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Learning on the Job:
The Impact of Job Tenure and Management Strategies on Nursing Home Performance

Anna A. Amirkhanyan
Associate Professor
Department of Public Administration and Policy
School of Public Affairs
American University
amirkhan@american.edu

Seung-Ho An
Assistant Professor
School of Government and Public Policy
University of Arizona
seungho@protonmail.com

Beth A. Hawks
Assistant Professor
F. Edward Hébert School of Medicine
Uniformed Services University of the Health Sciences
beth.hawks@usuhs.edu

and

Kenneth J. Meier
Distinguished Scholar in Residence
Department of Public Administration and Policy
School of Public Affairs
American University
kmeier@american.edu

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Anna A. Amirkhanyan is an Associate Professor of Public Administration and Policy in the School of Public Affairs at American University. Her research and teaching focus on public and nonprofit management, privatization, performance, citizen engagement, and social policy.

Seung-Ho An is an Assistant Professor in the School of Government and Public Policy at the University of Arizona. His research interests include public and nonprofit management, organizational behavior, leadership, representation, and research methods.

Kenneth J. Meier is a Distinguished Scholar in Residence at the School of Public Affairs, American University, a professor of public management in the Cardiff School of Business, Cardiff University (Wales) and at the Institute of Public Administration of Leiden University (The Netherlands). His research interests include public management, representation, race and politics, and public policy.

Beth A. Hawks is an Assistant Professor in the F. Edward Hébert School of Medicine at the Uniformed Services University of the Health Sciences. Her research interests include public management, performance, and health policy.

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Abstract

This study investigates linear and nonlinear effects of job tenure on organizational performance and explores how administrators' job tenure can moderate the relationship between three key managerial strategies – innovative management, participatory management, and external management – and performance. Using archival performance indicators available from the Centers for Medicare and Medicaid Services in combination with a recent survey of nursing home administrators, we find that job tenure has a linear and nonlinear relationship with two different performance dimensions, respectively. Also, more experienced managers are better able to manage external environments and share power internally to achieve better outcomes.

Introduction

Work experience is expected to affect employees' skills and knowledge, influence their behavior, and enhance individual and organizational performance. Often used as a predictor or a proxy for employees' capacity, work experience plays a crucial role in decisions related to hiring, firing, compensation, and promotion (Dragoni et al. 2009; Dokko et al. 2009; McEnrue 1988). Prior theoretical and empirical research on work experience reveals its breadth and complexity, identifying its numerous dimensions (Tesluk & Jacobs 1998). With the significance of one of its many dimensions – job tenure – well established, research proceeded to explore its complex interactions and moderating effects with organizational context, the environment, and other individual characteristics. While past studies examined interactions of job tenure with numerous factors, research on how, specifically, managerial job tenure enhances the impact of management strategies on organizational performance is limited. To address this gap, our study investigates both linear and nonlinear effects of managers' job tenure on organizational performance and explores how job tenure augments the effect of three key management strategies – innovative management, participatory management, and external management – on performance.

This study examines public, for-profit and nonprofit U.S. nursing homes that receive federal government funds. The topic of managerial longevity has received considerable attention

in this field. High levels of administrative turnover, shown to be detrimental to its performance, characterize the nursing home industry, making it an ideal case for assessing the impact of managerial experience (Geletta & Sparks 2013; Lerner et al. 2014). Our theoretical framework on the effect of managers' job tenure and management strategies on performance is informed by public administration, business management, strategic management, psychology, and the health care literature. In our analysis, we use a set of reliable performance indicators available from the Centers for Medicare and Medicaid Services performance appraisal system in combination with a recent survey of nursing home administrators' managerial strategies.

We find that managers' job tenure has a linear and potential nonlinear relationship with two different dimensions of nursing home performance measures. In addition, more experienced managers are better able to manage external environments and share power internally to improve organizational outcomes. In contrast, the effect of an innovative management style on performance is not influenced by managers' job tenure. By shedding light on job tenure, this study contributes to our understanding of the complex pathways through which good management can enhance organizational outcomes.

Managerial Tenure and Performance

The broader domain of temporal features of employment includes work experience;[1] succession and turnover;[2] individual age and longevity;[3] career path, life-cycle and seniority;[4] and other factors. Chief among them is work experience, encompassing life events occurring in and

[1] See Allen and Panian (1982), Ammons and Bosse (2005), Bedeian, Ferris and Kachar (1992), Boardman et al. (2010), Dokko et al. (2009), Fizel and D'Itri (1997), Marato and Rodgers (1984), McEnrue (1988), Nass (1994), Ng and Feldman (2009); Quinones et al. (1995); Rollag (2004), Sturman (2003), Tesluk and Jacobs (1998).
[2] See Fizel and D'Itri (1997), Haveman (1993), Hill (2005), Mondak (1995).
[3] See Allen and Panian (1982), Bedeian, Ferris and Kachar (1992), Schwoerer and May (1996), Sturman (2003).
[4] See Miller and Shamsie (2001), Thurmond (2010).

perceptions gained in a work setting.[5] With the growing median age of U.S. workers (Toossi, 2015), the experience of employees in executive leadership, middle management, and line staff positions has been studied across public and private sector settings (Allen & Panian 1982; Eitzen & Yetman 1972; Finkelstein & Hambrick 1990; Fizel & D'Itri 1997; Henderson et al. 2006; Juenke 2005; Marato & Rodgers 1984; McEnrue 1988; McNitt 2010; Miller & Shamsie 2001; Mondak 1995; Scully 1994; Taylor & Greve 2006; Thurmond 2010). Theories of work experience have advanced from narrow early conceptualizations to the more complex, nuanced and multi-dimensional definitions and approaches.[6] The earliest and most common[7] approach to experience – job tenure – captures its duration within a unit or organization.[8] The concept of tenure is relevant to all levels within organizations. Recognizing the central role that top executives and their actions play in organizations, our study is focused specifically on *managerial tenure* and its impact on organizational performance (Hambrick & Mason 1984; Hambrick, Geletkanicz & Fredrickson 1993).

Learning Theory (March & Simon 1994; March 2010), and Human Capital Theory (Becker 1975) provide insights on the relationship between these two factors. The former advances the idea that people learn through experience (Herriot, Levinthal, & March 1985; March 2010). Gaining experience is a process of making sense of one's work (Wagner et al.1987). Experience generates memories that generate solutions and mechanisms – routines,

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[5] This is adopted from the original definition from Quinones et al. (1995: 890), where "Experience is generally defined as events that occur in an individual's life that are perceived by the individual."

[6] Tesluk and Jacobs (1998) as well as Quinones, Ford, and Teachout (1995) offer more comprehensive models of work experience that includes the core components of amount, duration, density, timing, type, and incorporates both the quality and the quantity of experiences for each of the core components.

[7] Quinones, Ford, and Teachout (1995) report that 79% of studies they found employed time-based measures of experience.

[8] Employee or managerial job tenure, organizational or within-division tenure, tenure with a specific supervisor, within-the-sector tenure, and tenure at a location/site are just a few examples of constructs reflecting the duration of various distinct aspects of employment-related experiences (Allen & Panian 1982; Bedeian, Ferris & Kachar 1992; Marato & Rodgers 1984; McEnrue 1988; Nass 1994; Sturman 2003).

theories and behaviors – to respond to the uncertainty (March & Simon 1994; Nass 1994). Experience influences performance through the acquisition of knowledge and skills: by enhancing competency, which in turn improves individual and organizational performance (Dokko et al. 2009; Hambrick & Mason 1984; Nass 1994; Quinones et al. 1995). Experienced managers internalize the occupational norms, expectations, and policies; they learn about authority, who to work with, and how to build relationships (Boardman et al. 2010; Dokko et al. 2009; Henderson et al. 2006; Miller & Shamsie 2001; Nass 1994; Sturman 2003). This knowledge prepares managers for problem-solving and makes them more resilient (Ng & Feldman 2009). Similarly, Human Capital Theory approaches work experience as on-the-job training that enhances productivity and leads to better compensation (Becker 1975).

