' performance (on a 1-5 scale) in eight areas: Analytical Skills, Decision Making, Strategic Vision, Team-Working, Change, Business Orientation, Customer Orientation, Monitoring and Control. The yearly performance evaluation score is the average of the scores in each area. To identify managers' marginal contribution to performance we estimate a manager fixed-effects model regressing *Unit performance* on *Gender, Age, Tenure, Unit strategic relevance, Unit quality, Worked hours, Regional unemployment rate, Competition,* and *Population density* (Bertrand & Schoar, 2003). We include store and time fixed effects. The model estimates the coefficient of managers fixed effects for each manager net of the managers' observable characteristics, and of store and time effects. We correlate these manager fixed effects on performance with the performance appraisals score received by the manager. The correlation is only 9% (p-value <

0.01). Such a low correlation between performance appraisals and the marginal productivity of human capital supports the argument that the firm lacks sufficient information to recognize the value created by managers.

To gain further confidence in the argument that the firm ability to observe and assess managers' contribution to performance is limited, we test the relationship between the value that managers create and their likelihood of being assigned to high impact positions. Firms can garner rents from human capital either by lowering pay to appropriate some of the value created by managers, or by creating additional value through complementarities between managerial human capital and other organizational assets (Chadwick, 2017). Decisions on the assignment of managers to jobs is one of the ways in which firms can create value, maximizing the performance impact of high performing managers and minimizing the cost of poor performing ones (Jacobs, 1981). Since jobs differ in their performance sensitivity to different human capital characteristics (Bidwell and Keller, 2014), the firm would create the most value by assigning high performing managers to jobs where their abilities will have the most impact and poor performing managers to positions where their failure has negligible effects on organizational performance (Jacobs, 1981). In this way, the firm maximizes each manager's marginal impact on organizational performance (Gabaix and Landier, 2006). Hence, if firms recognize differences in managerial abilities, we would expect them to assign managers to jobs strategically.

We use a logistic regression model to estimate the probability of a manager to be assigned to a higher impact positions. The model is adjusted to account for the rarity of the event that a manager moves to such positions (King & Zeng, 2001).

We measure *Assignment to higher impact positions* with a dummy variable equal to 1 if, in month t+1, the manager is assigned to a bigger store than in month t and 0 otherwise.

The company classifies stores on a 1 (very small) to 6 (very big) size scale based on the stores' superficies (square meters), the number of workers, the daily traffic, the variety of the products and services offered. We measure *Manager fixed effect on performance* by estimating a manager fixed-effects model regressing *Unit performance* on *Gender, Age, Tenure, Unit strategic relevance, Unit quality, Worked hours, Regional unemployment rate, Competition,* and *Population density* (Bertrand & Schoar, 2003). We include store and time fixed effects. The model estimates the coefficient of managers fixed effects for each manager net of the managers' observable characteristics, and of store and time effects.

We regress managers' *Assignment to higher impact positions* on *Manager fixed effect on performance, Gender, Age, Tenure, Unit strategic relevance, Unit quality, Worked hours, Regional unemployment rate, Competition,* and *Population density.* The coefficient of *Manager fixed effect on performance* on the probability of a manager to be assigned to higher positions is not significant (p-value > 0.10). This finding suggests that the firm does not assign managers to units based on their marginal productivity and provides further support to the argument that managers' performance is not perfectly observable by the employer.

Overall, these results sustain that one of the explanations to why managers do not capture value from their general human capital is that the employer cannot perfectly observe and assess the marginal contribution of managers to performance. They provide empirical support to the theoretical argument that perfect information on the employer's side is a boundary condition of the equality between wages and marginal productivity (Campbell et al., 2012).

Supply-side mechanisms

In addition to demand-side information asymmetry, supply-side conditions can also affect managers' ability to capture their next-best marginal productivity through pay. The

equation between pay and marginal productivity assumes that managers will leave their employer unless they receive a wage equal or higher than their next-best offer outside the firm (Mahoney & Kor, 2015). However, this argument does not take into account that some firms are able to retain workers at wages below their marginal productivity thanks to their retention practices and non-financial rewards (Chadwick, 2017). If the firm has this capability, then managers will be unwilling to leave even if their pay is below their marginal contribution to performance. The firm will thus be able to capture part of the value that general managerial human capital creates without losing high-performing managers (Campbell et al., 2012).

To validate this supply-side explanation, we estimate the probability of a manager's voluntary turnover event. We use a logistic model adjusted for the rarity of the event that a manager leaves the organization (King & Zeng, 2001). We measure *Managers Voluntary Turnover* with a dummy equal to one if the manager leaves the organization voluntarily at time t and zero otherwise. Exits are classified as voluntary using the classification provided by the company. We regress *Managers Voluntary Turnover* on *Total Pay, Manager fixed effect on performance, Gender, Age, Tenure, Unit strategic relevance, Unit quality, Worked hours, Regional unemployment rate, Competition,* and *Population density.* We find that the coefficient of *Manager fixed effect on performance* on the probability of a manager to leave the organization is not significant (p-value > 0.10). This finding supports that managers' preference to remain by their current employers explains why they do not capture the full value of their general human capital (Campbell et al., 2012).

