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Do reputational threats influence the rigidity of US agencies? A dynamic panel data approach

Do reputational threats influence the rigidity of US agencies? A dynamic panel data approach

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Abstract:

What happens to organizational rigidity when public organizations faced reputational threats over time? Do they take external criticism as incentives to become less rigid and more innovative and flexible through employee involvement and empowerment? Or do reputational threats paradoxically contribute to the very rigidity that is often stereotyped as inherent parts of government? Building on threat-rigidity theory, we test the temporal relation between reputational threats (both in terms of the direction of reputation and its turbulence) and organizational rigidity. We apply a dynamic panel data approach combining different data sources on 34 US agencies over a period of 13 years. The results show that organizational rigidity increased, both when reputations evolved negatively over time and when reputations evolved more turbulently. No combined effect of negative reputations and reputational turbulence was observed. Both sources of reputational threats independently precluded organizations from creating a climate of employee empowerment, involvement, flexibility and innovation.

Key words: organizational rigidity; reputational threats; dynamic panel data approach

Evidence for practice:

- Public organizations demonstrate higher degrees of organizational rigidity when their reputations were evolving negatively or more turbulently.

- Negatively evolving reputations generate more organizational rigidity, even under conditions of rather stable (non-turbulent) evolution.

- Turbulently evolving reputations generate more organizational rigidity, even when these reputations evolved in a neutral or positive direction.

- The climate of reputational negativity that many public organizations face leads to an organizational climate that is more rigid. Managers have a clear role to play in these tendencies, by avoiding the urge in situations of uncertainty to centralize control, formalize procedures and apply pressure on employees to conform to their directions.

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Acknowledgements

Introduction

Organizational rigidity in government refers to the inflexibility of bureaucratic systems and processes, which can hinder the ability of public organizations to adapt to changing circumstances and effectively serve the needs of citizens (Deverell 2010; Staw, Sandelands, and Dutton 1981). Over the past decades, reforms have sought to address rigidity in government, by decreasing hierarchical, formalized and centralized decision-making, while promoting employee flexibility, experimentation and innovation (Mergel, Ganapati, and Whitford 2021). In discussions on how governments can harness the capacity of their workforce to flexibly adapt to environmental needs, empowering and including employees in organizational processes has been a recurring recommendation (OECD 2021; Steen and Schott 2019).

In sharp contrast to this idealized image stands the reality in which many public sector employees are working. Studies consistently report the comparatively high rate of unnecessary and burdensome rules and procedures in public organizations (Pandey and Kingsley 2000; Wright and Davis 2003). Rigidity continues to be a stereotype that is often attached to public organizations as sources of general underperformance vis-à-vis private organizations (Marvel 2015; Waeraas and Byrkjeflot 2012), and contributes to an overall atmosphere of distrust and negativity surrounding government (Gilad, Bloom, and Assouline 2018; Kettl 2017). While rigidity is likely to provoke negative public sector reputations, the goal of this study is to examine the reverse relation: what happens to organizational rigidity when organizations are faced with reputational threats? From a democratic responsiveness perspective, one may expect that public organizations will take external societal criticism as incentives to do better, and break out from existing routines. Such a perspective, however, conflicts with widely validated insights from threat-rigidity theory. Threat-rigidity theory was developed by organizational psychologists to understand the processes that lead organizations to become rigid in response

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to perceived threats (Dutton and Jackson 1987; Wynen et al. 2020), through restrictions in information processing and constriction of control (Deverell 2010).

Bridging the hitherto largely separate literatures of organizational rigidity and organizational reputation in the public sector, this study addresses the question how reputational threats impact organizational rigidity over time. We make several contributions to both literatures. The literature on threat-rigidity theory tends to focus on acute crises as instances of threat (Sarkar and Osiyevskyy 2018; Staw, Sandelands, and Dutton 1981), and has yet ignored the role of more slowly accumulating reputational threats and how these impact organizational rigidity over time. In addition, organizational rigidity (or its opposing concepts such as agility, flexibility, empowerment) tends to be analyzed as an antecedent of a wide range of outcomes, rather than as an outcomes in itself (Skrinou and Gkorezis 2020; Tummers et al. 2018). The few studies that do focus on rigidity as an outcome tend to zoom in on internal organizational dynamics and managerial practices that foster employee autonomy, innovation and empowerment (Bos-Nehles, Bondarouk, and Nijenhuis 2017; García-Juan, Escrig-Tena, and Roca-Puig 2020; Wynen et al. 2020), with little appreciation for the role of external dynamics such as reputation.