While these arguments suggest a positive relationship between experience and performance, some theories suggest a curvilinear relationship (Eitzen & Yetman 1972; Sturman 2003). Studies on the stages of CEO careers find that the learning and maintenance stages are followed by the stages of decline and disengagement (Miller & Shamsie 2001; Hambrick & Fukutomi 1991; Stout, Slocum, & Cron 1988). As March and Simon (1994) note, experience is an imperfect teacher: its lessons can be incomplete and ambiguous. Learned routines can lead to rigidity and complacency which eventually undermine performance (Dokko et al. 2009; Eitzen & Yetman 1972; Hambrick, Geletkanicz, & Fredrickson 1993; Henderson et al. 2006; Miller & Shamsie 2001; Taylor, Audia, & Gupta 1996). These arguments suggest an inverted U-shaped relationship between tenure and performance.

Empirical studies support these propositions. Some find a positive relationship between tenure and various objective indicators of individual and organizational performance (Finkelstein & Hambrick 1990; Marato & Rodgers 1984; McDaniel et al. 1988; McEnrue 1988; Scully 1994;

Taylor & Greve 2006). Studies investigating the non-linear effects find that late-tenure performance tends to plateau or decrease (Eitzen & Yetman 1972; Hambrick & Fukutomi 1991; Miller & Shamsie 2001; Tesluk & Jacobs 1998; McDaniel et al. 1988).[9]

Managers do not operate in a vacuum, and the role of the organizational context and individual attributes and actions may change as managers gain experience (Sturman 2003; Hambrick & Fukutomi 1991; Nass 1994). Prior research explored how job tenure moderates the influence of employees' race (Bratsberg & Terrell 1998), gender (Lynn, Cai, & Horn 1996; Bedeian, Ferris, & Kachar 1992), abilities (Schmidt et al. 1988), job satisfaction (Bedeian, Ferris, & Kachar 1992), stress levels (Hunter & Thatcher 2007), within-firm experience (Dokko et al. 2009; Hill 2005), organizational size (Thurmond 2010), level of managerial discretion (Finkelstein & Hambrick 1990), industry stability (Henderson et al. 2006), job complexity (McDaniel et al. 1988, Sturman 2003), and past performance (Boeker 1997) on organizational outcomes. A notable area of limited research involves the interaction between management strategies and the administrators' job tenure. This study seeks to fill this gap.

Managerial strategies related to internal and external organizational realities are critical in determining organizational outcomes (Andrews, Boyne, & Walker 2006; Boyne 2003; Boyne et al. 2006; Brewer 2006; Meier & O'Toole 2001; Nicholson-Crotty & O'Toole 2004; O'Toole & Meier 2011; Selden & Sowa 2004). Organizational managers set goals, design structures, motivate staff, build relationships, and manage performance (Forbes, Hill, & Lynn 2006, p. 255; Kenis 2006; Lynn, Heinrich, & Hill 2000; Rainey & Steinbauer 1999). Work experience is likely to produce valuable knowledge and skills that can enhance the use of various management

[9] A recent study finds a positive relationship between tenure and task-relevant knowledge and skills, but once knowledge and skills are controlled for, the direct effect of tenure on performance in fact becomes negative (Dokko et al. 2009).

strategies by illuminating their pitfalls, their applicability to different contexts or various contingencies involving their use. Managers with longer tenures may be more likely to be the carriers of organizational cultures and develop a better understanding of and relationships with the internal and external organizational stakeholders (Juenke 2005). This knowledge may reinforce the impact of various management strategies on organizational outcomes. To conclude, past studies provide ample evidence of job tenure and management being critical sources of organizational improvement. What we do not know is how management strategies and job tenure interact while influencing organizational service quality and outcomes. That is the primary focus our study.

Hypotheses

The current study examines the relationship between job tenure, management and performance. Specifically, we investigate how job tenure moderates the relationship between three key managerial practices – innovative management, participatory management and external management – and organizational performance. Past studies provide helpful insights on these relationships.

First, managers' experience can be a prominent factor in an organization's propensity for inertia and status quo rather than risk-taking and innovation (Hambrick, Geletkanicz, & Fredrickson 1993; Simsek 2007; Jaskyte 2011). Managers with longer tenure are likely to pursue less experimentation and informational diversity, and follow more consistent strategies that conform with the industry trends (Finkelstein & Hambrick 1990; Miller & Shamsie 2001). They are more likely to follow the fixed paradigms that worked in the past and lose touch with the new developments (Henderson et al. 2006; Boeker 1997). Managers in the earlier stages of their careers, on the other hand, may be more open to gaining new knowledge through new

experiences (Hambrick & Fukutomi 1991; Miller & Shamsie 2001). Thus, shorter tenure may enhance the effect of innovative management on organizational performance as new managers may be more open to fully embrace these innovations and lead the change (having said that, it is also possible that more experienced managers may use their knowledge to selectively and carefully apply innovation for the benefit of organizational outcomes, while the younger managers may seek to improve performance by simply pursuing a broader scope of innovations, some of which may or may not have a desired effect).

Second, longer job tenure might augment the influence of external management strategies on performance. Longer job tenure results in more extensive knowledge of the external environment and stakeholders and may increase the managers' propensity to take advantage of or to buffer external influences (Sturman 2003). Juenke (2005) finds that managers' tenure interacts with networking behavior, resulting in improved outcomes. In networks, less experienced managers tend to suffer since networking requires understanding the network and its actors and developing trust (Juenke 2005). These managers are more prone to exploration and more concerned with ways to cope with external changes (Stout, Slocum, & Cron 1988), and thus, may be less effective at using networks to the organization's advantage.

Third, job tenure can enhance the effect of the internal relationships that administrators develop within organizations. While this area is less explored, job involvement does increase with longer job tenure (Wagner et al. 1987). This can enhance managers' embeddedness, reliance on and use of organizational resources, including human capital.

All of these arguments suggest that the impact of three management strategies – participatory style of management, management of external influences, and use of innovation – on performance may be different at various levels of job tenure.

Turning to the context of this research, we study the effects of top administrators' job tenure on organizational performance in U.S. nursing homes which provide room, meals and care for individuals with severe chronic care needs.[10] Nursing home administrators are licensed professional managers who oversee clinical, financial, administrative, personnel and other aspects of nursing home operations (Geletta & Sparks 2013). Among their top priorities are health care quality, financial performance and regulatory compliance: all equally important for a facility's wellbeing. Similar to the broader public management literature, the concept of work experience has received attention in the nursing home care literature providing additional insights on the relationships examined in this paper.[11,12] Focusing on the experience of top nursing home administrators, numerous studies explore its effect on performance. The findings generally suggest that tenure is associated with better resident outcomes, such as percent of residents in pain or unmet standards of care, and lower odds of having severe deficiencies (Anderson et al. 2003; Decker & Castle 2011; Keays et al. 2009; Lerner et al. 2014). Research on the relationship between job tenure and management strategy is limited. Castle and Banaszak-Holl (1997) provide empirical evidence suggesting that a nursing homes' top management team's combined tenure is positively related to innovation (computerization) adoption; however, two top managers with more *dissimilar* job tenures are also more likely to innovate. While we found no studies of tenure and other management strategies, in the broader healthcare context,

[10] Most U.S. nursing homes are for-profit (65%), while some are nonprofit (28%) and governmental (7%) (Amirkhanyan et al. 2008). Theories of nursing home markets suggest key differences across ownership mostly due to significant informational symmetries between providers, clients, and third-party payers (Davis 1993; Scanlon 1980).

[11] In addition to the studies of job tenure and performance, reviewed above, some researchers also explore factors contributing to the length of employment. Singh and Schwab (1998) examine the effects of job environment related factors on length of employment. In another paper they suggest job history and performance outcomes are associated with administrator job tenure (Singh & Schwab, 2000).

[12] There are also some papers exploring other temporal aspects of employment, such as administrator turnover. Numerous studies have been conducted to examine the effects of administrator turnover on organizational performance, staff turnover, and job satisfaction (Castle 2001; Castle 2005; Castle 2007).

the tenure of hospital administrators has been found to be positively associated with higher levels of networkedness (Pfeffer & Salancik 1977). However, investigating the effect of health administrators' job tenure and domain consensus in inter-organizational Health Systems Agencies,[13] Burns (1982) finds that more experienced administrators are more skeptical about such external inter-organizational arrangements.[14] No research, however, explores how job tenure influences the relationship between management and performance. To address this gap in the literature, this study proposes the following hypotheses:

H_1: Shorter job tenure will enhance the effect of managerial innovation on organizational outcomes.

H_2: Longer job tenure will enhance the effect of external management strategies on organizational outcomes.

