Gender Differences in Performance-driven Managerial Innovation: Evidence from US Nursing Homes*

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Abstract

The management literature has highlighted the role of a manager's gender in adopting and practicing managerial innovation. The conditions that affect female (or male) managers' decision making on innovations, however, have been less explored. Using a national survey of top-level administrators in US nursing homes and archival nursing home quality data, this study examines how performance information shapes gender differences in managerial innovation adoption. We find that female managers are more likely to adopt innovations relative to male managers, particularly when they perform better than they have in past years. Our findings, however, do not support a gender difference in innovation adoption when a nursing home performs worse than other competing organizations. The findings provide important implications on how a manager's gender produces systematic differences in innovation adoption related to performance information.

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Introduction

Organizational innovation is a central concern of public management because it is considered a major contributor to successful programs (Andrews, Boyne, and Walker 2006; Boyne and Walker 2004, 2010; Walker, Damanpour, and Devece 2010). The innovation literature has studied the antecedents of innovations and considered both internal factors, such as performance gaps, the pursuit of high-quality service, slack resources, and organizational structures (Borins 1998; Walker 2014; Wynen, Verhoest, and Kleizen 2017) and external factors, such as political environments, turbulence, munificence, and relationship with stakeholders (Barrutia and Echebarria 2019; Burns and Stalker 1961; Light 1998; Tidd 2001). Less examined are the characteristics of managers who adopt innovations (Damanpour and Schneider 2009). The absence of attention on managers is surprising because an extensive literature documents that a prospecting managerial style focused on innovations can lead to higher levels of organizational performance (Andrews et al. 2006; Miles and Snow 1978).

This article examines how the gender of top managers and organizational performance information affect managers' innovation adoption. We consider a manager's gender as a critical factor in innovation adoption because managerial innovation is "not gender-neutral; rather, it is gender-biased" (Nählinder 2010, 14). On the one hand, the stereotype that "women are less innovative than men" (Nählinder 2010, 14; Luksyte et al. 2018) and gendered preferences in risk aversion (Bijedić et al. 2016; Croson and Gneezy 2009; Eckel and Grossman 2008) can discourage female managers from seeking new ideas and strategies. Even if female managers are more innovative, they are less likely to receive credit for successful innovations compared to their male counterparts (Johnson et al. 2008). On the other hand, female managers could be more innovative because they are more likely

to be motivated to perform well and prove themselves in their positions. While management is a general function, the managerial position has been more dominated by men. A glass ceiling often exists for women in their career development in organizations, and women find it more difficult to be promoted to top-manager positions than men. Female managers may feel they need to do a better job to compete with their male peers, and this pressure may lead them to take more risks and be innovative (Eckel et al. 2021).

A substantial literature has shown significant gender differences in managerial priorities and practices (Jacobson, Palus, and Bowling 2010; Johansen and Zhu 2016) and the crucial role of management in innovation adoption (Mergel 2017). The business literature and strategic management studies have also highlighted the gender difference in innovation adoption (Kalleberg and Leicht 1991; Nissan, Carrasco, and Castano 2012). Yet, the findings on the effect of gender on innovation adoption are inconclusive. Furthermore, it is still understudied why this gender gap exists and under what circumstances the gap narrows or widens. These all suggest a manager's gender deserves more attention in public management generally and managerial innovation specifically.

Among the various contextual factors that can affect gender differences in innovation adoption (Schøtt and Cheraghi 2015), this study focuses on organizational performance information—whether an organization meets or fails to meet expectations. Specifically, we focus on the historical performance gap (current performance compared to past performance) and the social performance gap (relative performance compared to other organizations) as moderators and examine how these performance gaps shape the relationship between a manager's gender and innovation adoption.

By investigating how and under what performance conditions gender influences innovation adoption, this research expands the gender-management link to performance management. The findings of this study suggest that a manager's gender matters in innovation adoption, and the relationship varies depending on organizational performance conditions. This research situates the literature on gender and innovations directly within existing theories of managerial decision-making (Cyert and March 1963; Meier, Favero, and Zhu 2015). Additionally, this study advances our understanding of managerial strategies and provides implications for adopting innovations.

The Adoption of Managerial Innovation

Innovation refers to the generation or adaptation of new ideas, objects, and practices, which are new for the unit of adoption (O'Toole 1997; Walker 2008, 2014; Walker et al. 2010). Innovation scholars have proposed three typologies of innovation based on the assumption that each typology has different attributes and antecedents: (1) service/product versus process innovation – whether innovation focuses on outcomes or processes to change the relationship among employees (Osborne 1998; Walker et al. 2002; Walker, Avellaneda, Berry 2011), (2) radical versus incremental innovation – whether it results in major changes or gradual changes in organizations (Germain 1996), and (3) technological versus managerial innovation – whether it targets for new technological knowledge/skills or new managerial practices to increase efficiency and effectiveness of the internal operations (Birkinshaw, Hamel, and Mol 2008; Damanpour and Schneider 2009). Among the categories, managerial innovation has received substantial attention as an antecedent of organizational performance (Altshuler 2010; Damanpour, Walker, and Avellaneda 2009; Walker et al. 2010).

This study adds to the literature on managerial innovation by looking at three important aspects of it. First, we focus on a manager's *adoption of innovation*, not the

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generation or implementation of innovation. In public service organizations, ideas or practices are commonly adopted from other organizations (Damanpour and Wischnevsky 2006); the ideas or practices may not be the state of the art, but they are new to the adopting unit (Damanpour and Schneider 2009). Second, we highlight *a manager's gender* as a factor in innovation adoption and examine whether female managers are more or less likely to adopt innovations compared with their male counterparts. Third, we stress the role of *performance information* in facilitating managerial innovation. While managers are often motivated to adopt innovations to overcome low performance or to accelerate high performance (Cheon and An 2017; Tidd 2001), few studies have considered performance as an antecedent of managerial innovation. An organization's performance should logically be one reason for seeking out new innovations (Meier et al. 2015).

The policy context of this research is healthcare. Innovation adoption is widely recognized in the healthcare domain to seek cost efficiency and effectiveness of the healthcare systems, longer life expectancy, quality of life, and patient-centered care (Omachonu and Einspruch 2010). Particularly, managerial innovation adoption has become more important recently in the U.S. healthcare environment to balance the quality of care and cost containment. US nursing homes, for example, face high pressures to innovate due to the poor quality and high costs of long-term care (Castle 2001). Many US nursing homes have adopted innovative management tools such as total quality management (TQM), electronic medical record (EMR) systems, care transition programs, and use of specialized care settings (Banaszak-Holl, Zinn, and Mor, 1996; Zinn, Weech, and Brannon 1998; Giuffrida 2015).

