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Does negative feedback on financial performance affect managerial turnover?

Jinhai Yu[a] and Xin Chen[b]

[a]School of Public Policy, University of Connecticut, Hartford, CT, USA; [b]Center for Chinese Public Administration Research, School of Government, Sun Yat-Sen University, Guangzhou, China

ABSTRACT

Public organizations hold managers accountable for performance, but its impact on managerial outcomes is less understood. We examine how negative financial feedback affects managerial turnover. We revisit a contingency model by adapting the resource dependency theory, predicting that negative performance feedback increases managerial turnover, conditional on organizational resource dependency and managerial coping ability. We test the model using data from Texas school districts and employ a regression discontinuity design based on close scores that determine performance ratings. Receiving a lower rating increases superintendent turnover, with stronger effects in districts more fiscally dependent on the state and with lower-paid superintendents.

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KEYWORDS Performance feedback; financial performance; managerial turnover; resource dependency; regression discontinuity design

Governments have adopted various performance-based accountability systems to provide performance feedback on public organizations to decision-makers and the public, aiming to improve performance and accountability (e.g. Han 2020; J. Kim 2022; Moynihan and Ingraham 2003). The performance feedback takes such forms as performance scores or performance ratings, which have targeted student academic performance (e.g. Kogan, Lavertu, and Peskowitz 2016a; Mitani 2018), the fiscal condition of school districts (Thompson 2019), and public service performance (Hong 2019). While scholars have examined the impact of performance feedback on organizational performance improvements (e.g. Hong 2019, 2020; van der Voet 2023), only some have attended to its effects on managerial outcomes. One rationale of the performance-based accountability systems is that public managers should be held accountable for poor organizational performance, often by resigning or being dismissed (Boyne et al. 2010a, 2010b; Hood 1991). However, empirical evidence is thin on whether organizational performance feedback causes managerial turnover.

CONTACT Xin Chen xinchen1910@gmail.com

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Further, while scholars have focused on clients and outcomes as crucial facets of organizational performance (e.g. Boyne et al. 2010a; Petrovsky et al. 2017), less attention has been paid to financial management performance. Managing financial resources is a critical dimension of public management and contributes to organizational performance (Kioko et al. 2011; Park, Kim, and Chen 2022). Yet, it remains to be seen how financial management performance drives such managerial outcomes as turnover. This study examines the impact of negative financial performance feedback on managerial turnover.

Using resource dependency theory as a theoretical lens, we revisit a contingency model of how negative performance feedback affects managerial turnover. The resource dependency theory has been used to explain executive succession in private firms (Pfeffer and Salancik 2003). In our case, it sheds light on the resource dependency between organizations that set performance-based rating systems and those subject to performance ratings. Managerial turnover of organizations receiving performance feedback is considered a strategic response to manage environmental dependencies. The theory predicts a positive impact of negative financial performance feedback on managerial turnover as a step to realign with the organizational environment, of which the organizations sending the performance feedback are a primary part. Further, it predicts that the impact can vary by how much the organization relies on external resources and how well the manager can cope with the negative feedback.

To test the contingency model, we use data from the Financial Integrity Rating System of Texas (FIRST) to estimate the impact of receiving lower performance ratings on the turnover of school district superintendents. Superintendents have been widely recognized as top public managers who run school districts (e.g. Huang and Ryom Villadsen 2023). Since 2003, the FIRST system has assigned numerical scores to the financial management performance of school districts, generating four ratings of A, B, C, and F. One unique feature of the FIRST system is that the ratings cover not only conventional measurements of financial condition but also the financial management actions taken by school districts. The performance ratings are designed to hold school districts accountable for their financial management performance and are made public yearly. We conduct a regression discontinuity (RD) analysis of the causal impact of receiving a lower performance rating on the turnover of school district superintendents. We find empirical support for the model.

We seek to make several contributions. First, we adapt the resource dependency theory, particularly its explanation of firm executive succession, to explain the impact of negative performance feedback on managerial turnover under performance-based accountability systems. We propose a contingency model focusing on negative financial performance feedback as an organizational environmental contingency and its effects on managerial turnover under varying coping abilities and fiscal resource dependency. Thus, we apply the theory to a new setting, generating valuable insights on why and when negative performance feedback can lead to managerial turnover.

Second, we offer empirical evidence on the causal impact of negative feedback on financial management performance on managerial turnover. The extant literature has focused on the impact of organizational performance on managerial turnover and the effect of managerial turnover on organizational performance (e.g. Boyne et al. 2011; Meier and Hicklin 2008), leaving the direction of causality indeterminate. We show that negative financial management

performance causes higher turnover in performance-based accountability systems, independent of the effects of other organizational performance dimensions, such as student academic achievements in the public education sector (Meier and O'Toole 2002).

Finally, our study of the FIRST system adds to the literature by focusing on financial management performance. While extant research has studied various dimensions of organizational performance (Boyne et al. 2010a, 2010b; Petrovsky et al. 2017), financial management performance is generally difficult to measure and receives less attention. The FIRST system provides a rare opportunity to assign numerical scores to financial management actions and thus allows a test of a new dimension of organizational performance. While scholars have focused on such financial condition indicators as surpluses or deficits, much less is known about financial management actions such as auditing, accounting, or financial reporting. Given that it is generally challenging to measure management actions (e.g. Brewer and Selden 2000), our analysis of the FISRT data provides an invaluable test of whether 'public financial management matters' (Kioko et al. 2011).

Previous studies

We examine how negative financial performance feedback affects managerial turnover, with Texas FIRST as an empirical setting. Three strands of literature are relevant to our research: the consequences of organizational performance feedback, the various dimensions of organizational performance and their impact on managerial turnover, and the determinants of superintendent turnover.