H_3: Longer job tenure will enhance the effect of managerial power-sharing strategies on organizational outcomes.

Methods

Data

To test our hypotheses empirically, we employ three data sources: the federal Nursing Home Compare (NHC) dataset, the Texas A&M University's (TAMU) Nursing Home Administrator (NHA) Survey (Compton et al. 2013), and the Area Health Resource Files (AHRF). The NHC is collected by the Centers for Medicare and Medicaid Services (CMS) provides archival measures of ownership, care quality, staffing, and facility characteristics. We use the NHC January 2014 data file (which includes nursing home state inspection data conducted 9 to 15 months prior to January 1, 2014), and merge it with the NHA survey conducted between 2012 and 2013. The

[13] Health System Agencies considered in the cited article provide opportunities for health care consumers and participating organizations to get engaged in variety of community health planning.
[14] The negative relationship between experience and domain consensus may be specific to the context of specific inter-organizational arrangements considered in this study.

NHA surveys were sent out to all governmental nursing homes (N=903), and randomly selected 1,000 for-profit and 1,000 nonprofit facilities. The survey was sent to nursing homes' top executives – nursing home administrators. A total of 717 nursing home administrators responded to the survey in three waves, yielding a 25% response rate. Despite the modest response rate (25%), the average key characteristics of our sample, by sector, do not significantly differ from the population (N=15,695) or the fielded sample (N=2,906). All fifty states and the District of Columbia were represented in the final sample. One difference of note is that our sample includes slightly better performing nursing homes than the population (see appendix Table 1). Lastly, the AHRF data set, produced by the U.S. Bureau of Health Professionals, provides county-level data on demographic characteristics, socio economic status, and other health organizations relevant to the chronic care market (e.g. hospices, hospitals, etc.) in 2010 and 2011.

Dependent variables: nursing home quality

We employ two measures of nursing home quality: the *total number of health deficiencies* and *overall 5-star rating*. The total number of health deficiencies reflects all violations assigned to a Medicare or Medicaid (or dually) certified nursing home in a single inspection cycle (typically, 15 months). These violations include both the results of a standard inspection by state inspectors who visit nursing homes every 9 to 15 months, or a formal resident/family complaint. Though the health deficiency measure can theoretically range between 0 and at least 180 – that is how many regulations can theoretically be violated, in our sample the values range between 0 and 31 with the mean of 5.87 and standard deviation of 5.08. The deficiency measure has been widely used in the health policy literature and in the public management research (e.g. O'Neill et al.

2003; Amirkhanyan, Meier, & O'Toole 2017; Amirkhanyan et al. 2018). Collected by a multi-disciplinary team of independent state surveyors, who follow a standardized protocol during their annual unannounced inspections, health violations are regarded as a valid, reliable and comprehensive measure of nursing home service quality.

Another indicator of the nursing home service quality is the overall five-star rating. Since 2008, the CMS began calculating and making public the overall facility rating, with higher ratings reflecting higher quality care. The formula used to calculate the ratings incorporates (1) the health inspection results (accounting for health deficiencies in the three recent years with more weight assigned to the more recent inspections); (2) staffing per resident per day, adjusted for the severity of residents' care needs; and (3) measures of quality drawn from the patients' clinical data.

Key independent variables: management strategies and job tenure

The main independent variables in this study are nursing home administrators' management strategies and their job tenure. We use information on three management strategies (innovative management, participatory management, and external management) from the NHA survey. Nursing home administrators were asked to answer a set of questions about their management strategies using a 4-point scale, from strongly disagree (coded as 1), to strongly agree (coded as 4). First, to measure *innovative management*, we used three questions that ask about the nursing home administrators' propensity to look for and adopt new ideas, technologies, and practices. The three items all loaded on a single factor between 0.86 to 0.90 with a Cronbach's alpha of 0.81 (see appendix Table 2 for the questions and individual factor loadings). Second, *participatory management* reflects managers' propensity to encourage other stakeholders to

participate in decision-making. Three survey items loaded on a single factor with coefficients between 0.77 and 0.84 with a Cronbach's alpha of 0.74. Third, *managing external influences* capture an administrator's understanding and strategies on external influences. Four questions correlated with a single factor between 0.59 and 0.81 with a Cronbach's alpha of 0.59. In this paper, we use the average of survey items for each measure as a proxy for each concept.

We measure job tenure as the number of years that a nursing home administrator has worked in her/his current position (source: NHA Survey).[15] In our sample, the average job tenure of nursing home administrators is 7.16 years with a standard deviation of 7.41.

Control variables

We control for several organizational factors: organizational ownership, the number of certified beds, the number of residents, a total of nursing hours per resident per day, percent of residents on Medicaid, hospital affiliation, the change of ownership during past 12 months, the status of chain affiliation, and the years since initial certification.[16] Ownership indicates whether a nursing home is public, nonprofit, or for-profit. Using for-profit nursing homes as the base category, we include dummies for nonprofit and public nursing homes. Second, chain affiliation is also a dummy variable indicating whether a nursing home is affiliated with a Continuing Care

[15] We also test the effects of the total number of years as a nursing home administrator instead of job tenure in the current position (models not shown). Yet, we find neither a linear nor nonlinear relationship with the quality of care. In fact, the correlation coefficients between years of experience in the current position and the total number of years as a nursing home administrator are 0.44, which suggests a short tenure. This suggests that experience in the current position is a more valid measure than administrator experiences throughout the career since it captures experience within a specific context (internal and external, with a given set of community partners, navigating staffing dilemmas and needs of their current nursing home, and knowledge of the local labor market conditions, etc.).

[16] Our control variables, except for the chain affiliation, are in 2011 since the nursing home inspection cycle is mostly every 9 to 15 months and it overlaps with the NHA survey period (for more details see Amirkhanyan, Meier, and O'Toole 2017, pp. 386-387). The chain affiliation measure is in 2013 since it is not available in 2011 and less likely to change from year to year. Our results hold with using all control variables in 2013 or excluding the chain affiliation indicator.

Retirement Community (yes=1; no=0). Third, the number of certified beds captures nursing home size. Fourth, the number of residents who occupy beds reflects the occupancy rate of the organization after controlling for the number of certified beds. Fifth, the measure for total nursing hours per resident per day captures the number of registered and vocational nurses, as well as the hours of the nurses' aides per day per resident as an indicator of the facilities' ability to provide care and supervision of the residents. Sixth, the percentage of residents on Medicaid represents the share of nursing home residents who have spent down their incomes and are covered by the Medicaid program. Seventh, we include a variable reflecting whether the nursing home is affiliated with a hospital rather than being a freestanding organization (1=affiliated with a hospital; 0=freestanding). Eighth, we include a binary variable indicating whether the nursing home experienced the change of ownership in the past 12 months (1=yes; 0=no). Lastly, years since the initial certification of the nursing home is a proxy for the age of the facility.

In addition, we also include controls for environmental factors: population density (county population per square mile), the percent of (65+) elderly, the percent of persons in the county below the poverty line, and market competition. Market competition is measured by the Herfindahl index of market competition which ranges between 0 and 1 and is calculated using the sum of squared market shares (number of beds) for Medicare or Medicaid certified nursing homes in a county (Source: NHC). Table 1 includes summary statistics of all variables.

Analytical approach

Given the different data-generating processes of our two dependent variables (nursing home quality measures), we use two different modelling strategies. For health deficiencies, we use negative binomial regression models due to the presence of overdispersion in the "count" nature

of this measure. For overall five-star ratings, we use generalized ordered logit models.[17] To account for unobserved characteristics across states, we add state fixed effects to each model. Lastly, in Appendix Tables 3 to 4, we test all models in Tables 2 to 3 including total number of health deficiencies in 2011. With or without this measure of previous total health violations, our key findings are consistent across models.

Findings

Tables 2 and 3 present results on the effects of job tenure and management strategies as well as their interaction effect on nursing home service quality. Each table includes five models. Model 1 is the base model testing the linear relationship between job tenure, management strategies and performance. Model 2 adds a squared term of job tenure to investigate the potential nonlinear relationship. Models 3 to 5 add interaction terms between (a) participatory management and job tenure, (b) innovation management and job tenure, and (c) external management and job tenure, respectively, to the base model.[18]

[Insert Table 2 about here]

In Table 2, the dependent variable is total number of health deficiencies. All models in Table 2 suggest that innovative management is positively related to the service quality. Consistent with the past research (Amirkhanyan et al. 2018), innovation-focused management is associated with fewer health violations in a nursing home. Model 1 in Table 2 suggests that managerial tenure is negatively related to the total number of health deficiencies (β=-0.012;

[17] When running ordered logit models, the parallel regression assumption is violated. Since five-star ratings are clearly ordered, rather than running multinomial logit (or probit) models, we choose generalized ordered logit models to consider the nature of dependent variable, at the same time, alleviating the concern of the violated assumption.