Existing studies identify four stages in innovation processes in the healthcare domain —dissemination, adoption, implementation, and continuation—and investigate which factors facilitate or impede the innovation process (Fleuren, Wiefferink, and Paulussen 2004;

Omachonu and Einspruch 2010; Rogers 1995). Fleuren et al. (2004), for example, propose several key factors that affect innovation adoption in healthcare organizations, including socio-political context, organization characteristics, characteristics of the person adopting the innovations (e.g., skills, knowledge), and characteristics of the innovations (e.g., complexity). Building upon this framework, the present study investigates how a top manager's gender (characteristics of the person who adopts the innovation) and performance information (organization characteristics) are associated with innovation adoption in the US nursing homes.

Gender Differences in the Adoption of Managerial Innovation

Previous studies in public administration have focused on identifying institutional or organizational factors that influence innovation adoption (Damanpour and Schneider 2006; Walker 2008). The role of a manager's individual characteristics on innovation adoption, however, has received relatively less attention (but see Damanpour and Schneider 2009). Given that top managers can create a work environment that promotes innovations (Light 1998; Osborne 1998), some scholars have considered how managers' characteristics, such as age, education, experience, background, and disposition relate to their attitudes toward innovation adoption (Hambrick and Mason 1984; Huber et al. 1993; Young, Charns, and Shortell 2001). Unlike the consistent effect of age, experience, and education on innovation,[1] findings on the gender differences in innovation adoption are mixed. Some studies show no significant gender differences in innovation adoption. Damanpour and Schneider (2006; 2009), for example, show that a manager's gender has no significant effect on innovation adoption using data from US local governments. Similarly, Sonfield et al. (2001) demonstrate that women are not significantly different from men in innovation strategies. In a similar vein, Bass (1990) suggests that gender differences will blur when women and men achieve

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status as leaders (see also Dobbins and Platz 1986).

The non-significant findings on gender differences link to theories of organizational socialization and individual self-selection. Organizations socialize their managers to adopt values and norms that support the organization's mission. This socialization process can lead female managers to mimic what male managers do in order to succeed in their careers (Eagly 2007; Nielsen 2015). Self-selection mechanisms can also minimize gender differences at the management-level (Eckel et al. 2021). Individuals attracted to management positions are likely to share certain characteristics, such as ambition, competitiveness, or public service motivation. Gender differences in the same management occupation, as a result, can be minimal (but see Nielsen 2015). These arguments suggest that managerial practices are not significantly influenced by a manager's gender.

Contrary to the studies showing no gender effect, other research has found noticeable gender differences in attitudes toward innovation adoption. Regarding gender differences, either scenario—female or male managers as more likely to adopt innovation—could be possible. Regarding the former argument, female managers may adopt innovations more because they tend to use more participative and democratic leadership styles, and these styles create an employee culture that welcomes innovations (Eagly, Karau, and Johnson 1992; Hooijberg and DiTomaso 1996).[2] For the latter, men may adopt innovations based on their greater propensity to take risks, whereas women tend to be risk averse and less likely to act in uncertain situations (Croson and Gneezy 2009; Sexton and Bowman-Upton 1990).

Some studies support the view that male managers are more open to innovation. Based on the results from US city/county managers, Fox and Schuhmann (1999) show that female managers view themselves as less entrepreneurial than male managers do, perhaps

reflecting the generally higher level of competitiveness found among male managers (Nielsen 2015). Similarly, DiTomaso and Farris (1992) find that female R&D engineers rate themselves lower on innovativeness than males do.[3] Using more than 12,000 entrepreneurs from 44 countries, Yu and Chen (2016), however, find that women are more likely to be innovative than men in general; but the positive effect of individuals' self-efficacy and risk propensity on innovation is enhanced when a manager is male. In the context of healthcare, Hoque (2016) shows that men are more likely to adopt innovations due to their preferences for new technology. Using US nursing homes, Chisholm et al. (2018) find that male staff members are more likely to perceive innovative practices as favorable and compatible with current practice than their female counterparts.

Performance Information and Gender Difference in Innovation Adoption

Regarding gender differences in innovation adoption, a few studies have explored under what conditions female (or male) managers are more or less likely to adopt innovations and found a significant role for contextual factors in the decision-making process (Schøtt and Cheraghi 2015; Mazman, Usluel and Çevik 2009). Performance information—learning about how well or badly an organization functions—is an important contextual factor that influences innovation strategy because public managers are interested in achieving results and concerned with performance (Cheon 2020; Lipsky 2010).

Using formal models explaining how managers make decisions based on organizational performance, Meier, Favero, and Zhu (2015) theorize regarding the contexts that encourage managers to be innovative. Their model focuses on a performance gap, that is, the difference between a performance goal and current performance. Relying on Cyert and March (1963), Meier et al. (2015) propose that performance gaps can be assessed either via

historical aspirations (comparing to oneself over time) or social aspirations (comparing to others).[4] Specifically, historical aspirations indicate how an organization's current performance (P_t) is different from its own historical base (P_{t-1}). Social aspirations reflect a gap between the organization's own performance (P_t) and how other organizations are performing (P_t^*). Simply:

$$\text{Historical performance gap} = P_t - P_{t-1}$$

$$\text{Social performance gap} = P_t - P_t^*$$

Gender differences might arise from selecting one criterion or the other. Scholars suggest that women are more attuned to historical aspirations, that is, what the organization is doing relative to its past performance. Research finds that women use a more participatory and consultative managerial style compared to their male counterparts (Eagly et al. 1992), which places a priority on what the organization is doing and internal operations. Specifically, participative management directly relates to incorporating feedback and opinions from internal actors, thereby leading female managers to prioritize internal performance indicators. In a similar vein, Envick and Lanford (1998) show that female entrepreneurs are more likely to engage in internal activities (e.g., internal communication, human resource management, controlling and monitoring employee performance) than their male counterparts. This finding indicates that women focus on the effectiveness of internal operations while men are more likely to focus on external factors such as market competition (Lim and Envick 2011).

Scholars also argue that male managers exhibit a higher degree of risk-taking, competitiveness, and growth-orientation than female managers, which encourages them to be more innovative based on their performance relative to others (Eckel et al. 2021; Sexton and Bowman-Upton 1990). Female managers, in contrast, tend to place less value on money and

growth in the market because they view success as having control over their organizations (Cromie 1987). These arguments suggest that women will be more attuned to historical aspirations. In contrast, the greater networking activities by men and their orientation concerning competitive aggressiveness suggest that male managers could be more focused on social aspirations. This logic results in the following hypotheses:

> Hypothesis 1a. Female managers are more likely to adopt managerial innovation based on historical performance gaps.
>
> Hypothesis 2a. Male managers are more likely to adopt managerial innovation based on social performance gaps.