First, recent studies have examined organizational performance feedback as a particular type of performance information. Scholars have studied the impact of performance feedback on such outcomes as managerial innovations (Nicholson-Crotty et al. 2017; Salge 2011; Ye and Ni 2016) and performance improvements (e.g. Hong 2019; I. Kim and Ko 2023; Wei et al. 2023), often using experimental or quasi-experimental research designs (Hong 2019; Nickolson-Crotty et al. 2017; van der Voet 2023). Yet, little attention has been paid to the impact of performance feedback on managerial turnover. Moreover, scholars have applied various theoretical frameworks to explain how public managers respond to negative performance information. For example, the behavioural theory of the firm and the resource dependency theory have been used to explain how negative feedback helps improve subsequent organizational performance (Hong 2019; Wei et al. 2023). However, the focus of the resource dependency theory on firm executive succession has yet to be used to explain managerial turnover in response to negative feedback in public organizations.

Second, scholars have studied the impact of fiscal performance and public service performance on managerial turnover. The effect of budgetary performance on managerial turnover is particularly relevant to our study. Research shows mixed effects of fiscal stress on county manager turnover (McCabe et al. 2008; Tekniepe and Stream 2010, 2012). Rich and Zhang (2016) find that reporting accounting errors is positively associated with the turnover of municipal financial managers. Stewart and Diebold (2017) find that non-profit financial performance positively correlates with executive turnover. These studies focus on public organizations' financial condition, typically measured as the fiscal surplus or deficit.

Further, scholars have examined the impact of public service performance on the turnover of public managers. Boyne et al. (2010a) show that low organizational performance is associated with high turnover of top public managers, especially in the presence of political party control changes, indicating that the impact of negative performance is not unconditional. Boyne et al. (2010b) find that public service performance negatively affects turnover. Petrovsky et al. (2017) find that organizational performance is associated with a shorter tenure of agency heads. They point out that 'low organizational performance is a reason to not renew an agency head's contract, even in settings with merit protection' (Petrovsky et al. 2017, 3). These studies have used the outputs or outcomes of public organizations to measure performance.

Finally, education scholars have examined the impact of school performance information on local elections, but some studies have treated superintendent turnover as an outcome. Kogan, Lavertu, and Peskowitz (2016b) find no evidence that school report cards affect superintendent tenure. Grissom and Mitani (2016) find nonlinear effects of district academic performance on superintendent turnover. The districts with the lowest and highest student academic performance show lower superintendent turnover. Thompson (2019) finds that superintendents are more likely to lose their jobs when the state of Ohio took over fiscally stressed school districts. These studies focus on student academic or district fiscal performance as policy outputs.

Our study builds upon the extant literature in three ways. First, we focus on the financial management performance of school districts in Texas, a different dimension of organizational performance. While the extant studies have examined financial condition, public service performance, or student academic performance, we examine financial management performance as part of the internal functioning of school districts, as measured under the FIRST system in Texas. Second, we estimate the causal impact of negative financial performance feedback on managerial turnover. In contrast, the extant studies have primarily estimated the correlational relationship between organizational performance and managerial turnover. Finally, we extend the resource dependency theory to explain the effect of negative performance feedback on public sector managerial turnover.

Negative feedback and managerial turnover: toward a contingency model

Why negative feedback matters

In this section, we adapt the resource dependency theory to explain why negative performance feedback affects managerial turnover. The resource dependency theory sheds light on resource dependency and the resultant organizational dynamics between the organizations sending and receiving performance feedback, a common feature of performance-based accountability systems. From this perspective, the resource dependency of the organizations receiving performance feedback on the organization sending it determines whether and how they may respond. More specifically, the theory's focus on executive succession in the private sector can be extended to explain managerial turnover in response to negative performance feedback.

The resource dependency theory considers executive succession a strategic response to the organizational environment to manage resource dependencies (Papenfuß and Schmidt 2022; Pfeffer and Salancik 2003). The organizational environment, consisting

of other organizations, provides a source of uncertainty, constraints, and contingency. The environment influences the distribution of power and control within organizations, which, in turn, affects the selection and replacement of top executives. As Pfeffer and Salancik (2003, 225) put it, 'Environmental contingencies affect the selection and removal of top organizational administrators to make the organization more aligned with its environment'. From this perspective, executive succession is an organizational response to realign with the organizational environment (Hillman, Withers, and Collins 2009). The theory has been widely tested with control of executives by private firms, which shows that firms experiencing poor performance are more likely to replace executives (Boeker 1992; Conyon and Florou 2002; Schwartz and Menon 1985).

The theory offers a powerful lens to understand the impact of negative feedback on organizational performance on managerial turnover. Performance feedback under performance-based accountability systems represents a crucial contingency in the organizational environment (Huang and Ryom Villadsen 2023). Consider the case where a state education agency offers performance feedback to school districts. The school districts rely on state education agencies for fiscal resources and a framework of regulation, among others. The resource dependency theory suggests that school districts have incentives to respond to the performance feedback because of their resource dependency on state agencies. If there were no resource dependency, the school districts receiving the performance feedback may ignore it without negative consequences for their survival.

Further, the resource dependency theory stipulates executive succession as a strategic response to negative performance feedback from the organizational environment. Given its resource dependency, negative feedback indicates an unfavourable contingency an organization must respond to. Managers are crucial in managing environmental contingencies; turnover can help realign the organizations with the external environment. More importantly, as Pfeffer and Salancik (2003) argue, top managers play a symbolic role in organizations and serve as 'scapegoats', rewarded for good performance and dismissed for poor performance (Boeker 1992; Gamson and Scotch 1964). For organizations with poor performance, replacing managers can improve their perceived image or legitimacy to internal and external stakeholders.

In addition, the agency theory provides a different yet complementary perspective on how negative performance feedback influences managerial turnover (Boyne et al. 2010b). The agency theory focuses on the principal-agent relationship between board members and public managers receiving negative feedback. School boards and district superintendents constitute principals and agents, respectively, and their interaction can affect a district's response to negative feedback. As elected officials motivated by electoral concerns, board members can hold public managers accountable for poor organizational performance. The 'organizational leader bias' suggests elected officials can be biased towards attributing blame for poor performance to top managers. Due to incomplete information about leaders' professional traits and abilities, elected officials often resort to a leadership attribution heuristic as a shortcut to assign blame or credit for organizational performance (e.g. Funk et al. 2023; Meindl, Ehrlich, and Dukerich 1985; Nielsen and Moynihan). Consequently, elected officials tend to attribute the responsibility for low performance to public managers, and they may remove public managers to show voters that they disapprove of low organizational performance.