DISCUSSION

This study investigates the magnitude of the relationship between managers' contribution to value creation and pay for managers below the executive level. Using an original and unique longitudinal data-set from a world's leader in the restaurant industry, we show that

managers create value and that the differences in such do not result in differences in their compensation. Differences in managerial pay are significantly smaller than differences in the value creating contribution deriving from managerial abilities, once controlled for other significant organizational and individual variables. Contrary to what predicted by traditional human capital theory, managers do not capture the full value that they create. We provide evidence of two potential mechanisms explaining this finding (Campbell et al., 2012). On the demand-side, we find that the employer lacks information on the managers' contribution to value creation. On the supply-side, we find that, after controlling for financial compensation, managers remain in the firm independently of their marginal productivity.

Our study has three major intended contributions. First, it contributes to the recent debate on how firms can extract value from general human capital (Campbell et al., 2012; Chadwick, 2017). We provide, at least to our knowledge, one of the first direct tests of the relationship between differences in marginal productivity and differences in pay among managers. Our test allows us to estimate how much value managers capture from their general skills (Campbell et al., 2012). Furthermore, we explore two potential mechanisms through which labor market frictions on the demand-side and on the supply-side interact and distort the distribution of rewards inside the organization. Second, our study contributes to the literature on managers effect on performance (Bertrand & Schoar, 2003; Mollick, 2012) by providing, at least to our knowledge, one of the first studies on the relationship between managers' individual contribution to value creation and managers' pay for managerial positions below the C-level. Third, we aim to contribute to the strategic human resource management literature on the design of effective pay-for-performance systems (Gerhart, Rynes, & Fulmer, 2009). In addition to its performance effects, exploring the relationship between abilities and

pay also informs how individual differences shape pay dispersion and income distribution within organizations (Shaw, Gupta, & Delery, 2002).

Finally, one of the major limitations of our study resides in the generalizability of the results. While our research setting provides an ideal context to study general and transferrable managerial skills, we only have data for one company. Replicating our study with multi-firm data would address this issue of external validity and be an important contribution to future research. This would require the collection of a detailed establishment-manager multi-firm data-base with information on both performance and pay for managers below the C-level (Lazear et al., 2015).

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TABLE 1
Summary statistics and correlations[a, b, c]

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Unit performance	69.38	73.60	1														
2.	Total pay	2.44	.44	0.39***	1													
3.	Bonus	.17	.31	0.10***	0.73***	1												
4.	Base salary	2.27	.30	0.47***	0.71***	0.03***	1											
5.	Tenure	15.77	8.34	0.01	0.22***	-0.02*	0.33***	1										
6.	Age	41.68	7.83	-0.05***	0.21***	-0.03***	0.33***	0.83***	1									
7.	Gender	.70	.46	0.08***	0.12***	0.01	0.17***	0.18***	0.18***	1								
8.	Performance appraisal	3.24	.79	0.28***	0.21***	0.12***	0.17***	-0.17***	-0.23***	-0.10***	1							
9.	Unit quality	89.36	5.13	-0.07***	-0.21***	-0.05***	-0.25***	-0.14***	-0.16***	-0.05***	0.13***	1						
10.	Worked hours	2112.54	2210.56	0.72***	0.40***	0.08***	0.51***	0.02***	-0.02***	0.10***	0.23***	-0.09***	1					
11.	Unit strategic relevance	3.77	1.23	0.40***	0.29***	0.00	0.412***	0.02***	-0.01	0.04***	0.15***	-0.11***	0.41***	1				
12.	Competition	28.44	12.58	-0.01*	0.02***	-0.00	0.03***	0.03***	0.07***	0.10***	-0.01	0.00	-0.03***	-0.03***	1			
13.	Regional unemployment rate	.08	.04	-0.25***	-0.02*	-0.06***	0.04***	0.14***	0.16***	0.06***	-0.17***	-0.36***	-0.15***	-0.02***	0.10***	1		
14.	Assignment to higher impact position	.01	.09	-0.02***	-0.01*	-0.01	-0.011	-0.03***	-0.03***	-0.00	0.02*	-0.01	-0.02*	-0.05***	-0.00	0.02*	1	
15.	Manager's voluntary turnover	.01	.04	-0.00	-0.03***	-0.02*	-0.02**	0.01	0.02*	-0.01*	0	0.01	0.00	-0.01	-0.00	0.00	0	1

[a] * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
[b] Unit of analysis: manager-month-year
[c] n = 28580

TABLE 2
Managers' value generation and value capture: Mixed effects estimation [a,b, c]