Performance gaps can be either positive ("exceeding the performance target") or negative ("falling short of the performance target"); a larger negative performance gap encourages managers to take larger risks and adopt more innovative strategies (Meier et al. 2015, 1231). This hypothesis is consistent with the view of 'problem-oriented innovations,' which suggests that failure often induces searches and innovations (Cyert and March 1963; March and Shapira 1987). This idea of necessity-driven innovation can be contrasted with the situation where performance exceeds expectations. March and Shapira (1987), for example, develop a relative risk preference model based on the notion that risk-taking is a function of performance relative to the manager's goals. When the organization exceeds expectations, managers are under no pressure to adopt innovation, but they are also likely to have both more resources and less day-to-day pressure. Under such situations, even a risk-averse manager might decide that it was the perfect time to seek out new ways of doing things simply because there were no immediate performance pressures.[5]

If we combine the performance gap theory with previous works on gender and risk-taking, which indicate that men are more risk-seeking than women (Byrnes, Miller, Schafer

1999), some additional hypotheses are possible. Clearly, adopting innovations when the organization is exceeding its targets is less risky than innovating when the organization falls short of its goals. In the former case, a bad decision does not risk the failure of the organization or the manager's career. The relative risk of the two options, as a result, suggests that female managers are more likely to adopt innovations when their organizations exceed their goals. By contrast, male managers are more likely to respond to problem-oriented innovations based on their risk-taking tendency. Put differently, male managers are more likely to adopt innovations when performance falls short.[6]

> Hypothesis 1b. Female managers are more likely to adopt managerial innovation when they exceed their objectives based on historical aspirations.
>
> Hypothesis 2b. Male managers are more likely to adopt managerial innovation when they fail to meet their objectives based on social aspirations.

Empirical Setting: US Nursing Homes

This study examines how female and male managers adopt innovations differently in response to performance information. US nursing homes provide a good empirical context to address this research question. First, to study gender differences in management, one needs a policy area where female executives are relatively common. Unlike other industries where men dominate managerial positions, US nursing homes have more than 40% female executives and 80% female workers on average (U.S. Bureau of Labor Statistics 2016).

Second, innovation in nursing homes has been the key to promoting quality long-term care. As the demand for long-term care increased due to longer average life-spans, federal and state governments have demanded that nursing home managers find new ideas, approaches, and practices to ensure high-quality services with limited public funds (Amirkhanyan et al. 2017). Additionally, recent advanced technologies allow managers to

adopt new practices, such as telemonitoring, bed sensors, virtual pets, and life care systems with community collaboration (Morely 2012).

Third, the Centers for Medicare and Medicaid Services (CMS) report a standardized quality indicator, the five-star quality rating, for each nursing home that is easy for managers and consumers to compare (CMS 2018). The CMS issues warnings and even terminates low-performing nursing homes (withdraws federal reimbursements) based on the quality rating. Nursing home administrators, therefore, have strong incentives to pay attention to whether their quality rating is satisfactory or not. They also need to take strategic action, especially based on changes in their ratings, because the performance gaps relative to past years or as compared to other facilities can affect their financial viability.

Data and Methods

To address our research questions, we employ three different datasets: (1) the 2013 National Nursing Home Administrator Survey (NHAS) conducted by researchers at Texas A&M University, (2) the 2011-2013 Nursing Home Compare (NHC) data by CMS, and (3) the 2009-2013 American Community Survey (ACS) (5-year estimates) by the Census Bureau. The Texas A&M University's Nursing Home Administrator Survey (Compton, Calderon and Meier 2013) asks nursing home administrators about their managerial decisions, including innovation adoption. This survey also provides information on administrators' characteristics—such as gender, race/ethnicity, educational attainment, and years as a nursing home administrator. The survey is based on a stratified random sample from each sector—1,000 for-profit, 1,000 nonprofit, and all 903 public nursing homes—to generate a representative sample by sector. The sample is based on a three-wave survey (an initial survey with two additional reminders) from January 2013 to May 2013, both online and by mail, to ensure satisfactory response rates from nursing home administrators. A total of 725

nursing home administrators responded (24.97 % response rate).[7] The final sample includes 540 nursing homes due to the missing observations in key variables.

We use NHC five-star ratings for 2012 and 2013 to measure historical and social performance gaps.[8] This standardized star-rating quality index is based on three domains—(1) health inspections (number of deficiencies), (2) staffing (staffing hours per resident day), and (3) quality rating (residents' clinical outcomes). Based on these three domains, the overall rating is assigned to each nursing home from 1 star (the poorest quality) to 5 stars (the best quality). We merge 2011, 2012, and 2013 NHC data to include organizational characteristics, including the number of beds, ownership, and funding sources. To control for environmental factors, we use the 2009-2013 American Community Survey (ACS) five-year estimates and collect information about population characteristics at the county level. OLS regression models are used to test our hypotheses.

Measures

Managerial innovation adoption. Our dependent variable is managerial innovation adoption—whether a manager adopts new ideas, practices, opportunities, or technologies in her or his management (Andrews et al. 2012). We measure managerial innovation adoption by using three Nursing Home Administrator Survey questions, asking about the administrator's perspective on (1) adopting new technologies and practices, (2) searching for new opportunities to provide services, and (3) adopting new ideas and practices. The questions have a four-point scale: 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). We use factor analysis to extract commonalities among the three responses. All items load onto a single factor with an eigenvalue of 2.23 and a Cronbach's alpha of 0.82 (see Table 1).

<< Table 1 here >>

Manager's gender. Our key independent variable is the gender of the nursing home administrator. We have a fairly balanced sample in terms of gender: 301 female (55.7%) and 239 male (44.3%) administrators. A manager's gender is coded as female = 1 and male = 0.

Performance information. Following the framework proposed by Meier et al. (2015), we measure two performance information indicators—the historical and the social performance gap—using the five-star quality rating. Since our dependent variable, innovation adoption, comes from the nursing home survey completed in May 2013, we use five-star rating results in January 2013 to capture the current performance of nursing homes. To measure prior performance, we use the five-star ratings in 2012 prior to that of the 2013 survey. Although five-star rating systems are not set up for an annual decision cycle in the nursing home context, we will use the term "year gap" for simplicity's sake.[9] The historical gap is measured by subtracting a nursing home's five-star rating in the past year from the current five-star rating ($\text{star rating}_{2013} - \text{star rating}_{2012}$). A positive value in the historical gap indicates that a nursing home performed better than the previous year, and a negative value means a drop in performance. Histograms of the historical gap (both for our sample and population) are shown in Figure 1. Our historical gap measure shows a relatively normal distribution; the shape of the distribution of our sample is very similar to that of the population.