Finally, managerial turnover in responding to negative feedback can be involuntary or voluntary. As Salancik, Staw, and Pondy (1980, 423) summarize, 'When significant organizational problems persist unmanaged, support for the administrator diminishes, and separation is more likely, be it *voluntary* or *mandatory*'. While involuntary turnover can result from such organizational actions as school board decisions, managers may exit voluntarily to disassociate themselves from low organizational performance. Voluntary turnover can be more feasible for public managers with flexible contracts, viable labour market alternatives, or early retirement options (Petrovsky et al. 2017). However, separating voluntary and involuntary turnover in response to negative performance feedback can be difficult. As Boyne et al. (2010b, 263) put it, 'It is often impossible to disentangle such induced departures from voluntary departures, even in the private sector'. One might even question whether an entirely voluntary turnover exists when it is caused by negative performance. In either case, we should observe an increase in managerial turnover in response to negative performance feedback. Therefore, the first hypothesis follows.

H1: Negative performance feedback increases managerial turnover.

Fiscal resource dependency and the performance-turnover link

The resource dependency theory indicates that negative performance feedback may not unconditionally cause managerial turnover. At least two contingency factors are important: resource dependency and coping ability (Pfeffer and Salancik 2003). Organizations tend to pay more attention to a given performance feedback when the resource dependency level is higher. What matters to organizational responses is less about 'objective' performance feedback. Organizations must interpret the performance feedback and evaluate its importance. As Pfeffer and Salancik (2003, 13) argue, 'Organizational environments are not given realities: they are created through a process of attention and interpretation'. Under bounded rationality (Simon 2013), organizations are more likely to attend to negative performance feedback when there is high resource dependency and, thus, a high stake. Conversely, negative performance feedback that fails to threaten resource viability may fall into the 'zone of indifference' (Meier, Favero, and Zhu 2015), leading to minimal organizational responses.

The resource dependency theory suggests that negative performance feedback can have a larger consequence on managerial turnover when the resource dependency level is higher. Consider a 'sender' organization that assigns performance feedback to a 'recipient' organization. A higher resource dependency of the recipient organization on the sender organization indicates that the recipient organization is weaker in the power relationship and vulnerable to potential negative consequences imposed by the sender organization. Recipient organizations are more likely to respond to a given performance feedback signal when they rely more on the sender organizations for critical resources. As Pfeffer and Salancik (2003, 59–60) put it, 'The organization will tend to be influenced more the greater the dependence on the external organization, or, alternatively, the more important the external organization is to the functioning and survival of the organization'. Empirically, Pfeffer and Salancik (1977) find that hospital administrators' tenure correlates with the operating budget condition only for hospitals relying less on donations and more on operating funds. This suggests we

should observe a larger impact of negative performance feedback on managerial turnover as the resource dependency level increases. While resource dependency may take multiple forms, we focus on fiscal resource dependency and test the following hypothesis:

H2 Negative performance feedback increases managerial turnover more when the fiscal resource dependency is high than when the dependency is low.

Coping ability and the performance-turnover link

Another contingency factor for negative performance feedback to affect managerial turnover is managers' coping ability (Pfeffer and Salancik 2003). Coping refers to a person's 'cognitive and behavioral efforts to manage (reduce, minimize, or tolerate) the internal and external demands of the person-environment transaction that is appraised as taxing or exceeding the person's resources' (Folkman et al. 1986, 572). Coping has been used to describe how managers or organizations respond to organizational environmental changes (Pfeffer and Salancik 2003), such as budget cuts (Meier & O'Toole 2009) and natural disasters.

Negative feedback represents an environmental contingency, external demand, or source of uncertainty that managers must cope with (Folkman 1982; Pfeffer and Salancik 2003). One form of coping is rational problem-solving (Folkman 1982; Folkman et al. 1986). For instance, managers may evaluate the performance feedback as new information, meet performance gaps, and improve subsequent organizational performance (Hong 2019; Meier, Favero, and Zhu 2015). Managerial coping ability can be related to personal traits, skills, knowledge, competence, or coping resources (Folkman 1982). Managers may have higher coping ability if they possess more coping resources, such as staff support, political resources, or reputation resources (Meier and O'Toole 2001).

Managers with varying abilities to cope with negative performance feedback can experience different levels of turnover. If managers can successfully address the organizational performance problems indicated by negative feedback, managerial turnover will become less likely. Conversely, failure to cope with organizational problems identified by negative feedback can increase the likelihood of managerial turnover. As Pfeffer and Salancik (2003, 236) put it, 'Visible failure calls into question the competence of those in control, and the administrators become visible and, at times, arbitrary targets'. As a result, 'administrators will tend to be removed when organizational performance is below acceptable levels' (Pfeffer and Salancik 2003, 236). Consequently, we should expect a larger impact of negative performance feedback on managerial turnover when the managerial coping ability is lower. We test the following hypothesis:

H3 Negative performance feedback increases managerial turnover more when the managerial coping ability is low than when the ability is high.

We summarize the theoretical expectations of the impact of negative performance feedback on managerial turnover in Figure 1. Based on the resource dependency theory, negative performance feedback indicates uncertainty, contingency, or constraints from the organizational environment. It can lead to managerial turnover

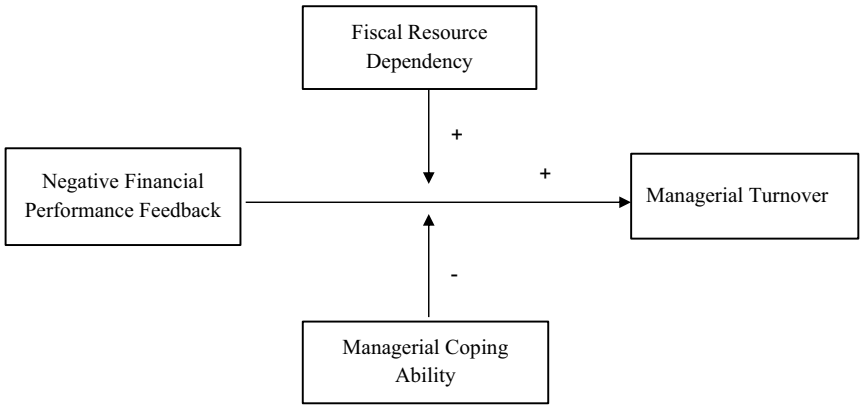

Figure 1. Negative financial performance feedback and managerial turnover: a contingency model. Notes: '+' indicates a positive effect, and '-' indicates a negative effect.

due to organizations realigning their structures and actions with the environmental environment through executive succession. The positive impact of negative feedback on managerial turnover is also consistent with the agency theory in that elected officials attribute blame for low organizational performance to public managers. Two contingency factors moderate the positive effect of negative feedback on managerial turnover. The effect should be larger when fiscal resource dependency is higher. The effect should also be larger when the coping ability of the managers is lower. We consider it a contingency model adapted from the resource dependency theory's perspective on executive succession (Pfeffer and Salancik 2003).