[18] Although we do not include all three interaction terms together in one model due to severe multicollinearity, the interactive results remain the same when we do so.

p<.01). As managers gain more experience in their positions, their facilities are likely to have fewer violations. Model 2 tests the nonlinear relationship between job tenure and the quality of nursing home care. In this model, both linear and squared term of job tenure are not statistically significant at the conventional significance levels. To ensure the relationship is linear, we further examine a potential polynomial relationship between the two, adding a cubic term of job tenure to Model 2.[19] Though the linear term in Model 1 in Appendix Table 5 is statistically significant, it becomes statistically insignificant once past performance is controlled in Model 2; squared, and cubic terms of job tenure in both models are also not statistically significant. Thus, we conclude that the relationship between job tenure and the total number of health deficiencies is likely to be linear.

Models 3 to 5 test an interaction effect of job tenure and management on nursing home violations. We find that when managers have a very short tenure and encourage employees to participate in executive decisions, violations are more likely to occur. As managers gain more experience, however, this negative relationship can be moderated.

[Insert Figure 1 about here]

Figure 1 is a graphic illustration of Model 3 in Table 2 generated through simulating parameters 1,000 times using Clarify (see King, Tomz, & Wittenberg 2000). We calculate expected values in a hypothetical public organization where its nursing home administrator has

[19] To ensure the relationship between job tenure and total number of health deficiencies is a linear function, we conduct post-hoc analyses. In doing so, we first split our sample by years of job tenure, run about thirty regression models, and find no consistent results. Since our sample for each regression model was small, as a next step, we employ regression models splitting our sample in quantiles of job tenure. The first regression model (the first quantile of job tenure) shows no statistically significant relationship. The second, third, and fourth models, however, suggest job tenure has a negative, positive, and negative impact on total number of health deficiencies, respectively. The set of analyses suggests a potential polynomial relationship between job tenure and performance. We also conduct the analyses using overall 5-star rating as the dependent variable and find the same results. The results of post-hoc analyses are available upon request from the corresponding author.

not changed during the past 12 months, holding all other variables at their mean values. In Figure 1, the (dashed) line indicates the predictive margins of one standard deviation (below) above the mean value of participatory management. Figure 1 suggests that when managers involve stakeholders less in decision making, even if they gain more experience, the number of violations will not decrease substantially. However, when a manager involves stakeholders more in the decision-making, as she/he gains more experience, the total count of deficiencies will decrease from 4.47 to 1.85. Thus, a new administrator does not seem to benefit from participatory decision-making at the beginning of their career, potentially, due to the fact that he or she does not yet do a good job of incorporating the demands of stakeholders into decision making. They may be too quick to take bad advice or not have the experience to resolve competing demands. Whether these managers are ineffective early adopters of participatory style or they adopt it later in their careers, involving more stakeholders as the administrator gains expertise on the job seems to have a positive effect. In Models 4 and 5, the interactive hypotheses between innovation management and job tenure and between external management and job tenure are not significant.

Table 3 investigates the relationship between job tenure, management strategies, and the overall five-star rating. Model 1 in that table suggests that participatory and innovation management are positively associated with the overall five-star rating. Adding the squared term of job tenure to examine its potential nonlinear relationship, Model 2 still shows both linear and squared terms of job tenure are not statistically significant. As our post-hoc analyses suggested (see footnote 19), we include a cubic term of job tenure in Model 2 to test a potential polynomial relationship. Model 3 in Appendix Table 5 shows a polynomial relationship between the two: first positive (β=0.150; p<.05), second negative (β=-0.010; p<.05), and third positive

(β=0.0001; p<.010). The relationship holds even after controlling for the past performance measure in Model 4 in Appendix Table 5, suggesting a polynomial relationship between the two, first positive, second negative, and then positive.

As job tenure has a different relationship with our service quality measures shown in Tables 2 and 3, the relationship between management strategies and overall five-star rating also depicts different dynamics compared to the results in Table 2. Participatory and innovative management strategies do not seem to have an interactive effect with job tenure in Models 3 and 4. Model 5, however, suggests that the effect of external management is conditioned on job tenure though the direct term of external management is not significant.

[Insert Figure 2 about here]

Figure 2 graphically presents Model 5 from Table 2. We calculate the predicted probabilities of each of the overall five-star rating categories through simulating parameters for 1,000 times. We set a nursing home organization as the one in the public sector, assuming no changes in the administrator position during the past 12 months, and holding all other values at their mean. Figure 2 suggests that when a manager is less active in external management (one SD below the mean), even if the job tenure increases, predicted probabilities rarely change. In fact, the probabilities of receiving lower evaluations (from 1 to 3 stars) slightly increase with less external management. For an externally active manager (one SD above the mean), if she/he has no experience in the organization, the manager is less likely to perform better compared to the less externally active one. The gap, however, disappears quickly. As the job tenure increases, for managers with better external management skills, the predicted probabilities for receiving the highest rating substantially increases from 0.52 to 0.74, while predicted probabilities of receiving other ratings (from 1 to 4 stars) decrease.

To reflect on the findings pertaining to control variables, they are consistent with the large body of theoretical and empirical literature investigating the effect of legal ownership, size, Medicaid reimbursements, urbanicity, and other factors on quality of care in nursing homes (Amirkhanyan 2008; Amirkhanyan, Kim & Lambright 2008, 2009; Amirkhanyan, Meier & O'Toole 2017; Amirkhanyan, Meier, O'Toole, Dahwe & Janzen 2018; Amirkhanyan, Meier, Holt, & McCrea 2019). Mirroring this past research, our findings suggest that nonprofit and pubic homes have fewer deficiencies and higher star ratings compared to for-profit nursing homes. Additionally, facility size (measured in number of beds) is associated with more violations and lower star ratings. Also, nursing home quality is negatively related to the percent of residents in a nursing facility who are reimbursed by the Medicaid program (as opposed to private long-term care insurance, Medicare, or out-of-pocket payments). Finally, lower population density is negatively related to both regulatory violations and star ratings.

Discussion

This study explores the relationship between organizational performance, job tenure, and management strategies using data collected from a recent survey of nursing home administrators combined with the CMS performance assessment data. Our paper focuses on two distinct measures of nursing home quality: health deficiencies and star ratings. Each captures a different set of performance aspects, and hence, it is not surprising that management strategies interact differently with job tenure while influencing these two measures of performance.

For the first measure – the total number of health deficiencies – longer tenure results in fewer health deficiencies. These findings align with the existing literature that suggests a positive relationship between experience and performance. The findings suggest that more prolonged

tenure as a nursing home administrator – entailing a more in-depth understanding of all the various components of care quality and relevant internal management strategies, as well as the nature of the regulatory mandates – generates 'professional wisdom' that better prepares managers to minimize the number of regulatory violations.

Importantly, we find that the interaction effect of tenure and participatory style of management significantly decreases the number of deficiencies. This improvement offers a more nuanced explanation of the linkage between management, tenure, and performance. The government holds nursing homes accountable using a plethora of regulations: a complex system of over 180 regulatory standards that span a wide variety of technical areas (i.e. resident rights, clinical nursing, administration, dental, dietary, pharmacy services, etc.). The deficiencies identified by regulators pertain to a single inspection cycle and are not adjusted for the clinical case mix. State inspectors observe and record the majority of these deficiencies (as opposed to self-reporting by home administrators) thus imparting more integrity and independence into these third-party assessments. In order to comply with the vast number of regulatory requirements successfully, our findings suggest that nursing home administrators can't "do it alone" and must rely on internal allies (staff) as well as patient/family groups in decision-making. They need a strong team of professionals in a variety of areas who can ensure that service delivery meets the regulatory requirements. Building such a team and learning how to best delegate to its members may require time.