We measure the social gap by calculating the performance gap between a nursing home's five-star rating and the average rating of other nursing homes in the same county ($\text{star rating}_{2013} - \text{average star rating}^{*}_{2013}$). If a nursing home outperforms other nursing homes in a county, its value of the social gap would be positive; if it underperforms, the value would be negative. The value of 0 in the social gap indicates either a nursing home's rating is

the same as county-average, or there is only one nursing home in a county. Our social gap measure shows a relatively high peak at 0, suggesting that many nursing homes have average performance, and this pattern appears in both the sample and population (Figure 2).[10]

<< Figures 1 and 2 here >>

Control variables. We control for individual manager characteristics that are known determinants of adopting innovation, such as management experience (years as a nursing home manager in that facility), race/ethnicity (minority = 1, otherwise = 0), and education levels (Master, Ph.D., and Other). We also consider organizational factors that may be related to slack resources for adopting innovation. All models control for legal ownership (public, nonprofit, and for-profit), the percentage of Medicaid and Medicare patients (indicating government funding), and the size of facilities (the logged number of certified beds). As for environmental factors, we measure market competition using the Herfindahl index—the sum of the squared market shares (measured in number of beds) for all nursing homes within a county (Amirkhanyan 2006). For easier interpretation, we reverse the index so that a higher value means more competition in the market. To capture demographic factors in a county, we control for the percentage of elderly population (ages 65 and older), the percentage of population below the poverty line, the percentage of white population, and population density (per sq. mile). Descriptive statistics and coding schemes for all the variables are shown in Table A1 in the Appendix.

Findings

We analyze multiple models to investigate gender differences in innovation adoption and whether performance information influences the impact of gender on innovation adoption. First, we test how a manager's gender and performance information affect

managerial innovation adoption in a linear manner (Table 2), and then analyze whether the effect of gender on managerial innovation adoption is moderated by performance information (Table 3). Model (1) in Table 2 shows that all other things being equal, female nursing home managers score higher on managerial innovation than their male counterparts; and this result is statistically significant and consistent across all models. Model (2) shows that the historical performance gap is positively and significantly related to innovation adoption, suggesting that progress in performance over the years is likely to encourage managers to adopt innovation. Similarly, model (3) indicates that the social performance gap is positively and significantly associated with managerial innovation adoption. This result shows that managers are more likely to adopt managerial innovation when they perform better than other competing nursing homes in a county. Both findings in models (2) and (3), in short, suggest that managers respond to performance information but only do so when they are performing well. Next, we include both historical and social gaps for the case that managers consider both historical and social gaps simultaneously. In model (4), both historical and social gaps are positively associated with innovation adoption but no longer significant statistically due to the collinearity between historical and social gaps ($r=0.32$, $p<0.000$).

<< Table 2 here >>

In reference to the main question of this study, we specifically examine whether female managers react to performance gaps differently than their male counterparts when deciding whether or not to adopt innovation. Table 3 includes interaction terms between gender and performance information to answer this question. Our first hypothesis expects that female managers are more likely to consider their performance history when they decide to adopt managerial innovation. In model (1) in Table 3, the interaction term between female

managers and the historical gap is statistically significant, suggesting female managers are more likely to respond to a historical performance gap (hypothesis 1a supported). Furthermore, the sign of the interaction term is positive, indicating that female managers are more likely to adopt managerial innovation when their current performance is better than the previous performance (hypothesis 1b supported). While these findings support our expectations about the relationships between female managers and the historical gap, we do not find evidence that supports the hypotheses regarding male managers and social gaps. Specifically, the interaction term between gender and the social gap is not significant, suggesting that there are no significant gender differences in responding to social performance gaps (hypotheses 2a and 2b rejected).

We include both performance gaps and their interactions with gender in the same model because managers could analyze their performance based on both historical and social reference points (Greve 1998). By doing so, we test how female managers react to one performance gap while holding the effect of other performance gaps constant. Model (3) in Table 3 shows that the positive and significant interaction effect between female managers and the historical gap remains the same in the full model.[11]

<< Table 3 here >>

To interpret the results more intuitively, we visualize the marginal effect of gender in the full interaction model by the types of performance information. The marginal effects of female managers need to be interpreted relative to their male counterparts. The first plot in Figure 3 shows that female managers have a significantly different pattern from their male counterparts when adopting managerial innovation only when their historical gaps are positive (historical gap > 0). This means that female managers are more likely to adopt

managerial innovation when their current performance exceeds their previous performance but otherwise act similar to male managers. The second plot in Figure 3, however, confirms that there is no significant gender difference in responding to social gaps.[12]

<< Figure 3 here >>

Discussion and Conclusion

Despite the significant attention to gender differences in the public management literature, the role of a manager's gender and the conditions that affect when female (or male) managers are more likely to adopt innovations have gone essentially unexplored until recently. To address this gap, this article investigates how performance information shapes gender differences in managerial innovation adoption. Evidence from US nursing homes shows that gender matters in innovation adoption in two ways. First, female managers are more likely to adopt managerial innovation in general. Second, female managers are more sensitive to historical performance gaps than their male counterparts when they adopt innovation. This finding implies that female managers heed internal voices (prioritizing what staff and residents need) and care about internal performance (paying attention to whether their performance is satisfactory compared to the past year). The leadership literature also contends that female managers are more participative and more likely to engage in transformational leadership (Eagly et al. 1992; Hooijberg and DiTomaso 1996), which could also contribute to these relationships.

The results of this study may reflect the different career pathways of female and male nursing home administrators, which might have influenced their reactions to performance information. The nursing home industry focuses on providing care to psychologically and/or physically dependent residents. Recently, female registered nurses (RNs) or licensed practical

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nurses (LPNs) with extensive experience in nursing homes have had a higher probability of becoming nursing home administrators, whereas male administrators who occupied that position for decades had backgrounds in business, healthcare management, or healthcare administration (Singh 2002). Female administrators with a career pathway of practicing long-term care starting at the street-level may develop a more comprehensive understanding of their facility and residents, and therefore consider internal performance more than competitiveness in a market.

Another possible reason for gender differences is that elder care is a female-dominated industry. About 80% of workers in nursing homes are women (U.S. Bureau of Labor Statistics 2016), and the resident ratio of women to men residents was about 10:1 in 2017 (Anderson 2017). This female-dominated environment may motivate female managers to concern themselves more with internal opinion and be more sensitive to historical performance changes. Moreover, this industry characteristic may induce female managers to search for new ideas and practices from internal opinion. Further analysis shows that female managers are more likely to adopt managerial innovation related to new services and practices compared to their male counterparts (see Appendix A2); there are no differences in innovation adoption regarding new technologies. This finding supports the contention that, in a female-dominated industry like nursing homes, female managers may be more likely to adopt innovations because new ideas and new services are much more likely than new technologies to originate from inside the organization.