	Unit performance				Total Pay			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unit strategic relevance	0.940***	0.895***	1.049***	1.047***	0.023***	0.030***	0.016***	0.019***
	(0.240)	(0.240)	(0.248)	(0.290)	(0.005)	(0.005)	(0.005)	(0.006)
Gender		-0.144	-0.272	-0.556		0.057***	0.046**	0.040
		(1.102)	(1.097)	(1.507)		(0.021)	(0.021)	(0.025)
Age		0.012	-0.019	0.079		0.005**	0.006***	0.003
		(0.112)	(0.112)	(0.153)		(0.002)	(0.002)	(0.002)
Tenure		0.015	0.035	-0.010		0.007***	0.006***	0.007***
		(0.109)	(0.108)	(0.145)		(0.002)	(0.002)	(0.002)
Unit quality			-0.003	0.010			0.014***	0.015***
			(0.120)	(0.139)			(0.002)	(0.003)
Worked hours			0.004***	0.004***			0.0001***	0.0001***
			(0.0002)	(0.0002)			(0.00000)	(0.00001)
Regional unemployment rate				-27.207				-0.710**
				(28.658)				(0.336)
Competition				-0.053				0.0001
				(0.057)				(0.001)
Constant	46.105***	46.213***	38.856***	48.903***	2.329***	2.014***	0.621***	0.581**
	(4.653)	(5.793)	(12.365)	(14.780)	(0.027)	(0.067)	(0.237)	(0.292)
St. Dev. of Manager Effect	6.42	6.76	6.69	8.74	0.76	0.58	0.15	0.21
St. Dev. of Store Effect	77.60	77.50	70.81	73.73	0.71	0.67	0.14	0.23
St. Dev. of Store Time Trend Effect	0.42	0.41	0.41	0.45	0.02	0.04	0.00	0.00
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23,117	22,698	21,509	15,071	2,054	2,023	1,999	1,399
Number of managers	431	427	425	352				
Log Likelihood	-109,933.400	-107,585.900	-101,639.400	-70,800.710	-232.982	-274.488	-157.478	-140.099

[a] * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; [b] Standard errors in parentheses; [c] Unit of analysis: manager-month-year

TABLE 3
Managers' heterogeneity, base salary and bonus: Mixed effects estimation [a,b,c]

	Base Salary	Bonus
	(1)	(2)
Unit strategic relevance	-0.001	-0.012**
	(0.002)	(0.005)
Gender	0.068**	0.005
	(0.027)	(0.018)
Age	0.002	-0.001
	(0.003)	(0.002)
Tenure	0.008***	-0.0005
	(0.002)	(0.002)
Unit quality	0.001	0.008***
	(0.001)	(0.002)
Worked hours	0.00002***	0.00001***
	(0.00000)	(0.00000)
Performance appraisal	0.005**	0.026***
	(0.003)	(0.008)
Constant	1.758***	-0.405*
	(0.107)	(0.221)
St. Dev. of Manager Effect	0.24	0.10
St. Dev. of Store Effect	0.14	0.15
St. Dev. of Store Time Trend Effect	0.02	0.15
Time FE	Yes	Yes
Observations	1,450	3,537
Number of managers	406	375
Log Likelihood	1,208.634	-642.346

[a] * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
[b] Standard errors in parentheses
[c] Unit of analysis (Base Salary): manager-year; Unit of analysis (Bonus): manager-month-trimester-year

TABLE 4
Standard deviation of the manager effect: Mixed and Fixed effects estimation

	Unit Performance		Total Pay	
	(1)	(2)	(1)	(2)
St. Dev. of Manager Effect	**9.94**	**8.73**	**0.27**	**0.21**
Mixed or Fixed Effects	Fixed	Mixed	Fixed	Mixed
Random Intercept	Yes	Yes	Yes	Yes
Random Slope	No	Yes	No	Yes

CHAPTER 3

with Arnaldo Camuffo and Ekaterina Netchaeva

Questioning the effect of firm-specific human capital on staffing decisions: An experimental approach

ABSTRACT

This paper contributes to the academic conversation on the strategic relevance of firm-specific human capital and on the interaction of internal and external labor markets. Using three controlled lab experiments, we test the validity of the prediction of transaction cost and personnel economics that employers prefer to fill jobs with internal candidates over hiring external ones when the job requires firm-specific human capital. We present three distinct conceptualizations of firm-specific human capital: a) knowledge, skills and abilities in using firm-specific technology; b) knowledge, skills and abilities in firm-specific social relationships (firm-specific social capital); c) knowledge, skills and abilities in dealing with the firm-specific context (i.e. culture, practices and norms of behaviors). In addition, we analyze the moderating effect of the firm economic performance on the relationship between job-level firm-specific skills and the decision between hiring and internal mobility. We do so providing one of the first, at least to our knowledge, experimental study on the effects of firm specific human capital on staffing decisions.

Keywords: firm-specific human capital; staffing; internal labor markets

INTRODUCTION

Organizations increasingly blend internal mobility and external hiring to fill jobs at all levels (Bidwell & Keller, 2014; Jacoby, 2005). On the one hand, when internal movers fill a job, they get up to speed faster than external hires because they already have firm-specific skills and information (Bidwell, 2011). Moreover, since their skills are specific to the firm and hard to transfer elsewhere, the firm can negotiate a lower salary than it would with external hires (Bidwell, 2011). On the other hand, filling jobs by external hiring has advantages for the employer, such as the acquisition of novel and diverse knowledge (Rao & Drazin, 2002).