How this experience gained from tenure is used to build teams is interesting and worthy of consideration. The longer the administrator's tenure within an organization, the higher the likelihood of personally hiring, developing a sense of expertise, and a trusting relationship with key leaders such as the Director of Nursing, the Medical Director, and other middle managers. In

cultivating these relationships and providing mentorship (leveraging their own longer-term experience), administrators have an opportunity to groom advocates who will champion regulatory compliance across a range of areas: from nursing care to residents' rights and administration. This trust-based relationship typically comes with a delegation of power to the middle managers' who possess subject-area expertise, which seems to have a positive effect on performance. The delegation of power is likely to have a stronger impact when managers have developed trust and shared goals with their team. Managers typically develop this type of advanced leadership through learning matched with experience, two processes that take time. New managers are less likely to know the right person to delegate to and are more likely to have to work with those hired by previous administrators. Experienced managers are better able to capitalize on power sharing within the organization than new managers are when navigating the very complex and diverse sets of performance outcomes and assessment tools that make up nursing home's compliance with a complex regulatory system.

The impact of tenure on the second measure of nursing home quality – the overall five-star rating – is similar to that of health deficiencies. To illustrate, administrator's longevity enhances the effect of externally oriented management practices on the overall star rating. Based on the current CMS star rating formula, nursing homes may in fact influence the various components of their star ratings. O'Toole and Meier (2011, p. 56) note the effect of public managers' interacting and engaging with external actors, as their actions result in the ability to "fend off potential disruptions and threats to the core organization's operations." Specifically, staffing levels are one component of the star rating that may be influenced by the administrators' use of external management aimed at more effective staffing practices. These external strategies may involve communicating with staffing agencies to address last-minute staff shortfalls such as

filling vacant nursing shifts quickly. Having an established relationship with the local staffing agencies and knowing the best nurses available can facilitate filling positions quickly and avoiding a clinician gap. Thus, an experienced manager attuned to the value of external relations will develop and maintain a relationship with external agencies to achieve higher performance by influencing the staffing component of the star ratings.

A nursing home's clinical case mix is another component of the star rating, and deliberate external strategies can help maintain the optimal case mix in the facility. Relationships with the Area Agency on Aging, local hospital discharge planners, assisted living facilities' administrators, other nursing homes, and chronic care providers can serve that purpose. Experienced administrators are likely to have collaborative relationships with the case managers of these agencies to optimize the mix of placements (e.g., admitting more patients covered by Medicare), or to allow the nursing home to more effectively compete for specific clients to maintain a desirable case mix. These external strategies can also help maintain a healthy occupancy rate and can be aided by the nursing home administrator's long tenure and embeddedness in the local community.

The so-called "Quality Measures" are another component of the star rating score, reflecting facility's compliance with a set of clinical practices related to the use of restraints, psychotropic drugs, and others. An experienced administrator who is attuned to the external environment is more likely to recognize the importance of hiring top-tier Quality Management (QM) nursing staff. To successfully identify and hire superior candidates, though, a manager requires a strong working knowledge of the QM nursing network. Similarly, networking with various professional associations will help in obtaining the strategies to elevate the star ratings. Likewise, networking with government agencies and other health care providers in the

community can provide more information on regulatory inspections and develop trusting relationships that can aid in the communication of information (including self-reported data, such as staffing[20]) with government inspectors.

Lastly, our results indicate that job tenure has a different relationship with nursing home service quality measures. To illustrate, the relationship between tenure and the health deficiencies is linear suggesting that as tenure increases, there are no diminishing (marginal) returns on a nursing home's retention of the long-term administrators, all things else being equal. The implication is that administrator effectiveness continues to increase with tenure, without a later-period fall off. This long-term improvement appears to benefit organizational performance with no stages of decline throughout the administrators' career. The relationship between tenure and the overall five-star rating is more complex. Our findings suggest that as tenure increases, the rating will initially improve. After a certain point, the relationship between tenure and the training becomes negative (see Model 4 in Appendix Table 5); retaining a nursing home administrator can harm the rating. The mixed results on the relationship between tenure and nursing home service quality measures call for future research. We suggest future scholars to investigate the inverted-U shaped and polynomial relationships, even if they do not directly posit the relationship, so that we can accumulate scientific knowledge.

Overall, we find that experience enhances the use of traditional management strategies such as participatory management and external management, and that seasoned administrators provide benefits and elevate a nursing home's performance. Interestingly, tenure may also assist in the development of relationships with state regulators and provide similar benefits. If the

[20] As of July 1st, 2016, CMS requires nursing homes to upload their staffing data directly from their payroll records to CMS, allowing for verification of staffing ratios by CMS staff (CMS 2017).

nursing home administrator and the state inspector and his/her team are both experienced, the learning curve of inspections and regulatory compliance is theoretically steeper. It is even possible that the two teams have an established professional relationship from previous inspections, further contributing to the development of a positive working relationship. This professional relationship may also include a significant element of trust earned through the nursing home's successful mitigation of past deficiencies identified by the inspector. Having said that, while such long-term trusting relationships can facilitate some aspects of the regulatory process, they also have the potential to compromise the validity of the state inspection process and the relevant ratings, and thus, require further investigation (for more on this, see Amirkhanyan, Meier and O'Toole, 2017 and the literature cited therein).

We note several limitations of this study. First, while similar to the population of U.S. nursing homes in terms of their key features, sampled facilities have somewhat higher service quality (not fully attributable to the oversampling of government nursing homes, which typically perform better than for-profit homes). Also, average job tenure in our sample is also higher than that in several past studies (Castle & Decker 2011; Singh & Schwab 2000; Murphy & Fridkin 2004). Stronger performance and longer tenure may be associated with higher managerial expertise and effectiveness than that in the general population. More effective managers may be more likely to learn from their experience and apply their knowledge to their decisions while working on improving performance.

Additionally, while the longer time-frame of administrators' tenure in our study and the use of lagged independent variable can help address the possibility of reverse causality (e.g., the possibility that substandard performance might prompt the administrators' departure), more research involving longitudinal analysis that follows individuals over a longer time-span may be

useful to fully investigate the relationship between job tenure, management strategy and organizational performance. Additionally, the external generalizability of our conclusions is limited by the unique nature of nursing home administrators' fairly short tenure compared to other fields (Castle and Decker 2011; Lerner et al. 2014; Murphy & Frinkin 2004; Singh and Schwab 2000).

Finally, while our study examines the effect of administrative strategies and tenure on nursing home service quality, there are other important aspects of organizational performance, such as financial performance, access to care, and others. Prior research suggests that different aspects of performance and assessments of performance by different stakeholders may be determined by a different set of organizational and environmental factors (Amirkhanyan, Kim, & Lambright 2014). Thus, extending this study to a broader range of organizational outcomes may be an important step in understanding the relationship between managerial tenure, management and performance.

Conclusion

This study has several implications for public management scholars and practitioners. First, the results show that tenure enhances managerial influence, albeit over time as the term suggests. The concept that tenure improves performance might prove useful for the county and state governments charged with public nursing home oversight, nursing homes' boards of directors, and particularly state licensing boards. This finding also aligns with other studies in public management literature in the context of public education (Cheon & An 2017; Juenke 2005) and local property assessors (Propheter 2016).

The unique contribution of this study is that job tenure can in fact augment the effect of managerial strategies on organizational performance. The positive link between some managerial strategies and organizational performance can be strengthened by longer tenure. Yet, for managers with shorter tenures it may be advisable to focus on core functions and learning on the job. To those interested in the impact of management on performance, our study reinforces the importance of organizational/individual context in which various management strategies are implemented. Participatory management and networked governance are concepts taught widely across public administration programs. Our study suggests the importance of recognizing that the effect of these strategies is highly dependent on who implements them and how performance is evaluated.

Third, the findings from this study offer policy implications. Each state sets the requirements for licensing nursing home administrators in their state. Most states require nursing home administrator applicants to work as a trainee before being board certified. For example, Pennsylvania requires participation in at least 1,000 hours of an 'administrator-in-training' program, under the "…supervision of a full-time nursing home administrator licensed in this Commonwealth or in another state whose licensing standards are equal to those of the Commonwealth" prior to sitting for their state and federal licensing boards (Pennsylvania 2010). Determining and adjusting the optimal length of the 'administrator-in-training' program might help address some of these ramifications of shorter job tenure on performance especially in the areas characterized by a shortage of experienced nursing home administrators. While some nursing homes do offer paid 'administrator-in-training' programs, increasing the number of these programs so that they become the norm in the path to productive performance may best serve the

nursing homes. More importantly, though, is growing the experience of future administrators so that they may improve the life of the clients under their care.