Contrary to expectations, male managers are not more likely to adopt managerial innovation in response to social performance gaps, perhaps reflecting the structure of the elderly healthcare market. In contrast to customers in other service areas, nursing home

residents tend to stay for a long period, sometimes years, and thus are less likely to shop for facilities or to move from one to another (Shi and Singh 2014). Furthermore, most nursing home residents choose a facility in their local community to stay near their family members and friends, thus limiting consumer choice.[13] The relatively static relationship between providers and consumers and the low presence of rivalry in the market may reduce men's innovation adoption based on competition in the market, thereby leading to non-significant gender differences in reactions to social gaps.

The nursing home quality assessment system, based on a bottom-line indicator, may also contribute to blurring gender differences in responding to social performance gaps. Nursing homes offer complex services, high levels of staffing, and diverse resident conditions, including bladder incontinence, depression, and Alzheimer's type dementia (Amirkhayan 2006; Sanofi-Aventis 2012). Due to these unique characteristics, the quality of nursing homes is less quantifiable and comparable across facilities for a specific individual seeking elder care services. Although CMS launched Nursing Home Compare using a five-star quality rating system to overcome the challenges, licensure and certification requirements and measurements focused on the bottom line may still not be sufficient to catch the dynamics of how competitiveness relates to innovation adoption.[14]

Bridging the gender and the performance management literatures, this study makes theoretical contributions to both. First, the analysis illustrates the theoretical utility of linking organizational performance to managerial decision making (Cyert and March 1963; Meier et al. 2015). If management is purposive behavior as theory suggests, then understanding why managers act as they do is important. Given the link to past performance, this study implies that the increasing emphasis on performance information is likely to create a feedback loop

from performance to management (see Cheon and An 2017).

Second, our study provides implications for our understanding of managerial strategies. Although neither a strategy of focusing on historical or a strategy of focusing on social aspirations is inherently superior in all cases, our findings suggest that the choice of whether to respond historically (internally) or socially (externally) can be influenced by a manager's gender. The advantage of an internal focus is that managers will know how innovations fit with the organization and the organization's present level of performance. Such a correspondence implies that innovations will be more easily accepted by the members of the organization and be implemented more faithfully. An external social focus, on the other hand, informs managers about their competitors in the market and makes them focus on their own competitive advantages and disadvantages. It requires managers to think in comparative terms and pay greater attention to the external environment. To the degree such innovations are successful, organizational survival would be enhanced.

Third, within the gender and management literature, this research illustrates how the various gender differences that have been documented also extend to major organizational strategies such as prospecting versus defending (Miles and Snow 1978) and their tie to innovations. The logic of an internal focus on the organization, including responding to historical aspirations, suggests that female nursing home managers combine elements of defending (a focus on what the organization does well) to use as a base of targeted innovations (prospecting with an emphasis on process and service delivery opportunities but not technology). The patterns for innovation adoption in this case appear to fit existing gendered patterns of managerial behavior and imply that some of these patterns could be functional for the organization.

Commented [KSJ9]: But you didn't ask questions on prospecting v. defending, did you?
Correct. There are no questions on defending in this study, but the focus on historical comparisons means examining what you are doing well relative to your past performance which is an essential element of defending as opposed to prospecting where the search is for new ways to do things. We could reword this to avoid the word defending, but think the current statement is justified. Alternative wording: The logic of an internal focus on the organization, including responding to historical aspirations, suggests that female nursing home managers focus on what the organization does well to use as a base of targeted innovations (prospecting with an emphasis on process and service delivery opportunities but not technology).

In addition to the theoretical contributions, this article also offers practical implications. In healthcare areas where female staff and residents dominate, female managers appear sensitive to how their organizations are doing relative to past performance. They likely seek internal support, trust, and slack resources before taking innovation initiatives. Furthermore, the findings provide useful perspectives on the quality assessment in nursing homes. CMS has focused on penalizing nursing homes that score far below others in performance. Due to the difficulty of assessing the quality of nursing homes, CMS set up some 180 regulatory guidelines, monitoring whether a nursing home violates these regulatory requirements. The deficiency measures, however, do not appear to incentivize male managers to take risks and pursue competitiveness in a market because only the lowest-performing nursing homes are at risk of closure. Yet, this assessment system may inform female managers to focus internally on the continued improvement of the organization. A historical focus in the current assessment system can be a reasonable strategy for managers to build a top-quality organization.

The present study is not without limitations, which suggests directions for future research. First, we measure the social performance gap at the county level. Although this measure has face validity, it is not a perfect measure. A nursing home located at the edge of a county may compete with other nursing homes in neighboring counties. Residents also tend to choose a nursing home within their community, which may not coincide with county boundaries.[15] Furthermore, not all nursing homes deliver the same services at the same level of quality. Future studies could develop better social gap measures by considering the actual competitiveness of nursing homes in a market.

Second, the cross-sectional nature of data does not allow us to capture environmental

changes that can influence managers' innovation adoption. Prior research contends that the external environment influences innovation adoption (Burns and Stalker 1961; Tidd 2001); when the policy environment is stable, managers have little motivation to change things, while environmental turbulence may force managers to try new things to survive and adapt to the new environment. New policy initiatives such as Medicaid expansion may motivate managers to adopt greater innovations, and gender could play a key role in the dynamics of innovation adoption. Using panel datasets, future research can develop further explanations of how gender differences determine innovation adoption in response to environmental conditions.

Lastly, the findings for nursing homes may only apply to other organizations with similar characteristics. Long-term care is characterized as a 'low technology, high touch' industry that relies on a high ratio of employees to clients (Amirkhanyan et al. 2017). In many ways, it is a classic street-level bureaucracy with frequent interaction between employees and clients. The industry is also highly regulated and funded in large part by the government. It is female dominated at the service level and has substantial proportions of women managers. To the extent to which the current findings can be generalized, they are likely to apply to similar organizations such as other health care agencies, social services agencies, and educational institutions. Additional research into organizations in different policy areas, however, is needed to determine how general these findings are to the interplay of gender, management, and performance.