Data and measurements

Data

Our data are taken from the Financial Integrity Rating System of Texas (FIRST), implemented by the Texas Education Agency (TEA) since 2002. The FIRST system assigns ratings to each school district. There are four possible ratings from high to low, including 'A=superior achievement', 'B=above standard achievement', 'C=meets standard achievement', and 'F=substandard achievement'. The lowest rating category, F, means a school district fails to pass the minimum standard. All ratings are based on a district's financial management performance compared against predetermined rating metrics consisting of dozens of indicators. We focus on the period between 2012 and 2020, when a numeric score was used to determine the district ratings.[1] The data from TEA cover school districts' performance scores, performance ratings, the thresholds for each rating, and various district-level characteristics. We code the performance ratings into a categorical variable ranging from 1 to 4, representing the four ratings of F, C, B, and A, respectively.

The FIRST system seeks to ensure that Texas public schools are held accountable for the *quality* of their financial management practices and that they improve these practices. The FIRST system has both a performance

component and an accountability component. On the performance side, the FIRST system is designed to help Texas public schools better manage their financial resources to improve allocational efficiency for direct instructional purposes. On the accountability side, the FIRST system serves as a tool to hold districts accountable by publishing school districts' financial management performance ratings on the Texas Education Agency's (TEA) website.

One unique feature of the FIRST system is that it covers not only traditional financial condition indicators but also performance measures on the management actions of school districts. For example, the FIRST ratings for 2020–2021 cover 5 critical indicators, 9 solvency indicators, and 6 financial competence indicators, with 20 indicators in total. Particularly, the five critical indicators include whether a school district submitted an annual financial report to TEA on time, whether there was an unmodified opinion[2] by auditors on the financial report, whether the districts fulfilled all debt agreements and made timely payments to the Teacher Retirement System, and maintained a positive unrestricted net position balance (TEA 2022).

The ratings are based on audited financial statements and financial data submitted to TEA, designed to assess the quality of the financial management practices, such as fund balance, debt management, and financial stability. The ratings capture both the districts' underlying financial condition and the financial management actions. Superintendents can significantly affect the ratings because of their primary role in the 'management of the financial affairs of the district' (Davidson, Schwanenberger, and Wiggall 2019). They can affect management practices directly and financial conditions indirectly. For instance, districts with more skilled financial management are more likely to follow sound management practices such as making timely debt payments or financial disclosures. Districts with more abundant fiscal resources can score higher in fund balance or financial stability.

The performance ratings can be consequential for school districts. Within two months of releasing a final FIRST rating, a district must 'announce and hold a public meeting to distribute a financial management report that explains the rating and its performance' (TEA 2022). The public meetings may draw attention to public financial management from parents, taxpayers, legislators, and the media. For districts earning top ratings, FIRST can be an opportunity to obtain positive media coverage or enhance community support. TEA considers FIRST ratings when assigning an accreditation status to a district. Failure to satisfy accreditation criteria or any financial accountability standards can result in various interventions and sanctions for districts. The Texas Education Code requires a district assigned a rating of 'F' to submit a corrective action plan to address the financial weakness within one month after the public hearing.

Measurements

We collect superintendent data from the TEA, separately from the FIRST system. To measure superintendent turnover, we compare the name list in year t to the name list in year t + 1 for each district. We identify the superintendents whose names were up in the former list but no longer appeared in the latter list. As in the extant literature (Boyne et al. 2010b; Petrovsky et al. 2017; Rutherford and Lozano 2018), we create a dummy variable[3] of superintendent turnover that equals 1 if a school district has a superintendent who left in year *t*; otherwise, we code it as 0.

To measure fiscal resource dependency, we create a variable, reliance on state transfer, computed as the percentage of state fiscal transfers in total school district revenues. We also use state aid per pupil as an alternative measurement for reliance on state fiscal transfers. We use taxable property value per pupil as a third measurement of school districts' reliance on state fiscal resources. Since property taxes and state transfers are the two primary sources of revenues for school districts, those with a more robust tax base and, thus, greater potential of extracting property tax revenues should rely less on state fiscal transfers.

We use salary as a proxy for managerial coping ability. The resource dependency theory suggests that executive pay signifies the executive capacity to manage resource dependencies (Pfeffer and Davis-Blake 1987; Papenfuß and Schmidt 2022). Empirically, Papenfuß and Schmidt (2022) find that executives with higher pay in German municipal corporations have a lower likelihood of turnover, suggesting their higher ability to manage environmental contingencies. The public management literature has used managerial salary as a proxy for managerial quality or skills in the context of Texas school district superintendents (Meier and O'Toole 2002; Melton and Meier 2017) and for teachers (Selden and Sowa 2004). The argument is that higher salaries for public managers indicate a higher market value for the unobserved managerial ability in a quasi-competitive labour market.

We construct multiple variables for managerial coping ability. In addition to the superintendent's salary, we use administrators' salaries in central offices of school districts to indicate the ability of staff to support superintendents. The assumption is that superintendents will be more capable of addressing negative performance feedback if their subordinates are more skilful. Moreover, as an alternative to the superintendent's raw salary, we replicate the analysis with the regression residual approach[4] advocated by prior studies (Meier and O'Toole 2002; Melton and Meier 2017), which we name the superintendent's management quality indicator. We obtain the superintendent and staff salary data from TEA, which are not part of the FIRST system.