Lastly, in keeping with Juenke (2005), which illustrates the relationship between job tenure, managerial networking, and organizational performance, our study highlights the importance of job tenure in practicing managerial strategies and more importantly, its impact on service quality. Since managers and employees learn from their experience across all organizations, our findings should apply to other types of organizations regardless of sector. The findings of this study may be especially relevant in the field of health and human services where tangible performance outcomes may be harder to define and quantify. To strengthen the generalizability of this study, we encourage future scholars to examine these relationships in different contexts (e.g. both different countries and policy settings).

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Table 1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Total number of health deficiencies	647	5.85	5.04	0	31
Overall 5-star rating	618	3.66	1.25	1	5
Job tenure	649	7.22	7.46	0	38
Management: Sharing power	649	0	1	-3.22	1.20
Management: Innovation	649	0	1	-3.07	1.95
Management: External influences	649	0	1	-3.10	2.39
Change of owner during past 12 months	649	0.02	0.16	0	1
Nonprofit nursing home	649	0.36	0.48	0	1
Public nursing home	649	0.34	0.48	0	1
Chain affiliation	649	0.12	0.33	0	1
Number of certified beds	649	104.08	73.74	9	720
Number of residents	649	90.14	68.30	3	664
Total nursing hours per resident per day	649	4.12	1.44	1.5	24.02
Percent residents on Medicaid	649	58.41	21.95	0	100
Hospital affiliated home	649	0.11	0.31	0	1
Years since certification	649	21.42	11.81	0	44
Population density	649	0.79	2.77	0	35.37
Percent elderly	649	15.39	4.07	6.62	35.14
Percent in poverty	649	15.52	5.23	4	41.80
Herfindahl index of competition	649	0.29	0.29	0	1

Table 2: Job tenure, management strategies, and health deficiencies

	Model 1	Model 2	Model 3	Model 4	Model 5
Job tenure	-0.012**	-0.016	-0.014**	-0.012**	-0.013**
	(0.004)	(0.012)	(0.004)	(0.004)	(0.004)
Management: Participatory	0.017	0.017	0.084+	0.017	0.015
	(0.034)	(0.034)	(0.045)	(0.034)	(0.034)
Management: Innovation	-0.139**	-0.138**	-0.133**	-0.135**	-0.146**
	(0.034)	(0.034)	(0.034)	(0.045)	(0.034)
Management: External management	-0.053	-0.053	-0.058+	-0.054	-0.015
	(0.033)	(0.033)	(0.033)	(0.034)	(0.046)
Job tenure squared		0.000			
		(0.000)			
Job tenure × Participatory			-0.010*		
			(0.004)		
Job tenure × Innovation				-0.001	
				(0.004)	
Job tenure × External management					-0.005
					(0.004)
Control					
Nonprofit nursing home	-0.312**	-0.312**	-0.303**	-0.311**	-0.306**
	(0.087)	(0.087)	(0.086)	(0.087)	(0.087)
Public nursing home	-0.335**	-0.336**	-0.326**	-0.334**	-0.332**
	(0.091)	(0.091)	(0.090)	(0.091)	(0.090)
Chain affiliation	0.011	0.011	0.016	0.010	0.007
	(0.113)	(0.113)	(0.113)	(0.114)	(0.113)
Change of owner during past 12 months	0.053	0.049	0.042	0.050	0.038
	(0.209)	(0.210)	(0.208)	(0.210)	(0.209)
Number of certified beds	0.006**	0.006**	0.005*	0.006**	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of residents	-0.004+	-0.004+	-0.003	-0.004+	-0.004+
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Total nursing hours per resident per day	-0.022	-0.022	-0.019	-0.022	-0.021
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Percent residents on Medicaid	0.003+	0.003+	0.003+	0.003+	0.003+
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Hospital affiliated home	0.005	0.006	-0.002	0.005	0.006
	(0.117)	(0.117)	(0.117)	(0.117)	(0.117)
Years since certification	0.002	0.002	0.002	0.002	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Population density	-0.034*	-0.034*	-0.033*	-0.034*	-0.033*
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Percent elderly	-0.011	-0.011	-0.010	-0.011	-0.011
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Percent in poverty	0.014+	0.014+	0.013+	0.014+	0.014+
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Herfindahl index of competition	0.296*	0.296*	0.289*	0.297*	0.293*
	(0.148)	(0.148)	(0.147)	(0.148)	(0.147)
Constant	1.665**	1.678**	1.637**	1.668**	1.615**
	(0.414)	(0.416)	(0.412)	(0.415)	(0.416)
Alpha	-0.984**	-0.985**	-1.001**	-0.984**	-0.988**
	(0.092)	(0.092)	(0.093)	(0.092)	(0.092)
Observations	647	647	647	647	647
Likelihood ratio	211.15	211.23	216.13	211.18	212.55
p >	0.00	0.00	0.00	0.00	0.00

Note. +p < .10, *p < .05, **p < .01; state fixed effects included but not reported.

Table 3: Job tenure, management strategies, and overall five star rating

	Model 1	Model 2	Model 3	Model 4	Model 5
Job Tenure	0.018	0.050	0.019+	0.019+	0.018
	(0.011)	(0.031)	(0.011)	(0.011)	(0.011)
Management: Participatory	0.179*	0.172*	0.130	0.188*	0.189*
	(0.087)	(0.087)	(0.116)	(0.087)	(0.087)
Management: Innovation	0.191*	0.180*	0.187*	0.301**	0.208*
	(0.085)	(0.086)	(0.086)	(0.111)	(0.086)
Management: External management	0.066	0.069	0.070	0.047	-0.093
	(0.082)	(0.082)	(0.082)	(0.083)	(0.115)
Job tenure squared		-0.001			
		(0.001)			
Job tenure × Participatory			0.007		
			(0.010)		
Job tenure × Innovation				-0.015	
				(0.010)	
Job tenure × External management					0.021+
					(0.011)
Controls					
Nonprofit nursing home	0.956**	0.968**	0.954**	0.971**	0.949**
	(0.225)	(0.225)	(0.225)	(0.225)	(0.225)
Public nursing home	0.821**	0.853**	0.818**	0.837**	0.811**
	(0.226)	(0.228)	(0.226)	(0.227)	(0.226)
Chain affiliation	0.162	0.160	0.160	0.120	0.175
	(0.280)	(0.280)	(0.280)	(0.282)	(0.281)
Change of owner during past 12 months	-0.004	0.018	-0.010	-0.023	0.087
	(0.545)	(0.547)	(0.546)	(0.549)	(0.547)
Number of certified beds	-0.018**	-0.018**	-0.018**	-0.019**	-0.018**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Number of residents	0.016**	0.016**	0.016**	0.017**	0.016**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Total nursing hours per resident per day	0.079	0.081	0.076	0.081	0.075
	(0.072)	(0.072)	(0.073)	(0.072)	(0.073)
Percent residents on Medicaid	-0.015**	-0.014**	-0.015**	-0.014**	-0.015**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Hospital affiliated home	-0.097	-0.111	-0.093	-0.110	-0.093
	(0.286)	(0.287)	(0.286)	(0.287)	(0.286)
Years since certification	0.003	0.003	0.003	0.002	0.002
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Population density	0.122**	0.124**	0.122**	0.123**	0.121**
	(0.039)	(0.039)	(0.039)	(0.039)	(0.038)
Percent elderly	0.015	0.014	0.015	0.014	0.014
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Percent in poverty	-0.027	-0.027	-0.026	-0.028	-0.027
χ^2	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Herfindahl index of competition χ^2	0.019	-0.009	0.013	0.017	0.034
	(0.382)	(0.383)	(0.382)	(0.381)	(0.382)
Observations	618	618	618	618	618
Likelihood ratio	191.59	192.79	191.98	193.98	195.49
p >	0.00	0.00	0.00	0.00	0.00

Note. +p < .10, *p < .05, **p < .01; state fixed effects included but not reported.