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Table 1. Factor-Analytical Results of Innovation Adoption

Survey Item	Factor Loading
Our nursing home is always among the first to adopt new technology and practices.	0.87
We continually search for new opportunities to provide services to our community.	0.80
Our nursing home is always among the first to adopt new ideas and practices.	0.91
Eigenvalue	2.23
Cronbach's alpha	0.82

Table 2. The Impact of Performance Gaps and Gender on Innovation Adoption

DV = Innovation adoption								
	Model (1)		Model (2)		Model (3)		Model (4)	
	Basic model		Historical gap		Social gap		Joint model	
Manager gender (female=1; male=0)	0.216*	(0.086)	0.204*	(0.088)	0.207*	(0.087)	0.201*	(0.088)
Historical gap			0.082*	(0.041)			0.059	(0.044)
Social gap					0.090*	(0.045)	0.067	(0.049)
Management experience	0.016**	(0.006)	0.016**	(0.006)	0.015**	(0.006)	0.016**	(0.001)
Minority (yes=1; no=0)	-0.169	(0.169)	-0.143	(0.172)	-0.193	(0.170)	-0.161	(0.172)
Highest Degree: Master	-0.062	(0.091)	-0.053	(0.093)	-0.054	(0.092)	-0.048	(0.092)
Highest Degree: Ph.D.	0.130	(0.456)	0.115	(0.458)	0.171	(0.457)	0.151	(0.458)
Public nursing homes	-0.158	(0.116)	-0.180	(0.118)	-0.181	(0.117)	-0.190	(0.118)
Nonprofit nursing homes	-0.182	(0.115)	-0.179	(0.116)	-0.207+	(0.116)	-0.200+	(0.117)
Residents on Medicaid	-0.004	(0.002)	-0.004	(0.003)	-0.003	(0.003)	-0.004	(0.003)
Residents on Medicare	0.005	(0.004)	0.005	(0.004)	0.005	(0.004)	0.005	(0.004)
Number of certified beds	0.262***	(0.075)	0.280***	(0.077)	0.289***	(0.077)	0.297**	(0.078)
Market competition	-0.090	(0.171)	-0.127	(0.178)	-0.115	(0.173)	-0.137	(0.178)
Elderly population	0.000	(0.012)	0.001	(0.013)	0.002	(0.013)	0.002	(0.012)
Population in poverty	0.013	(0.010)	0.014	(0.010)	0.013	(0.010)	0.013	(0.010)
White population	0.007+	(0.004)	0.007+	(0.004)	0.007+	(0.004)	0.007+	(0.004)
Population density	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Constant	-1.776**	(0.550)	-1.867***	(0.560)	-1.944***	(0.561)	0.201*	(0.056)
Overall R^2	0.079		0.082		0.083		0.085	
N	540		528		534		528	

Notes. Standard errors in parentheses. Two-tailed test, + p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table 3. The Interaction Impact of Performance Gaps and Gender on Innovation Adoption

DV = Innovation adoption						
	Model (1)		Model (2)		Model (3)	
	Historical gap		Social gap		Full model	
Manager gender (female=1; male=0)	0.183*	(0.088)	0.202*	(0.088)	0.186*	(0.089)
Historical gap	-0.038	(0.066)			-0.075	(0.071)
Gender × Historical gap	0.194*	(0.084)			0.217*	(0.091)
Social gap			0.073	(0.066)	0.101	(0.070)
Gender × Social gap			0.031	(0.086)	-0.058	(0.093)
Management experience	0.016**	(0.006)	0.015**	(0.006)	0.015**	(0.006)
Minority (yes=1; no=0)	-0.156	(0.171)	-0.191	(0.170)	-0.182	(0.172)
Highest Degree: Master	-0.062	(0.092)	-0.056	(0.092)	-0.056	(0.092)
Highest Degree: Ph.D.	0.107	(0.456)	0.155	(0.460)	0.171	(0.459)
Public nursing homes	-0.166	(0.118)	-0.178	(0.118)	-0.182	(0.118)
Nonprofit nursing homes	-0.160	(0.116)	-0.206+	(0.116)	-0.182	(0.117)
Residents on Medicaid	-0.004	(0.002)	-0.003	(0.003)	-0.003	(0.003)
Residents on Medicare	0.004	(0.004)	0.005	(0.004)	0.004	(0.004)
Number of certified beds	0.292***	(0.077)	0.291***	(0.078)	0.306***	(0.078)
Market competition	-0.150	(0.177)	-0.116	(0.173)	-0.160	(0.177)
Elderly population	0.000	(0.013)	0.003	(0.013)	0.001	(0.013)
Population in poverty	0.013	(0.010)	0.013	(0.010)	0.013	(0.010)
White population	0.007+	(0.004)	0.007+	(0.004)	0.007+	(0.004)
Population density	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
Constant	-1.886***	(0.558)	-1.949***	(0.562)	-1.991***	(0.563)
Overall R^2	0.091		0.083		0.096	
N	528		534		528	

Notes. Standard errors in parentheses. Two-tailed test, + p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Figure 1. Distribution of Historical Performance Gap