Empirical strategy

We employ a regression discontinuity (RD) design to examine the causal effects of negative performance feedback on superintendent turnover. The RD design is characterized by treatment assignment based on whether the value for a running variable exceeds a designated cut-off. The RD design requires that the units barely receiving the treatment are not systematically different from those barely failing to receive the treatment. The treatment assignment is 'as good as random' near the cut-off (Lee and Lemieux 2010).[5] The observations just below the cut-off constitute a valid counterfactual for those just above the cut-off. In this setup, including control variables is unnecessary to reduce bias but may make the estimates more precise.

In a standard RD design, the cut-off in the running variable determining treatment assignment is the same for each observation. Since FIRST has four ratings and three cut-offs, we follow the RD literature to normalize the cut-offs (Cattaneo et al. 2016). Specifically, we centre the cut-off to zero by subtracting the closest cut-off from the district's performance scores. The running variable is computed as the distance between the actual performance score and the closest cut-off. In so doing, we transform the multi-cut-off RD design into a single-cut-off RD design.[6] The key variable of interest, negative feedback, is defined as a dummy that equals 1 when the running

Table 1. Summary statistics.

Variables	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Superintendent turnover	20,511	0.20	0.40	0	1
Performance rating	20,511	3.55	0.72	1	4
Rating A	20,511	0.66	0.47	0	1
Rating B	20,511	0.26	0.44	0	1
Rating C	20,511	0.06	0.23	0	1
Rating F	20,511	0.03	0.16	0	1
Reliance on state transfer	20,505	10.03	5.58	1.5	53.9
Superintendent salary (thousand)	20,497	120.05	55.52	5.51	589.40
Central administrator salary(thousand)	20,490	92.06	18.83	48.78	388.52
Management quality indicator	20,491	0.06	0.75	−12.13	3.54
State aid per pupil (thousand)	20,505	5.45	3.15	0.85	53.17
Taxable property value per pupil (thousand)	20,452	689.19	127.33	57.17	5407.60

Note: We measure the performance ratings with a categorical variable ranging from 1 to 4, indicating the four ratings of F, C, B, and A, respectively.

variable is negative and 0 otherwise. Thus, negative feedback indicates whether the performance score is below the closest cut-off. Table 1 reports the summary statistics.

Time is a critical dimension for organizations to respond to performance feedback. We expect managerial responses to occur over more than one year, given that it generally takes time for organizations to pay attention to performance feedback (Meier, Favero, and Zhu 2015) or for managerial turnovers to be realized. To allow flexibility for the turnover effects to unfold over time, we estimate the dynamic effects of negative performance feedback on managerial accountability over a relatively long period, i.e. five years after a performance rating.[7]

We employ a dynamic RD design to estimate the effects of negative performance feedback on superintendent turnover over time, following Cellini, Ferreira, and Rothstein (2010). We estimate the following model[8]:

$$y_{i,t+\tau} = \theta_\tau d_{it} + \delta_\tau f(v_{it}) + \alpha_\tau + \beta_t + \gamma_{it} + \varepsilon_{i,t+\tau} \quad (1)$$

Where outcome y is observed τ years after a performance rating is released for school district i in year t. On the right-hand side, d is a binary variable indicating that the school district i has negative feedback in year t; τ is a variable indicating the number of years away from the negative feedback; and θ is the coefficient of interest, which captures the year-specific effects of negative feedback on superintendent turnover. For instance, θ_3 captures the effect three years after a school district receives negative feedback. Moreover, $f()$ is a polynomial function of the running variable, which captures the relationship between proximity to the performance cut-off and the outcomes of interest. We use the quadratic polynomial function as the main specification, following Gelman and Imbens (2019). In addition, α, β, and γ represent the fixed effects for years relative to the negative feedback, calendar years, and performance rating, respectively. Finally, ε is the error term.

As in Cellini, Ferreira, and Rothstein (2010), for each school district i with a performance rating in year t, we stack the observations around the performance rating within the time window from t − 2 to t + 5. We then combine the stacked data sets for each performance rating into one that covers the entire study period from 2012 to 2020. Following the previous studies (e.g. Cellini, Ferreira, and Rothstein 2010; Kogan, Lavertu, and Peskowitz 2017), we constrain θ to 0 when $\tau < 0$, but allow it to vary otherwise.[9]

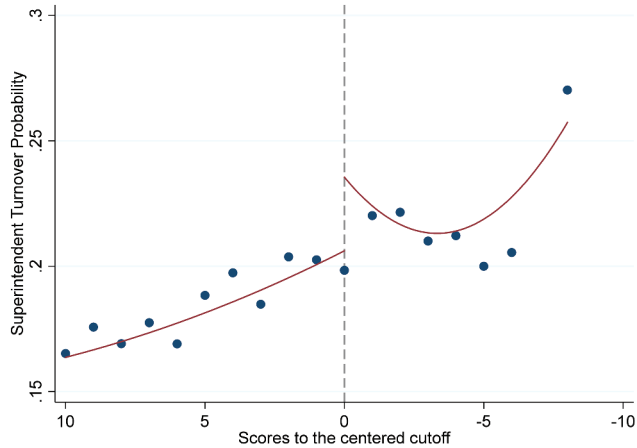

Figure 2. Distribution of Superintendent turnover by negative feedback. Note: The line shows a polynomial fit of order 2.

To test Hypothesis 1, we pool data for four ratings in the main model. We also estimate the model by each performance rating to test the heterogeneity of effects, following Cattaneo et al. (2016). We divide the sample into three groups[10]: rating A to rating B, rating B to rating C, and rating C to rating F. In addition, we conducted subgroup analyses to test hypotheses 2 and 3. We divide the sample based on the median of the indicators of fiscal resource dependency and coping ability to test if the effect of negative feedback varies across groups.