The literature on strategic human capital and strategic human resources management has used the distinction between firm-specific human capital, that is valuable only to the focal firm and constraints workers' mobility, and general human capital, that is transferrable to other employers, to explain how employers decide between these two alternative modes to fill a job (Bidwell & Keller, 2014). Within these literatures, Internal Labour Market, Transaction Cost Economics and Resource-Based theories all predict that, in presence of high firm-specific skills required, internal mobility should be preferred over external hiring, due to the high adjustment costs associated with the processes of unlearning and retraining (Lazear, 2009).

However, recent theoretical and empirical research raises doubts on this prediction (Nyberg & Wright, 2015) because an increasing number of scholars is questioning the conceptual relevance of firm-specific human capital to managers in the attraction, motivation and retention of human capital resources (e.g. Lazear, 2009; Molloy & Barney, 2015; Nyberg & Wright, 2015). Firm-specific skills might be "sufficiently tacit [to] be hard to convey or measure", and therefore "to observe and price in imperfect labour markets" (Coff, 2015: 3).

Human Resource professionals thus do not focus on firm-specific knowledge, instead they look for portable and general skills that are complementary to the firm's specific assets (Coff, 2015). Moreover, the empirical tests of the relationship between the degree of firm specificity of human capital and hiring outcomes have yielded mixed and non-conclusive results (Bidwell & Keller, 2014; Huckman & Pisano, 2006; Groysberg, Lee, & Nanda, 2008). Therefore, firm-specific human capital may even not matter at all to how employers staff jobs (Kryscynski & Ulrich, 2015). Whether employers prefer internal movers over external hires when a job requires firm-specific skills thus remains an open question that this paper aims to address.

We build on recent conceptual (Coff & Raffiee, 2015) and empirical (Raffiee & Coff, 2015) work arguing that the extent to which human capital is firm-specific rather than portable is not objective but subjectively assessed by employers and employees. We argue that traditional theories might be right in arguing that firm-specific human capital matters, but that its effect on staffing decisions is mitigated or hidden by the confounding action of firm-level characteristics.

First, we test whether the need for firm-specific skills, at the job level, affects staffing decisions between internal and external candidates. Second, we investigate the effect of firm performance on the relation between firm-specific skills required by the job and how it is filled. We conduct three studies in a controlled experimental setting involving MBAs, students, and HR professionals. The studies require participants to fill a job deciding between an internal mover and an external hire. We conceptualize and test firm-specific human capital in three distinct ways: a) knowledge, skills and abilities in using firm-specific technology (Study 1); b) knowledge, skills and abilities in firm-specific social relationships (firm-specific social capital) (Study 2); c) knowledge, skills and abilities in dealing with the firm-specific

context (i.e. culture, practices and norms of behaviors) (Study 3). Moreover, we consider one potential moderator of this relationship: firm performance.

We find, in line with previous evidence (Bidwell & Keller, 2014), no significant difference in the likelihood of selecting internal candidate over external and in their perceived suitability to the job when the job requires technical skills (Study 1). However, when the position requires firm-specific social capital (an established and well-developed network of social relationships within the firm), the internal candidate is preferred over the external one (Study 2). Study 3 shows that, when facing a condition of poor firm performance, participants systematically select the external candidate over the internal one; no main or interaction effect of firm-specific human capital was found.

This paper intends to contribute to the academic conversation of whether firm-specific human capital is relevant to managers (Kryscynski & Ulrich, 2015) and to address the inconsistencies in the empirical tests of the relationship between the job demands for firm-specific human capital and how the job is filled.

THEORY AND HYPOTHESES

Firm Specific Human Capital: does it matter?

An increasingly sizeable debate is challenging the foundations of the specific versus general human capital distinction (Nyberg & Wright, 2015). Researchers question the meaning of this distinction (Coff & Raffiee, 2015) and its managerial relevance (Krynscynski & Ulrich, 2015). The absence of conclusive empirical evidence on the effect of firm-specific human capital on competitive advantage and on the strategic implications of the generic vs. specific distinction fosters this debate (Krynscynski & Ulrich, 2015).

Firm-specific human capital might have limited relevance to managers because they do not consider it a primary driver of competitive advantage. Combinations of general and

transferable skills might be well more related to competitive performance than a set of firm-specific skills, which might be more useful to everyday organizational life (e.g. finding the supply room) than to the achievement of competitive advantage (Lazear, 2009). Managerial concerns thus do not lie in the distinction between firm-specific and generic human capital but in the accumulation and combination of skills leading to superior performance (Ulrich, Younger, Brockbank & Ulrich, 2012). The effects of firm-specific skills on staffing decisions might thus be offset by other factors. These factors gain higher levels of the employer's (limited) attention (Krynscynski & Ulrich, 2015) because they are more directly associated to performance (Lazear, 2009).

Moreover, the absence of conclusive empirical evidence on firm-specific human capital might be also due to a set of cognitive biases in how employers and employees perceive and assess human capital (Bidwell & Keller, 2014; Coff & Raffiee, 2015). Perceptions of firm-specificity might differ from one individual to another as individuals are subject to cognitive biases (Raffiee & Coff, 2016).

Therefore, whether and when firm-specific human capital drives employers' decisions remain unclear. In this study, we aim to contribute to this debate by testing whether firm-specific human capital matters to decisions on how to staff jobs and what influences the choice between internal mobility and external hiring.