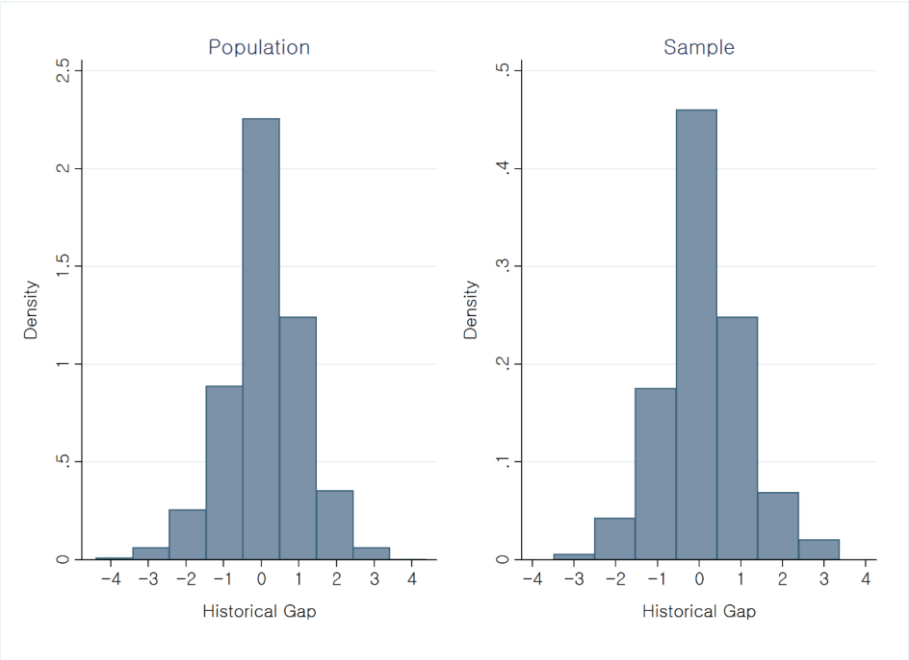


Figure 2. Distribution of Social Performance Gap

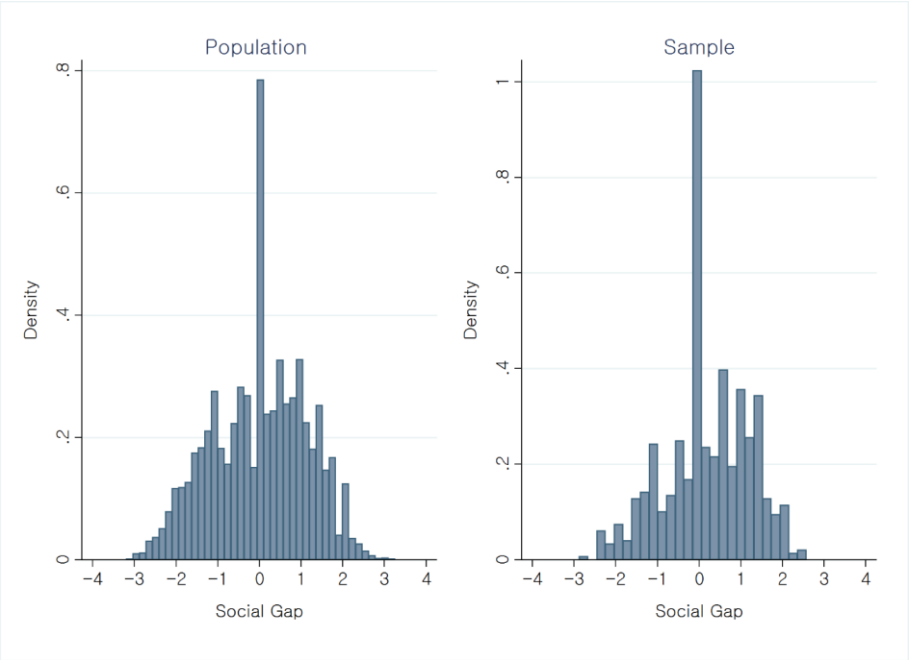
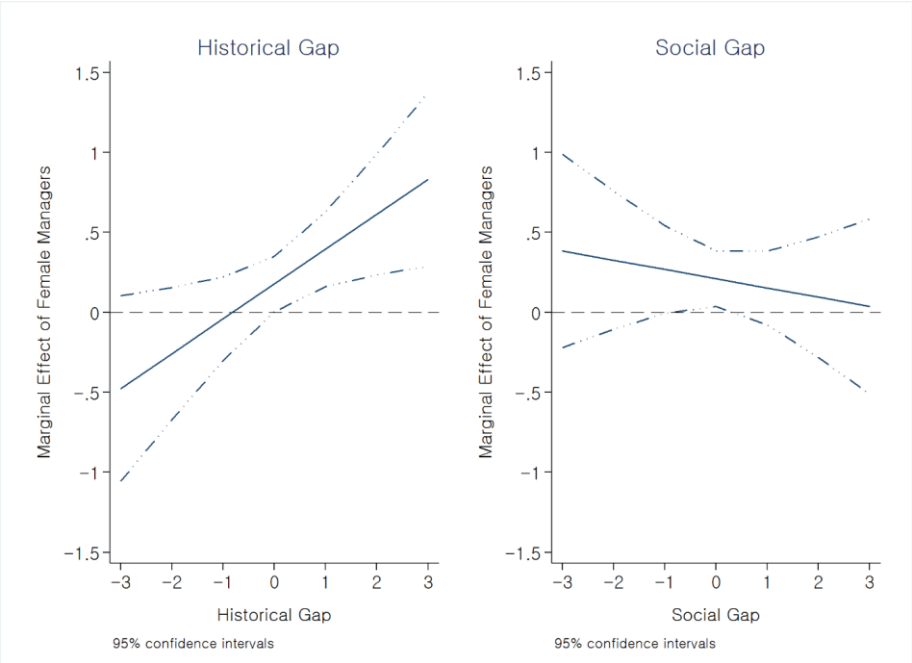


Figure 3. Marginal Effects of Female Managers on Innovation Adoption



Appendix

Table A1. Descriptive Statistics for All Variables

Variables	Mean	S.D.	Min	Max	Source
Dependent variable					
Innovation adoption (factor score)	0.00	1	-2.93	1.87	NHAS
Independent variables					
Gender (female=1; male=0)	0.55	0.49	0	1	NHAS
Historical gap	0.11	1.05	-3	3	NHC
Social gap	0.17	1.00	-2.88	2.35	NHC
Manager-level controls					
Management experience (years)	7.29	7.73	0	38	NHAS
Racial minority (yes=1; no=0)	0.07	0.26	0	1	NHAS
Highest degree: Master (yes=1; no=0)	0.37	0.48	0	1	NHAS
Highest degree: Ph.D. (yes=1; no=0)	0.01	0.06	0	1	NHAS
Organization-level controls					
Public homes (yes=1; no=0)	0.34	0.47	0	1	NHC
Nonprofit homes (yes=1; no=0)	0.36	0.48	0	1	NHC
For-profit homes (yes=1; no=0)	0.29	0.45	0	1	NHC
Residents on Medicaid (%)	58.11	22.70	0	100	NHAS
Residents on Medicare (%)	12.38	15.00	0	100	NHAS
Number of certified beds (logged)	4.45	0.63	2.19	6.58	NHC
County-level controls					
Market competition	0.71	0.29	0	1.00	ACS
Elderly population (%)	15.48	4.12	6.69	35.29	ACS
Population in poverty (%)	14.71	5.02	3.61	37.38	ACS
White population (%)	82.50	15.67	17.72	99.39	ACS
Population density (per sq. mile)	821.92	2885.50	0.37	35864.73	ACS

Notes. Based on a sample of 540 observations used in the analysis. Factor scores are used to measure innovation adoption. Racial categories include 1) White, 2) Caucasian, 3) Black or African American, 4) American Indian or Alaska Native, 5) Asian, 6) Native Hawaiian or other Pacific Islander, 7) Hispanic or Latino, 8) Others, and 9) Biracial/Multiracial. We consider White and Caucasian as racial majority (coded as 0) and other groups as racial minority (coded as 1).