The validity of the RD design hinges on the assumption that superintendents cannot precisely manipulate their performance ratings around the cut-off (Lee and Lemieux 2010). This assumption is plausible in the FIRST case because superintendents can have incomplete information about how scores on each performance indicator are mapped to their performance ratings.[11] We take two measures against the possibility of rating manipulation. First, TEA allows school districts to submit appeals after publishing initial ratings, which might enable districts to gain a rating jump. We drop the ratings subject to appeals to reduce the likelihood that school districts manipulated the ratings.[12] Second, as is conventional in the RD literature, we have conducted several tests to establish the validity of the RD design. As reported in Appendix C, all these tests show the RD design is valid.

Before presenting the regression analysis results, we graph the probability of superintendent turnover by negative feedback. Figure 2 shows the average turnover rate by performance ratings in the subsequent 5 years. The average superintendent turnover rates for the school districts with negative feedback are higher than those without negative feedback near the cut-off. This provides suggestive evidence for Hypothesis 1 that negative performance feedback increases superintendent turnover.

Results

Baseline model

We first report estimates with the full sample and then present the results grouped by three performance ratings. Column (1) of Table 2 reports the dynamic effects of

negative feedback and the average effects for the five years. Negative feedback shows a positive and statistically significant effect on the likelihood of superintendent turnover in all five subsequent years. The sizes of the effects range from 0.07 to 0.16. To better visualize the dynamic effects, we graph the dynamic effects of negative feedback on superintendent turnover in Figure 3. We observe a slight increase in the effect sizes of negative feedback over the subsequent five years, with larger effects in years 2 and 5.

Column (1) shows that the average effect of negative feedback for the five years is 0.09 and statistically significant at the $p < 0.01$ level. This indicates that negative feedback increases the probability of superintendent turnover by 9% points. The sample mean of superintendent turnover is about 0.2. Thus, this effect amounts to an increase in superintendent turnover by about 45%. These results are consistent with Hypothesis 1.

Columns (2) to (4) of Table 2 present the effects of negative feedback on superintendent turnover for the three rating groups. As shown in column (2), negative feedback from rating A to rating B has positive and statistically significant effects on the likelihood of superintendent turnover in the subsequent 2, 4, and 5 years. The sizes of the effects range from 0.13 to 0.17, with a statistically significant average effect of 0.085. The results in column (3) show that the negative feedback from rating B to rating C causes increases in superintendent turnover in the first three years. The sizes of these effects range from 0.21 to 0.33. The average effect is about 0.196 for the five years after a performance rating.

We find positive effects on superintendent turnover for negative feedback from rating A to rating B and from rating B to rating C. However, we find no effects from rating C to rating F. There are at least two possible explanations. One is the lack of statistical power for rating C to rating F because the subsample has fewer observations. Another may be related to the labour market of superintendents. School districts with

Table 2. Dynamic effects of negative feedback on Superintendent turnover over 5 years.

	(1)	(2)	(3)	(4)
Relative years after Negative feedback	Full sample	A to B	B to C	C to F
1	0.069*	0.081	0.294***	−0.125
	(0.037)	(0.056)	(0.099)	(0.208)
2	0.110***	0.125**	0.334***	0.204
	(0.037)	(0.054)	(0.103)	(0.310)
3	0.082*	0.089	0.206*	0.292
	(0.042)	(0.061)	(0.112)	(0.264)
4	0.078**	0.132**	0.074	0.265
	(0.038)	(0.054)	(0.131)	(0.294)
5	0.162***	0.174***	0.214	0.251
	(0.043)	(0.063)	(0.165)	(0.359)
5 years total	0.090***	0.085**	0.196***	0.108
	(0.030)	(0.036)	(0.065)	(0.136)
Observations	20,511	16,564	2,892	1,055
No. of school districts	989	975	374	150

Note: Fixed effects of relative years, calendar years, performance rating, and a quadratic function of the running variable are included but not shown. Robust standard errors, clustered at the school district level, are in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

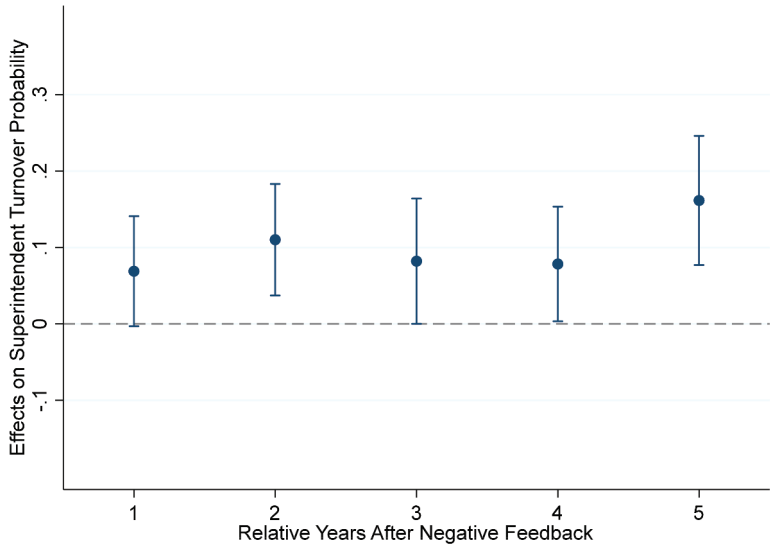

Figure 3. Dynamic effects of negative feedback on Superintendent turnover over 5 years. Note: The figure shows the 95% confidence interval.

ratings A and B face a more active market to fire and hire superintendents. In contrast, the districts with ratings C and F may see limited job mobility for superintendents, thus showing little response to lower performance ratings.

Effects of negative feedback by resource dependency

Table 3 shows the results of the subgroup analysis. Column (1) shows the results for the subsample below the median of reliance on state transfers; column (2) presents the

Table 3. Effects of negative feedback by resource dependency.