Firm Specific Human Capital and staffing decisions: the choice between internal and external candidates

Understanding how job vacancies are filled, with either internal or external candidates, as well as the economic rationale of these decisions, is an increasingly relevant and diffused managerial problem (Bidwell & Keller, 2014). Hiring and promotion decisions imply the attribution of different weights and rewards to internal and external candidates' characteristics,

such as workers' skills and credentials (Bidwell, 2011), race, and gender (Petersen & Saporta, 2004; Castilla, 2008). In addition to their outcomes for workers, such decisions also influence how much and in what ways organizations invest in human capital and, consequently, develop their own capabilities, either accumulating firm-specific human capital over time (Chadwick & Dabu, 2009) or learning from competitors by hiring their former employees (Rosenkopf & Almeida, 2003).

Transaction-cost economics predicts that firms rely on internal labor markets rather than external ones because of the value of firm-specific skills, and of the costs of evaluating external hires (Williamson, Wachter, & Harris, 1975). Firm-specific skills make employment relations "sticky" and motivate employers' reliance on internal labor markets whose "ports" are open to external candidates almost only for entry-levels positions (Doeringer, & Piore, 1985).

Internal candidates are the most economically efficient choice to fill jobs with high needs for firm-specific skills. Since the performance of external candidates' performance is hard to assess and to transfer from one employer to the other (Groysberg, 2010; Huckman, & Pisano, 2006), internal candidates are often preferred over external ones, even when they are less endowed or talented (Chan, 1996; Waldman, 2003). The study by Bayo-Moriones and Ortín-Ángel (2006) confirms that the likelihood to fill a position through internal mobility is positively correlated with the specificity of workers' human capital investment and to the efforts made to assess employees' skills. Therefore, staffing decisions should privilege internal candidates for highly idiosyncratic jobs (Lepak & Snell, 1999).

Accordingly, we hypothesize that the need for firm-specific skills to perform a job leads to staffing decisions in favor of internal candidates. In order to consider the vast set of realizations of what firm-specific skills are in practice (Lazear, 2009), we hypothesize three distinct conceptualizations of firm-specific human capital (Huckman & Pisano, 2006; Puranam,

Raveendran & Knudsen, 2012). We consider: a) firm-specific technology, involving firm-specific technical skills; b) firm-specific social relationships, involving social skills and networks that enable an individual to overcome imperfect information problems and that "are only applicable in a given firm" (Coff, 1997); c) firm-specific organizational context, generally defined as firm's technologies, productive processes, managerial practices and corporate culture, and incorporating firm-specific "soft skills".

> *Hypothesis 1. The likelihood of a job being filled by hiring relative to internal mobility will decrease as the firm-specific skills, related to firm-specific technology, required by the job increase.*
>
> *Hypothesis 2. The likelihood of a job being filled by hiring relative to internal mobility will decrease as the firm-specific skills, related to firm-specific social relationships, required by the job increase.*
>
> *Hypothesis 3. The likelihood of a job being filled by hiring relative to internal mobility will decrease as the firm-specific skills, related to firm-specific organizational context, required by the job increase.*

Firm performance and staffing decisions

Studies on the relationship of firm-specific human capital and the choice between hiring and internal mobility focus on the request of firm-specific skills at different levels of analysis such as job-level (Bidwell & Keller, 2014) and firm-level (Bayo-Moriones & Ortin-Angel, 2006). However, at least to our knowledge, little empirical evidence exists on how firm-specific skills required at the job level interact with firm characteristics to determine staffing decisions. In order to shed light on this cross-level interaction, we focus on the moderating effect of the firm's economic conditions.

Organizations adapt in response to environmental challenges and staffing is a fundamental adaptation mechanism (Friedman & Singh, 1989; Lubatkin, Ghung, Rogers & Owers, 1989; Pfeffer & Davis-Blake, 1986; Pfeffer & Salancik, 1978: 225-256). Intra-firm

mobility should have a positive correlation with prior firm performance (Dalton & Kesner, 1983), meaning that good performers are more likely to choose insiders Cannella & Lubatkin (1993) and not to change their strategies. Conversely, outside successors are more likely to be selected in conditions of poor performance to acquire novel solutions and expertise (Zhang & Rajagopalan, 2003).

Outsiders are perceived as better able to initiate and implement strategic changes by disrupting the status-quo (Furtado & Karan, 1990; Walsh & Seward, 1990; Vancil, 1987). They are not committed to the current strategy of the firm, as they were not personally involved in their design and adoption, and can thus be more objective in evaluating and eventually modifying them (Goodstein & Boeker, 1991). Moreover, they can innovate existing strategies (Virany, Tushman & Romanelli, 1992).