Table A2. The Impact Manager Gender on Innovation Adoption

	Model (1)		Model (2)		Model (3)	
DVs	New technology and practices		New opportunities for services		New ideas and practices	
Manager gender (female=1; male=0)	0.209	(0.166)	0.484**	(0.190)	0.412*	(0.169)
Management experience	0.037**	(0.011)	0.009	(0.012)	0.035**	(0.013)
Minority (yes=1; no=0)	-0.616+	(0.328)	-0.055	(0.309)	-0.416	(0.349)
Highest Degree: Master	0.015	(0.176)	-0.203	(0.198)	-0.100	(0.186)
Highest Degree: Ph.D.	-0.419	(0.967)	0.161	(1.144)	0.869	(1.068)
Public nursing homes	-0.094	(0.224)	-0.466*	(0.218)	-0.302	(0.228)
Nonprofit nursing homes	-0.285	(0.222)	-0.248	(0.244)	-0.365	(0.231)
Residents on Medicaid	-0.008+	(0.005)	-0.003	(0.005)	-0.008+	(0.004)
Residents on Medicare	0.006	(0.007)	0.014*	(0.007)	0.007	(0.006)
Number of certified beds	0.515***	(0.146)	0.410**	(0.154)	0.433**	(0.141)
Market competition	-0.287	(0.335)	-0.506	(0.341)	0.203	(0.360)
Elderly population	-0.015	(0.024)	0.017	(0.027)	0.001	(0.024)
Population in poverty	0.014	(0.019)	0.031	(0.022)	0.023	(0.020)
White population	0.011	(0.007)	0.008	(0.007)	0.010	(0.007)
Population density	-0.000	(0.000)	-0.000	(0.000)	-0.000	(0.000)
χ^2	40.019		35.448		40.321	
Prob $> \chi^2$	0.000		0.002		0.000	
N	540		540		540	

Notes. Ordered logit analysis is used. Standard errors in parentheses. Two-tailed test, + p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

[1] Specifically, studies suggest that a manager's age and tenure are negatively associated with innovation because older and experienced managers have been socialized into accepting institutionalized managerial practices and organizational routines (Hambrick and Mason 1984; Huber et al. 1993). Education, in contrast, is widely known to enhance the adoption of innovation (Damanpour and Schneider 2006). Highly educated managers have more knowledge and expertise, which inspires them to accept new ideas and changes. Young et al. (2001), for example, find that younger and more educated managers in hospitals are more likely to adopt an innovative strategy such as Total Quality Management (TQM).

[2] This view reflects the traditional view on gender differences in managerial styles. The early literature describes the typical features of men's managerial style as "'directive,' 'self-centered,' 'self-interested,' 'decisive,' 'aggressive,' and 'task- oriented'" while adjectives used to describe women's styles include "'participative,' 'collaborative,' 'co-operative,' 'coaching style,' 'people-oriented,' and 'caring'" (Wajcman 1996, 342).

[3] These studies demonstrate gender differences in the self-perceptions of innovation rather than differences in actual innovation outcomes. Although perceptual judgments of innovation do not perfectly predict innovative

behaviors, we expect that these two are positively related.

[4] Historical and social performance gaps not only influence managers' decision-making but also shape citizens' assessments of performance (see Olsen 2017).

[5] Using a relative risk model, Nicholson-Crotty, Nicholson-Crotty, and Fernandez (2016) test the quadratic U-shaped relationship between performance and innovation. They theorize that public managers will be less risk averse and more innovative when they think their organizations either fall short of or exceed performance. Their results support this theoretical argument.

[6] Nählinder (2010) also argues that women and men pursue innovation for different reasons, and cultural expectations of how a woman is supposed to act creates more pressure for women not to pursue new ideas even in women-dominated occupations.

[7] This sample is representative of the population of nursing homes in terms of both key variables and control variables. The sample also has a similar distribution to the population in terms of performance indicators.

[8] The star ratings make a comprehensive performance measure because they incorporate a wide range of nursing home quality indicators, including health deficiencies, staffing, and healthcare quality. Furthermore, the star ratings cover longer time spans of performance, compared to other performance indicators. The star ratings reported each year are constructed using three years of cumulative performance of health deficiencies, which means that star ratings in 2013 actually reflect the 3-year estimated performance from year 2011 to 2013. This measurement method helps us to capture more comprehensive historical and social gaps.

[9] The star ratings are constructed using three performance dimensions – health deficiencies, staffing, and quality ratings – which have different reporting time periods given the year. Particularly, health deficiencies in star ratings are constructed using recent three years of health deficiency reports and revisits. In calculating the total weighted score of health deficiencies, the most recent survey is weighted more heavily than earlier surveys; the weighting factor assigned to each survey cycle are 1/2 (most recent year), 1/3 (the previous year), and 1/6 (the second prior year), respectively. Given this weighting method, our historical performance gap between 2012 and 2013 star ratings actually reflects the 3-year estimates health deficiencies of 2010-2012 and 2011-2013 as a part of the star ratings. For more about the five-star quality rating system, see CMS (2018).

[10] We use the county as a reference unit for the social gap because elderly healthcare is long-term care in community-based settings. According to the National Council for Aging Care (2017), proximity to family is one of the most important factors when selecting a nursing home (see also Reinardy and Kane 1999). Research also often defines a county as a geographic market for elderly healthcare (Amirkhanyan et al. 2017; Bowblis 2012).

[11] Additionally, we conduct several diagnostic tests to check whether our models meet the assumptions of regression. Even the most elaborate model (with interactions between gender and performance gaps) meets all regression assumptions. Breusch-Pagan test results show that the null hypothesis of homoskedasticity is not rejected (χ^2= 0.105, p-value = 0.746). Ramsey's regression specification error test shows that the model has an appropriate functional form (F = 1.737, p-value = 0.158). Tests show our model is correctly specified (linktest t = 0.735, p-value = 0.463). There are no influential observations (Cook's distance), and residuals are also normally distributed (Shapiro-Wilk normality test). Overall multicollinearity is modest with a mean VIF of 1.73.

[12] For the robustness checks, we conduct additional analyses. First, there are cases where only one nursing home exists in a county, and in this case, the value of our social gap will be 0. To test whether the monopoly market structure influences our results, we exclude monopoly nursing homes from our analyses. The results remain the same. Second, we account for state variation by adding state-fixed effects and estimate models using standard errors clustered at the county level. The results are also similar to those reported here.

[13] The guide to choosing a nursing home published by CMS indicates that the first step in choosing a facility is finding one in your area (CMS 2017). Nursing Home Compare also guides potential residents to choose a facility based on their zip code, and allows them to expand the searching area from 1 mile to 200 miles.

[14] For instance, health inspection, the main quality measure in the five-star quality rating, is measured based on the number, scope and severity of facility deficiencies identified by state investigators. The nursing homes with high deficiencies are required to have revisits to ensure their compliance with the regulations. The number of deficiencies and revisits are key to determine nursing home closures; therefore, only lower-performing nursing homes at the bottom may react to the change in ratings, seeing it as a threat to their market survival.

[15] Recognizing that performance gaps across nursing homes in a county might not be very high, we also considered a larger unit when calculating social performance gaps. We used both metropolitan areas and states, but the main results are not significantly different from that of the county-level social gap results.