Figures

Figure 1: Predictive margins of participatory management as job tenure increases

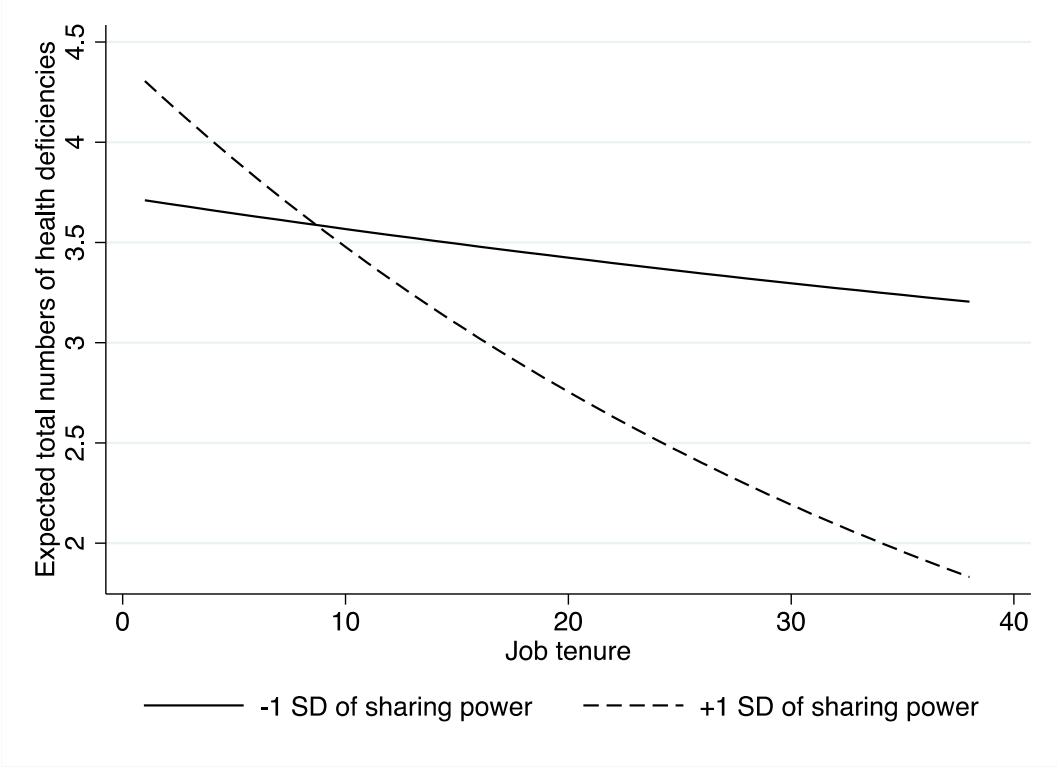
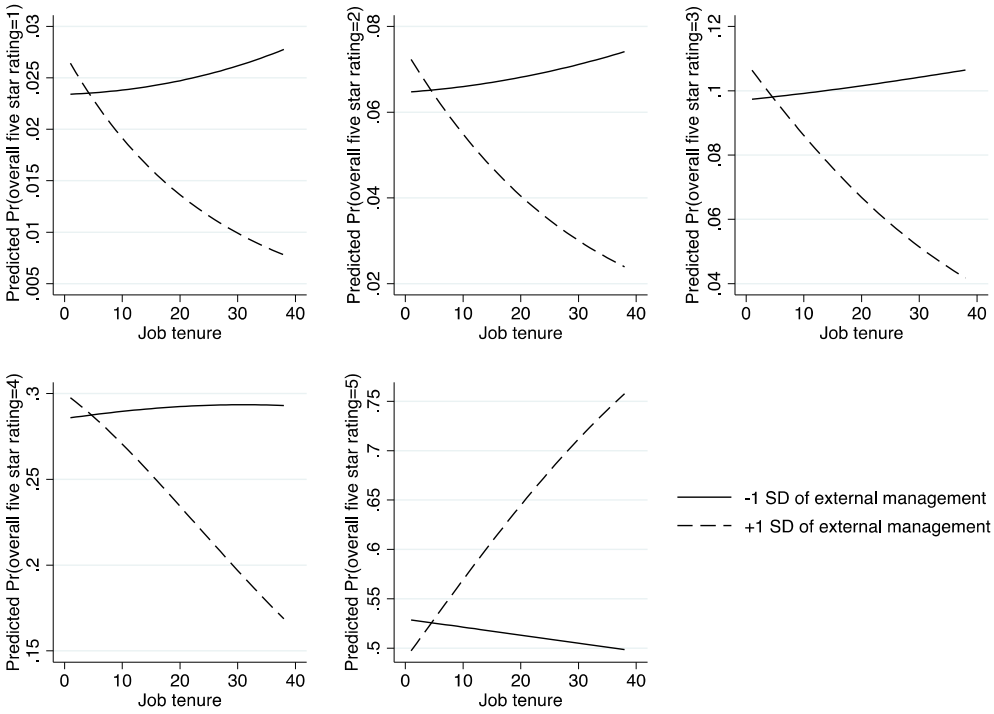


Figure 2: Predictive margins of external management as job tenure increases



Appendix Table 1: Comparison of All Operating US Nursing Homes to Our Sample.

	Population (2013-2012 wave)			**Sample (2013-2012 wave)**		
Variables	For-profit	Nonprofit	Public	For-profit	Nonprofit	Public
Percent residents on Medicaid (means)	63.2	49.0	62.1	62.4	50.3	62.0
Number of certified beds (means)	109.6	94.3	115.0	110.5	94.7	105.4
Number of residents (means)	89.2	81.2	95.0	91.5	83.2	90.0
Total nurse hours per resident per day (means)	3.9	4.5	4.5	3.9	4.4	4.5
Hospital affiliation (percent "affiliated")	1.1	14.5	26.2	0.9	12.4	19.6
Number of health deficiencies (means)	7.5	5.4	6.4	6.7	5.0	6.0
Overall 5-star rating (means)	3.2	3.8	3.6	3.2	4.0	3.7

Appendix Table 2: Factor analysis of survey items

Management: Innovation indicators	Loading
Our nursing home is always among the first to adopt new technology and practices	0.86
We continually search for new opportunities to provide services to our community	0.8
Our nursing home is always among the first to adopt new ideas and practices	0.9
Eigenvalues	2.18
Cronbach's alpha	0.81
Management: Participatory indicators	
I involve nursing and other nonmanagerial staff in my nursing home's decisions-making process.	0.77
Residents' and families' feedback and outcomes are taken into consideration when revising policies.	0.84
Non-manager feedback is taken into consideration when revising policies.	0.83
Eigenvalues	1.98
Cronbach's alpha	0.74
Management: External management indicators	
My role is to respond to various events and disturbances in the external environment of our nursing home.	0.59
I always try to limit the influence of external events on the staff and nurses.	0.67
I strive to control those factors outside the nursing home that could have an effect on my organization.	0.81
Our nursing home emphasizes the importance of learning from the experience of others.	0.62
Eigenvalues	1.83
Cronbach's alpha	0.59

Appendix Table 3: Job tenure, management strategies, and health deficiencies controlling for health deficiencies in 2011.