Accordingly, we hypothesize:

Hypothesis 4. *Poor firm performance positively moderates the relationship between the firm-specific skills required by the job and the likelihood of hiring relative to internal mobility. When the job requires firm-specific skills, the likelihood of hiring relative to internal mobility is higher if company performance is poor rather than good.*

METHODS

Overview

We conduct three experimental studies. In Study 1, we test Hypothesis 1, that the likelihood of a job being filled by hiring relative to internal mobility will decrease as the firm-specific technology required by the job increases. We lack to find support for Hypothesis 1. Study 2 tests Hypothesis 2, that the likelihood of a job being filled by hiring relative to internal mobility will decrease as the firm-specific social relationships required by the job increase. Hypothesis 2 is supported. Finally, we test Hypotheses 3 and 4 in Study 3. We do

not find support for Hypothesis 3, that the likelihood of a job being filled by hiring relative to internal mobility will decrease as the firm-specific knowledge of the organizational context required by the job increases. However, we find partial support for Hypothesis 4, as we find that the likelihood of hiring relative to internal mobility is higher if company performance is poor rather than good.

Study 1

Method. *Participants and design.* In Study 1, (N = 91 MBA students), we ask participants to fill a senior scientist position vacancy by a Pharmaceutical Company, choosing one of three candidate profiles. Participants were asked to take charge of the second phase of the selection process and to make the final decisions among three candidates, which were shortlisted during the first phase (Castilla & Benard, 2010). Each candidate's profile contained: 1) a quantitative score (assigned during the first phase of the selection process); 2) information on the application channel: internal job posting system (internal candidate) vs. job portal for external candidates (external candidate); 3) a list of qualitative attributes and characteristics. Participants were presented with one external candidate with score 4/5 and two internal candidates with scores 4/5 and 3/5 respectively. The candidate with the lowest score was included as a filler profile. The two experimental conditions are: job requiring firm-specific skills vs. job requiring general skills. 91 MBA students participated in the study. Of these, 5 were discarded as they did not pass the quality check questions included in the study. The final sample of participants is constituted by 86 MBA students (Males: 54 / Females: 32) with average work experience of 5 years. 40 participants were assigned to the condition "job requiring general skills" and 46 to the "job requiring firm-specific skills" condition.

Procedure. We manipulate the firm-specificity of the skills required by the position via the firm-specificity of the technology that the job announcement requires to master. In the

condition “job requiring general skills” the job requires “Proficiency in the flow citometry technique - KITOR (a mainstream technology, common in the industry)”, while in the “job requiring firm-specific skills” condition the job requires Proficiency in the flow citometry technique - KITOR® (the specific technology patented by AltDer Inc.). We use patented technology to manipulate firm-specific human capital as it represents a measure of firm-specific knowledge, which requires investments in human capital by employees (Wang, He & Mahoney, 2009).

The profiles were equivalent in quality and differed by the application channel only. In order to build qualitatively equivalent profiles, the list of attributes and characteristics was pre-tested in a separate study. Pre-Test 1 assessed recruiters’ perception on the importance of skills assigned to potential candidates. 61 managers, belonging to HR interest groups, were recruited through LinkedIn to take part to the study (Paik, Shahani-Denning, & Griffeth, 2014; Robinson, Sinar, & Winter, 2014). Participants were assigned to 2 Experimental Conditions: job requiring firm-specific skills vs. job requiring general skills. They were asked to rate 35 items/skills according to their importance for the position described (same as in Study 1). Candidates’ profiles in Study 1 contained attributes and characteristics with equivalent ratings and were gender neutral.

Results. The goal of Study 1 is to test Hypothesis 1. The manipulation was successful. Participants expressed their level of agreement with two manipulation check statements: “The job described above requires skills that are specific to AltDer Inc.” and “The candidate needs skills that are specific to AltDer Inc. in order to be successful in the job described above”. They ranked the level of firm-specific skills required in the “job requiring firm-specific skills” condition higher than in the “job requiring general skills” condition (“The job described above requires skills that are specific to AltDer Inc.”: 1.575; p-value: 0.01; “The candidate

needs skills that are specific to AltDer Inc. in order to be successful in the job described above": 1.048; p-value: 0.01).

We use a multinomial logit estimation model (Dependent Variable: Likelihood of selecting the internal candidate) to test the effect of the firm-specific human capital conditions on the likelihood of selecting the internal candidate over the external one. Results in Table 1 show no statistically significant effect of the experimental condition on the difference in the likelihood of selecting internal candidate over external ($p > 0.10$). Hypothesis 1 is thus not supported. This finding confirms the results by Bidwell and Keller (2014) in their longitudinal study of how jobs are filled in a US Investment Bank.

Insert Table 1 about here

Study 2

Method. *Participants and design.* In study 2 (N = 94 Master Students), we ask participants to fill a vacancy for a CFO position by a furniture company, choosing between two candidates' profiles. Participants were shown the CVs of two candidates, one external and one internal. The CVs contained information on: a) education and b) previous working experience. The two experimental conditions are: job requiring firm-specific skills vs. job requiring general skills. 94 Master students participated to the study. 53 of them had previous work experiences (mainly as interns). 50 participants were assigned to the condition "job requiring general skills" and 44 to the "job requiring firm-specific skills" condition.

Procedure. We manipulate the firm-specificity of the skills required by the position via the firm-specificity of the social skills and networks that are required. In the condition "job requiring firm-specific skills" the job requires "frequent interactions with other

employees in the company, both within and outside the Finance department (e.g. Sales, Marketing, Operations). The prospective CFO will need an established and well-developed network of social relationships inside ComfortSofa, to acquire relevant information and to collaborate with superiors, peers and subordinates in Finance and in the other departments (e.g. Sales, Marketing, Operations). Having strong and well-established relationships with other ComfortSofa's employees is necessary to successfully perform in the position.".