	(1)	(2)	(3)	(4)	(5)	(6)
	Reliance on State Transfer		State Aid Per Pupil		Taxable Property Value Per Pupil	
Relative years after Negative feedback	Low	High	Low	High	Low	High
1	0.065	0.077	0.064	0.087*	0.066	0.064
	(0.057)	(0.051)	(0.060)	(0.052)	(0.053)	(0.050)
2	0.074	0.155***	0.090	0.149***	0.134**	0.066
	(0.060)	(0.052)	(0.063)	(0.052)	(0.053)	(0.054)
3	0.045	0.134**	0.070	0.134**	0.109*	0.058
	(0.067)	(0.059)	(0.071)	(0.058)	(0.060)	(0.059)
4	0.039	0.111**	0.068	0.106**	0.097*	0.056
	(0.064)	(0.050)	(0.071)	(0.051)	(0.053)	(0.057)
5	0.134*	0.187***	0.170**	0.195***	0.166***	0.149**
	(0.068)	(0.061)	(0.076)	(0.059)	(0.060)	(0.064)
5 years total	0.065	0.119***	0.080	0.120***	0.100**	0.069
	(0.050)	(0.041)	(0.054)	(0.041)	(0.042)	(0.043)
Observations	10,248	10,263	10,250	10,261	10,223	10,288

Note: Fixed effects of relative years, calendar years, performance rating, and a quadratic function of the running variable are included but not shown. Robust standard errors, clustered at the school district level, are in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

sample above the median of reliance on state transfers. Column (2) shows that negative feedback has positive and statistically significant effects ($p < 0.05$) on superintendent turnover for all five subsequent years except for the first year. The average negative feedback effect is 0.119 and statistically significant at the $p < 0.01$ level. By contrast, column (1) shows that negative feedback has minimal effect on superintendent turnover, and the average effect is not statistically significant ($p < 0.1$). This suggests that negative feedback positively affects superintendent turnover when the reliance on state fiscal transfers is above the median level but not below the median level. Further, columns (3) to (6) of Table 3 show a similar pattern of results as columns (1) and (2). Negative feedback shows positive effects on superintendent turnover when state aid per pupil is above the median and when the taxable property value per pupil is below the median, consistent with Hypothesis 2.

Effects of negative feedback by coping ability

Columns (1) and (2) of Table 4 show the results split by the median level of superintendent salary. Column (1) shows negative feedback has a positive and statistically significant effect in all five subsequent years when the superintendent's salary is below the median. The average effect is 0.148 and statistically significant at the $p < 0.01$ level. Column (2) shows that when a superintendent's salary is above the median, negative feedback shows positive and statistically significant effects on superintendent turnover in the subsequent two and five years. However, the average effect is not statistically significant. Moreover, columns (3) to (6) of Table 4 show a similar pattern of results as columns (1) and (2), which show that negative feedback positively affects superintendent turnover when the coping ability is lower, supporting Hypothesis 3. Taken together, this indicates that negative feedback has a positive effect on superintendent turnover when the superintendent's salary is below the median.

Table 4. Effects of negative feedback by coping ability.

	(1)	(2)	(3)	(4)	(5)	(6)
Relative years after Negative feedback	Superintendent Salary		Central Administrator Salary		Management Quality Indicator	
	Low	High	Low	High	Low	High
1	0.143**	0.006	0.121**	0.011	0.118**	0.033
	(0.058)	(0.050)	(0.059)	(0.049)	(0.053)	(0.052)
2	0.162***	0.102*	0.175***	0.020	0.186***	0.057
	(0.055)	(0.055)	(0.056)	(0.055)	(0.070)	(0.056)
3	0.109*	0.069	0.122**	−0.003	0.131	0.019
	(0.059)	(0.063)	(0.062)	(0.062)	(0.081)	(0.057)
4	0.150**	0.043	0.127**	−0.042	0.119	0.039
	(0.058)	(0.056)	(0.057)	(0.061)	(0.083)	(0.052)
5	0.219***	0.161**	0.197***	0.059	0.241***	0.105*
	(0.068)	(0.063)	(0.063)	(0.066)	(0.088)	(0.058)
5 years total	0.148***	0.055	0.141***	0.007	0.128***	0.041
	(0.045)	(0.045)	(0.046)	(0.044)	(0.048)	(0.044)
Observations	10,414	10,097	10,617	9,894	10,230	10,281

Note: Fixed effects of relative years, calendar years, performance rating, and a quadratic function of the running variable are included but not shown. Robust standard errors, clustered at the school district level, are in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Robustness checks

We conduct several robustness checks for the main results. As is conventional in the RD literature, we re-estimate the main results in Table 2 using alternative RD specifications. In particular, we use two alternative bandwidths of 3 and 10. The former is the middle point of the smallest range between any two cut-offs in the sample. The latter is the data-driven bandwidth calculated following Cattaneo, Jansson, and Ma (2020). Then, we re-estimate the RD model with a linear and a cubic polynomial function instead of the quadratic polynomial function in the main model. Table A5 in the appendix shows that the results are similar to the main results.

Additionally, we rerun our main RD model by adding control variables measuring resources, task difficulty, and outcomes performance for superintendents (Meier and O'Toole 2002). As reported in appendix table A6, the results are robust. This reassures that financial management performance drives superintendent turnover while controlling for other factors. Finally, we show that our sub-group analysis results are robust when modelling the moderating effects via interactions in appendix table A7, further supporting Hypotheses 2 and 3.

Discussion and conclusion

In this study, we have examined the impact of negative performance feedback on managerial turnover. Adapting the resource dependency theory, we propose and test a contingency model of the impact of negative performance feedback on managerial turnover under performance-based accountability systems. The model predicts a positive impact of negative performance feedback on managerial turnover, contingent on fiscal resource dependency and managerial coping ability. We ground the empirical test in the FIRST system in Texas by employing an RD design to estimate the causal effects of negative performance feedback on superintendent turnover. We find that receiving a lower rating causes an increase of about 9% points in the probability of superintendent turnover in the subsequent five years. Consistent with the contingency model, the impact is larger when fiscal resource dependency is higher and managerial coping ability is lower.

The findings have critical implications. We show that resource dependency theory is a useful theoretical lens to explain the impact of negative performance feedback on managerial turnover. The theory highlights the role of resource dependency between organizations in performance-based accountability systems. Resource dependency provides the leverage for one organization to monitor the performance of other organizations. It also motivates the organizations being evaluated to respond to the performance feedback. The theory provides unique insights by considering performance feedback as an environmental contingency that may trigger managerial turnover as a response under two conditions: high organizational resource dependency and low managerial coping ability. It thus offers a coherent perspective on why and when performance feedback should lead to managerial turnover.