	Model 1	Model 2	Model 3	Model 4	Model 5
Job tenure	-0.009*	-0.005	-0.011*	-0.009*	-0.009*
	(0.004)	(0.012)	(0.004)	(0.004)	(0.004)
Management: Participatory	0.020	0.020	0.090*	0.020	0.019
	(0.034)	(0.034)	(0.046)	(0.035)	(0.034)
Management: Innovation	-0.117**	-0.119**	-0.110**	-0.116**	-0.120**
	(0.034)	(0.034)	(0.034)	(0.045)	(0.034)
Management: External management	-0.069*	-0.069*	-0.074*	-0.069*	-0.046
	(0.033)	(0.033)	(0.033)	(0.033)	(0.046)
Job tenure squared		-0.000			
		(0.000)			
Job tenure × Participatory			-0.010*		
			(0.004)		
Job tenure × Innovation				-0.000	
				(0.004)	
Job tenure × External management					-0.003
					(0.004)
Controls					
Nonprofit nursing home	-0.276**	-0.276**	-0.267**	-0.276**	-0.273**
	(0.087)	(0.087)	(0.086)	(0.087)	(0.087)
Public nursing home	-0.302**	-0.300**	-0.294**	-0.302**	-0.301**
	(0.090)	(0.090)	(0.089)	(0.090)	(0.090)
Chain affiliation	0.064	0.064	0.065	0.063	0.060
	(0.114)	(0.114)	(0.113)	(0.114)	(0.114)
Change of owner during past 12 months	-0.032	-0.028	-0.040	-0.032	-0.039
	(0.204)	(0.204)	(0.202)	(0.204)	(0.204)
Number of certified beds	0.005*	0.005*	0.004*	0.005*	0.005*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Number of residents	-0.004	-0.004	-0.003	-0.004	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Total nursing hours per resident per day	0.006	0.007	0.009	0.006	0.006
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Percent residents on Medicaid	0.004*	0.004*	0.004*	0.004*	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Hospital affiliated home	0.019	0.018	0.013	0.019	0.020
	(0.117)	(0.118)	(0.117)	(0.117)	(0.117)
Years since certification	0.003	0.004	0.003	0.003	0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Population density	-0.027+	-0.026+	-0.027+	-0.027+	-0.027+
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Percent elderly	-0.009	-0.009	-0.008	-0.009	-0.009
	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)
Percent in poverty	0.017*	0.017*	0.016*	0.017*	0.017*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Herfindahl index of competition	0.192	0.190	0.193	0.193	0.191
	(0.150)	(0.150)	(0.149)	(0.150)	(0.150)
Total number of health deficiencies in 2011	0.035**	0.035**	0.035**	0.035**	0.035**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Constant	1.158**	1.140**	1.133**	1.158**	1.134**
	(0.411)	(0.415)	(0.409)	(0.412)	(0.413)
Alpha	-1.067**	-1.067**	-1.088**	-1.067**	-1.069**
	(0.097)	(0.097)	(0.098)	(0.097)	(0.097)
Observations	625	625	625	625	625
Likelihood ratio χ^2	241.19	241.30	246.45	241.19	241.69
$p > \chi^2$	0.00	0.00	0.00	0.00	0.00

Note. +p < .10, *p < .05, **p < .01; state fixed effects included but not reported.

Appendix Table 4: Job tenure, management strategies, and overall five-star ratings controlling for health deficiencies in 2011.

	Model 1	Model 2	Model 3	Model 4	Model 5
Job tenure	0.002	0.012	0.003	0.004	0.003
	(0.011)	(0.032)	(0.011)	(0.011)	(0.011)
Management: Participatory	0.179*	0.177+	0.124	0.192*	0.188*
	(0.091)	(0.091)	(0.122)	(0.091)	(0.091)
Management: Innovation	0.146+	0.143	0.142	0.286*	0.162+
	(0.088)	(0.089)	(0.088)	(0.114)	(0.089)
Management: External management	0.052	0.053	0.057	0.029	-0.088
	(0.084)	(0.084)	(0.085)	(0.085)	(0.118)
Job tenure squared		-0.000			
		(0.001)			
Job tenure × Participatory			0.007		
			(0.011)		
Job tenure × Innovation				-0.019+	
				(0.010)	
Job tenure × External management					0.018+
					(0.011)
Controls					
Nonprofit nursing home	0.882**	0.886**	0.881**	0.901**	0.878**
	(0.232)	(0.232)	(0.232)	(0.232)	(0.232)
Public nursing home	0.791**	0.800**	0.789**	0.808**	0.781**
	(0.235)	(0.237)	(0.235)	(0.236)	(0.235)
Chain affiliation	-0.088	-0.088	-0.094	-0.136	-0.078
	(0.291)	(0.291)	(0.292)	(0.293)	(0.291)
Change of owner during past 12 months	0.385	0.393	0.388	0.348	0.459
	(0.533)	(0.533)	(0.534)	(0.531)	(0.531)
Number of certified beds	-0.021**	-0.021**	-0.021**	-0.022**	-0.021**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Number of residents	0.020**	0.020**	0.020**	0.021**	0.020**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Total nursing hours per resident per day	-0.025	-0.024	-0.029	-0.023	-0.028
	(0.074)	(0.074)	(0.074)	(0.074)	(0.074)
Percent residents on Medicaid	-0.014**	-0.014**	-0.014**	-0.014**	-0.014**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Hospital affiliated home	-0.197	-0.200	-0.193	-0.208	-0.190
	(0.303)	(0.303)	(0.303)	(0.305)	(0.303)
Years since certification	0.000	0.000	0.001	-0.001	-0.001
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Population density	0.094*	0.094*	0.094*	0.095*	0.093*
	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)
Percent elderly	0.017	0.017	0.017	0.017	0.016
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Percent in poverty	-0.036+	-0.036+	-0.035+	-0.038+	-0.036+
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Herfindahl index of competition	0.109	0.101	0.106	0.105	0.124
	(0.396)	(0.397)	(0.396)	(0.395)	(0.396)
Total number of health deficiencies in 2011	-0.205**	-0.204**	-0.205**	-0.206**	-0.204**
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Constant	-1.132	-1.087	-1.146	-1.235	-1.259
	(1.003)	(1.013)	(1.006)	(1.003)	(1.016)
Observations	603	603	603	603	603
Likelihood ratio χ^2	320.27	320.37	320.73	323.90	323.14
$p > \chi^2$	0.00	0.00	0.00	0.00	0.00

Note. +p < .10, *p < .05, **p < .01; state fixed effects included but not reported.

Appendix Table 5: Testing a polynomial relationship between job tenure and nursing home service quality measures

D.V.s:	Total number of health deficiencies		Overall five star rating	
	Model 1	Model 2	Model 3	Model 4
Job tenure	-0.045+	-0.028	0.150*	0.111+
	(0.025)	(0.025)	(0.065)	(0.067)
Job tenure squared	0.003	0.002	-0.010*	-0.009+
	(0.002)	(0.002)	(0.005)	(0.005)
Job tenure cubic	-0.000	-0.000	0.000+	0.000+
	(0.000)	(0.000)	(0.000)	(0.000)
Management: Participatory	0.013	0.017	0.187*	0.194*
	(0.034)	(0.034)	(0.088)	(0.092)
Management: Innovation	-0.134**	-0.116**	0.163+	0.130
	(0.035)	(0.034)	(0.086)	(0.089)
Management: External management	-0.053	-0.068*	0.065	0.049
	(0.033)	(0.033)	(0.082)	(0.084)
Controls				
Nonprofit nursing home	-0.312**	-0.275**	0.962**	0.881**
	(0.087)	(0.087)	(0.226)	(0.232)
Public nursing home	-0.335**	-0.298**	0.838**	0.790**
	(0.091)	(0.090)	(0.229)	(0.237)
Chain affiliation	0.022	0.073	0.135	-0.114
	(0.113)	(0.114)	(0.281)	(0.293)
Change of owner during past 12 months	0.050	-0.028	0.047	0.409
	(0.209)	(0.204)	(0.550)	(0.534)
Number of certified beds	0.005*	0.005*	-0.017**	-0.020**
	(0.002)	(0.002)	(0.006)	(0.006)
Number of residents	-0.004	-0.003	0.015*	0.020**
	(0.002)	(0.002)	(0.006)	(0.006)
Total nursing hours per resident per day	-0.023	0.006	0.086	-0.018
	(0.025)	(0.025)	(0.073)	(0.074)
Percent residents on Medicaid	0.003+	0.004*	-0.014**	-0.014**
	(0.002)	(0.002)	(0.005)	(0.005)
Hospital affiliated home	0.010	0.020	-0.125	-0.211
	(0.117)	(0.117)	(0.287)	(0.303)
Years since certification	0.002	0.003	0.004	0.001
	(0.003)	(0.003)	(0.008)	(0.008)
Population density	-0.034*	-0.026+	0.126**	0.097*
	(0.015)	(0.015)	(0.039)	(0.038)
Percent elderly	-0.011	-0.009	0.017	0.020
	(0.010)	(0.010)	(0.024)	(0.025)
Percent in poverty	0.015+	0.017*	-0.029	-0.039*
	(0.008)	(0.008)	(0.019)	(0.020)
Herfindahl index of competition	0.299*	0.194	-0.034	0.080
	(0.147)	(0.150)	(0.383)	(0.396)
Total number of health deficiencies in 2011		0.035**		-0.203**
		(0.007)		(0.019)
Constant	1.703**	1.164**	1.213	-0.987
	(0.416)	(0.415)	(0.968)	(1.018)
Alpha	-0.990**	-1.070**		
	(0.092)	(0.097)		
Observations	647	625	618	603
Likelihood ratio χ^2	212.99	242.35	196.00	323.26
$p > \chi^2$	0.00	0.00	0.00	0.00

Note. +p < .10, *p < .05, **p < .01; state fixed effects included but not reported.