The profiles were equivalent in quality and differed by the application channel only (internal vs. external). In order to build qualitatively equivalent profiles, the list of attributes and characteristics were pre-tested in a separate study. Pre-Test 2 assessed recruiters' perceptions on the skills assigned to a potential candidate. 127 Mturk Workers were asked to evaluate the attributes of 2 candidates' profiles. Candidates' profiles in Study 2 contained attributes and characteristics with equivalent ratings and were gender neutral.

Results. The goal of Study 2 is to test Hypothesis 2. The t-test on the differences in the means between the two experimental conditions shows that the manipulation was successful. The participants expressed their level of agreement with one statement to assess the degree of firm-specific social relationships required by the job. The participants in the "job requiring firm-specific skills" scenario ranked the degree of firm-specific social skills required by the job significantly higher than those in the other condition (p-value < 0.10).

Results of the t-test that when the position requires firm-specific social capital (an established and well-developed network of social relationships within the firm), the likelihood of internal mobility ($\mu = 0.79$) is higher than that of hiring ($\mu = 0.57$; p-value < 0.05). Hypothesis 2 is thus supported: when the job requires firm-specific social capital and idiosyncratic social relationships with colleagues (Huckman & Pisano, 2006), the likelihood of hiring vis-à-vis internal mobility is lower.

Study 3

Method. *Participants and design.* In Study 3 (N = 157 HR managers), we ask participants to fill a vacancy for a managerial position by choosing between two candidate profiles (same scenario as in Study 2). The study employed a 2X2 design: job requiring firm-specific skills / job requiring general skills and good / poor firm performance. We use a sample of Human Resources professionals. 157 managers completed the survey, corresponding to a very satisfying response rate of 26%. 87 of the 157 respondents successfully answered all of the five final quality check questions: as shown later, for the sake of comprehensiveness, the analyses will be run both on the total sample and on this selected subset, characterized by smaller dimension but by higher quality. The overall sample was composed of 72.32% of male and of 27.68% of female respondents, with an average age of 46.03 years (and a standard deviation of 8.76). 8.93% had been working in their current company for less than one year at the time of the survey completion, 20.54% between 1 and 3 years, 38.39% between 4 and 9 years, 22.32% between 10 and 20 years, and the remainder 9.82% for more than 20 years. When asked to describe their organizational position, no one defined it as "very junior", only 0.90% considered it "junior", 14.41% saw it as "intermediary", the majority (57.66%) was "senior", followed by 27.03% of "very senior".

Procedure. We manipulate the firm-specificity of the skills with the specificity of the organizational context. In the "job requiring firm-specific skills" condition the job posting included the following statement: «Given the uniqueness of Arredapiù's context, a six-month training period is required. During this period the new hire will familiarize with the firm's technologies, productive processes, managerial practices and corporate culture.». We use the same candidates' profiles as in Study 2. We adapted the firm performance manipulation from Haslam & Ryan (2008). In the good performance condition, participants read a financial

newspaper article on the company's positive economic performance, including a graph showing an increasing trend in performance over time. The poor performance condition showed the same article and graph describing a negative performance trend by the company over time.

Results. The goal of Study 3 is to test Hypothesis 3 and 4 with a sample of experienced HR managers. We lack to find support for the Hypothesis 3, while we find partial support for Hypothesis 4.

Participants did not rank the level of firm-specific skills required in the "job requiring firm-specific skills" condition higher than in the "job requiring general skills" condition (p-value for N=157: 0.923; p-value for N=87: 0.723). Although the manipulation was ineffective, the results here presented may still be valid (Perdue & Summers, 1986; Trafimow & Rice, 2009). One reason is that there is too much of a distance between the theoretical construct under study and what is salient to practitioners (Coff, 2015; Trafimow & Rice, 2009). Moreover, when the manipulated variable is hard to observe and to define, as in the case of firm-specificity (Lazear, 2009), the results of manipulation checks might be misleading (Perdue & Summers, 1986).

Table 2 and 3 report the results from ANOVA, both when considering the whole sample (N=157) and when including only respondents who passed the quality check (N=87) respectively. Performance explains the variance of choice between internal and external candidates (p-value for N=157: 0.010; p-value for N=87: 0.038), while FSHC does not (p-value for N=157: 0.622; p-value for N=87: 0.315). Hypothesis 3 is not supported, while we find partial support for Hypothesis 4. Consistently with the adaptive theory prediction, we find that company performance drives the likelihood of hiring over internal mobility (when performance is bad, external candidates are more likely to be selected). However, the

relationship between firm-specific skills required by the job and the selection decision is not statistically significant and is not moderated by firm performance.

Insert Table 2 and 3 about here

DISCUSSION

This paper contributes to the academic conversation on the strategic relevance of firm-specific human capital and on the permeability of internal and external labor markets. We provide, at least to our knowledge, one of the first experimental studies on the effects of firm specific human capital on staffing decisions.