Nonetheless, alternative theoretical perspectives exist. For instance, agency theory may explain the positive impact of negative performance feedback on managerial turnover. Job embeddedness theory suggests higher managerial turnover would result if negative performance feedback reduces managers' embeddedness with the

organization, offering an angle to understand the internal dynamics (Mitchell et al. 2001). Future research may compare these theoretical perspectives more systematically.

Moreover, our study shows that negative performance feedback does not affect managerial turnover equally. School districts that rely more on state government for fiscal resources, the sender of performance feedback, show a greater response. As resource dependency increases, the state has stronger leverage to use the performance ratings to solicit responses from school districts, whose bargaining position is weakened correspondingly. This suggests one condition for a performance-based accountability system to work is a relatively high level of resource dependency between the organizations sending and receiving performance feedback. Similarly, managers with lower coping abilities are more likely to turn over due to negative performance feedback, suggesting management skills are critical in assessing managerial responses. On the normative side, whether managerial turnover due to negative performance feedback is an intended or unintended consequence depends on the objectives of performance-based accountability systems and benefit-cost analysis of managerial turnover.

We show that financial management performance affects superintendent turnover independently of other factors, such as student academic performance. This suggests that financial management deserves more scholarly attention to fully understand organizational performance and managerial turnover. Meanwhile, other dimensions of public organizational performance, such as human resource management or public service delivery, are equally important. Future research may test the contingency model along these alternative dimensions.

The study has important implications for policy and practice. Governments have invested considerable resources in implementing performance-based accountability systems. Some examples include the No Child Left Behind Act by the federal government (Holbein and Hassell 2019) and the state's monitoring of the fiscal condition of school districts in Ohio (Thompson 2019). Holding top public managers accountable for organizational performance is a key consideration. Our study shows that negative performance feedback increases managerial turnover, indicating that public managers suffer higher job insecurity as a negative consequence. In this sense, public managers are held accountable, though it remains unclear if they receive their fair share of responsibility or serve as 'scapegoats' (Pfeffer and Salancik 2003). Future research might uncover such variations with qualitative research designs like interviews or case studies.

One question about external validity is whether the findings can be generalized to school districts in other states or countries with different administrative structures and accountability mechanisms. While fully answering this question requires further research, one may consider the implications of varying measurements, models, and empirical settings. First, while we use salary to proxy the managerial coping ability of the superintendent and support staff, there could be a better measurement. Salary may reflect other factors than managerial ability, such as labour market competitiveness, superintendent's negotiation skills, and tenure. It might not be generalizable to different contexts or countries where public sector salaries are fixed and depend on seniority. Second, the FIRST data allow an RD design to isolate the causal effect of financial management performance on managerial turnover. Yet, the RD design is known to capture the local causal effect near the cut-off (Lee and Lemieux 2010). Thus, our findings may not be extended to performance score changes far from the cut-offs.

Third, while we focus on FIRST as the empirical setting, our findings may be generalized to other performance-based accountability systems with resource dependency between organizations receiving and sending performance feedback.

Our study is not free of limitations and opens several avenues for future research. Unfortunately, the superintendent turnover data do not allow us to distinguish between involuntary and voluntary turnover. The empirical findings amount to estimates of the average effect of negative performance feedback on these two types of turnover. Since voluntary and involuntary turnover are driven by different reasons, such as retirement and dismissal, an effect of negative performance feedback can have differential implications. For instance, in the FIRST context, negative feedback's impact on involuntary turnover can be interpreted as an accountability effect more unambiguously than voluntary turnover. Future research may use more fine-grained data to separate these two types of turnover and fully uncover the heterogeneous effects of negative performance feedback.

In addition, the rating change from C to F shows no effect on superintendent turnover, which might result from a small sample size for these ratings. If a larger sample size becomes available, future research may revisit this result to systematically compare it with the impact of the rating changes from A to B or B to C. Related, while we show that the effect of negative performance on managerial turnover varies over time, future research may explain the timing of the impact with such qualitative designs as interviews or case studies. Finally, managerial coping ability is multidimensional, encompassing a broader range of capacities or resources, including political and reputation resources such as networks, trust, and credibility. Future research may test the contingency model using a more refined measurement of managerial coping ability.

Notes

1. We dropped the FIRST data in 2015 because the performance scores are unavailable; the data only show whether a school district passed or failed the performance evaluation.
2. An unmodified opinion means the auditors conclude the financial statements are presented fairly in all material respects by the applicable reporting standards.
3. This variable includes both voluntary and involuntary turnover, such as retirement and dismissal.
4. Following the method by Meier and O'Toole (2002) and Melton and Meier (2017), we derive an indicator for superintendent managerial quality using the residuals from a regression analysis. The regression correlates superintendent salaries with variables on district characteristics, human capital factors, and personal attributes and then uses the regression residuals to indicate the unobserved managerial quality. Specifically, we incorporate variables such as the district's total budget, tax rate, average revenue per student, the superintendent's tenure in their current position, and demographic variables, including gender and race. Additionally, we adjust for previous performance utilizing an instrumental variables technique, where six variables – encompassing student characteristics and district resources – serve as instruments.
5. Please see Lee and Lemieux (2010) for a review of the RD literature.
6. We report details on converting the multiple-cut-off RD to a single-cut-off RD in Appendix A.
7. The choice of 5 years is necessarily arbitrary but is consistent with prior studies on school district managerial responses to bond referenda results (Kogan, Lavertu, and Peskowitz 2017). We also use a window of 3 and 7 years as a robustness check. The results remain substantively unchanged and are available on request.

8. This model allows the districts to receive multiple performance ratings over time. The findings are robust with an alternative specification, also based on Cellini, Ferreira, and Rothstein (2010), by controlling for the history of performance ratings. See Appendix D for more details.
9. This assumption is consistent with the pre-rating tests, which show that the pretreatment outcomes are not statistically significantly correlated with negative feedback, as reported in tables A1 and A2.
10. Because one school district may appear in multiple groups in the stacked dataset, the sample sizes for the three groups do not add up to that for the total sample.
11. See Appendix C for more details.
12. See Appendix B for more details.

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