We test the validity of the predictions of transaction cost and personnel economics on the conditions (jobs with firm-specific requirements) in which firms should rely on internal labor markets (internal mobility over hiring). We test the relationships between firm-specific human capital and the selection of internal over internal candidates to extend existing non-conclusive findings (Bidwell & Keller, 2014; Groysberg, 2010; Bayo-Moriones & Ortin-Angel, 2006).

We explore two potential explanations to such non-conclusive evidence: 1) firm-specific human capital does not matter; 2) the effects of firm-specific human capital are offset by firm-level observable characteristics. In order to assess the validity of the first potential explanation (firm-specific human capital does not matter), we present three distinct conceptualizations of firm-specific skills: a) knowledge, skills and abilities in using firm-specific technology; b) knowledge, skills and abilities in firm-specific social relationships (firm-specific social capital); c) knowledge, skills and abilities in dealing with the firm-specific context (i.e. culture, practices and norms of behaviors). In addition, we analyze one

moderators of the relationship between job-level firm-specific skills and the likelihood of hiring over internal mobility: firm economic performance.

Our findings suggest that the likelihood of hiring is higher when the job requires firm-specific skills related to social relationships and networks within the firm (firm-specific social capital). Consistently with previous findings (Bidwell & Keller, 2014), Studies 1 and 3 show that there is not a significant relationship between the firm specific human capital (technology specificity and context "cultural" specificity) and the likelihood of filling a position with an internal vis-à-vis an external candidate. This finding is consistent across two different professional categories (scientist and manager). However, when the position requires firm-specific social capital (Study 2), the internal candidate is preferred over the external one for a managerial role. Firm-specific human capital does not matter to staffing decisions when it concerns technical skills and knowledge related to the organizational context, but it does when the idiosyncratic relationships with colleagues are necessary to perform the job (Huckman & Pisano, 2006).

Finally, Study 3 suggests that the external candidate is more likely to be selected when firm performance is poor. This supports the view that other factors, such as firm-level economic performance, are prioritized relatively to firm-specific human capital in staffing decisions (Lazear, 2009) and that the blending between internal and external candidates is contingent upon firm-level characteristics (Bayo-Moriones & Ortin Angel, 2006). Our results confirm the adaptive theory argument that hiring is more likely to occur when firm performance is poor.

Our findings partially support the claims that firm-specific human capital is more a theoretical rather than a managerial problem and that managers do not make decisions based on the extent to which firm-specific skills are required by the job. Hence, non-conclusive

evidence might reflect a managerial reality that challenges how managers perceive the contribution of firm-specific skills to competitive advantage rather than data or measurement constraints of existing studies (Bidwell & Keller, 2014).

This paper has several limitations. First, only Study 3 involves real HR managers, while Studies 1 and 2 involve MBAs and students. Future research should replicate these studies with samples of experienced employers. Second, Study 3 fails the manipulation check. Retesting the manipulation used and integrating the test with interviews to participants would be an important extension and clarification to the findings presented in this paper. Third, we selected three different dimensions of firm-specific human capital. However, firm-specificity is a multi-faceted and ambiguous construct (Lazear, 2009). Testing alternative operationalization of this construct represents a promising avenue for future research.

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TABLE 1

Study 1: Multinomial Logit Regression

	(Model 1)		(Model 2)		(Model 3)	
VARIABLES	Pat	Alex	Pat	Alex	Pat	Alex
scenario	-0.442	0.118	-0.450	0.189	-0.663	0.205
	(0.448)	(0.965)	(0.484)	(1.015)	(0.487)	(0.975)
gender			-0.570	-0.0764		
			(0.507)	(1.016)		
education			-0.829*	0.319		
			(0.467)	(1.000)		
workexp					0.361*	0.112
					(0.209)	(0.354)
age					-0.343**	0.135
					(0.159)	(0.280)
Constant	0.154	-2.197***	3.984**	-3.284	8.470**	-6.884
	(0.321)	(0.745)	(2.017)	(4.399)	(3.899)	(7.158)
Observations	86	86	83	83	85	85

Standard errors in parentheses
** p<0.01, ** p<0.05, * p<0.1

Baseline comparison = Internal test candidate
Pat = External test candidate
Alex = Internal filler candidate

TABLE 2

Study 3: ANOVA Analysis of Between-Subjects Effects (N=157)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.902[a]	3	.634	2.639	.053
Intercept	293.845	1	293.845	1223.010	.000
FSHC	.059	1	.059	.245	.622
performance	1.637	1	1.637	6.814	.010
FSHC * performance	.059	1	.059	.245	.622
Error	29.312	122	.240		
Total	333.000	126			
Corrected Total	31.214	125			

TABLE 3

Study 3: ANOVA Analysis of Between-Subjects Effects (N=87)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.693[a]	3	.564	2.351	.078
Intercept	196.071	1	196.071	817.110	.000
FSHC	.245	1	.245	1.021	.315
performance	1.063	1	1.063	4.428	.038
FSHC * performance	.127	1	.127	.528	.470
Error	19.916	83	.240		
Total	228.000	87			
Corrected Total	21.609	86			

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