Reputation scholars, in turn, have mainly focused on how organizations maintain their reputation towards external stakeholders. The implications of reputations for the attitudes and behaviors of public sector employees are rarely discussed. The few studies on the topic have demonstrated how reputations affect organizational debates on the identity of an organization (Dutton and Dukerich 1991), mediate the relation between mission match and job satisfaction (Ahn 2022), and impact employee identification (Gilad, Bloom, and Assouline 2018). More closely related to the interest of this study, Wæraas and Dahle (2020) studied how reputation acts as a strong internal organizing principle guiding human resources management strategies, practices, and control systems. In a qualitative study of private and public organizations, they

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observe that reputation-sensitive organizations pursue a desired reputation through a single, official corporate voice by discouraging prohibitive employee voice through technocratic control and coercive HRM practices. While this latter study already suggests that reputational concerns may trigger centralization dynamics, we lack theoretical and empirical insights into how reputational threats over time impact different characteristics of organizational rigidity. Moreover, reputational threats are commonly understood as negatively evolving reputations, while we posit in this paper that also the turbulence of reputation in itself might be seen as a reputational threat. Hence, we further contribute to the literature by theorizing and operationalizing two dimensions of reputational threats: the direction of aggregated sentiment (do reputations evolve more or less negatively?) and the turbulence of this evolution (do reputational judgments change recurrently?).

Empirically, we focus on 34 agencies of the United States (US) federal government in the time period 1998-2010 (13 years). We combine a novel dataset developed by Bellodi (2022) on the reputation through time of US agencies, with a combination of datasets of intertemporal statistics on characteristics of organizational rigidity (Bertelli et al. 2015). Coping with the challenges of estimating the relationship between reputational threats and rigidity over time, the study applies a dynamic empirical model that includes the lagged dependent on the right-hand side of the regression equation. Rigidity is after all expected to be dynamic (or: to depend on its own past values). Moreover, reputational threats are likely to be correlated with past values of rigidity. This poses an interesting empirical puzzle as OLS and fixed effects estimates will be biased (dynamic panel bias). In order to solve this puzzle, we turn to a dynamic panel estimator (Arellano and Bover 1995; Blundell and Bond 2000). Dynamic panel estimators allow to overcome dynamic panel bias because of their ability to treat explanatory variables as potentially endogenous or exogenous. Additionally, they are particularly suited for panels with

a 'small *T*, large *N*' structure (Roodman 2009). Both characteristics makes them specifically interesting for our data structure with a *T* of 13 and an *N* of 34.

The remainder of this paper is organized as follows: Section 2 describes the existing theoretical perspectives on the relationship between reputational threats and autonomy. The data, descriptive statistics, the research design and main findings are discussed in Section 3. The analyses in section 4 show that reputational threats, both when conceptualized as negatively evolving reputations and as turbulent reputations, have a negative and independent impact on organizational rigidity. This implies that negatively evolving reputations over time induce higher organizational rigidity, regardless of their turbulence of reputation; whereas reputational turbulence, being the extent to which reputational judgements change recurrently, has a negative effect on organizational rigidity, regardless of the underlying sentiment (so: even when reputations evolve in a positive direction.) We discuss these findings and their implications, as well as limitations and ideas for future research, in the concluding section of the paper.

Theoretical Framework

Threat-rigidity theory

Threat-rigidity theory was developed by organizational psychologists to explain how organizations turn rigid in response to external threats. Threats refer to stressors that may harm organizational continuity (Staw, Sandelands, and Dutton 1981). They involve a "negative situation in which loss is likely and over which one has relatively little control" (Dutton and Jackson 1987, 80). Because of their disruptive potential, threats bring uncertainty, stress, and anxiety. In order to offset these negative emotions and perceptions, threat-rigidity theory expects that managers will respond by turning to domains over which there is greater organizational control (Chattopadhyay, Glick, and Huber 2001). These responses – or: threat-

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consistent behaviors – tend to set in motion mechanisms that discourage employee empowerment and innovation (Niesen, De Witte, and Battistelli 2014). Staw et al. (1981) identify the following mechanisms that are induced by threats, and are characteristic of rigid organizations (see Figure 1):

Include Figure 1 here

First, a threat may result in control constriction. Threats create uncertainty because of their potential to change the status quo and existing routines, which had infused certainty and perceived safety in an organization. When such certainty is threatened, this will create a sense of urgency among managers to mitigate the threat as effectively as possible (Plotnick and Plotnick 2010), and a tendency to take and centralize control, formalize procedures and apply pressure on employees to conform to their directions (Olsen and Sexton 2009). Under such conditions, the willingness of managers to empower and include employees will decrease, leading to an organizational climate that is more rigid, top-down, and nonparticipatory (Staw, Sandelands, and Dutton 1981; Wynen et al. 2020).

Second, threats are expected to lead to restrictions in information-processing. In times of threat, managers are less likely to invite information from below as inputs in their decision-making (Staw, Sandelands, and Dutton 1981). They are hesitant to add additional uncertainty in the solution mix, and will rather rely on existing internal hypotheses and prior expectations (Deverell 2010; Sarkar and Osiyevskyy 2018). In addition, information flow towards line employees will be strongly coordinated and reduced in order to enforce uniformity and hierarchy (Wæraas and Dahle 2020).

Third, the interplay of control conscription and information restriction dynamics create an organizational setting that facilitates organizational rigidity, by discouraging employee empowerment, innovation and creativity. Scholars have noted the correlation between

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decentralized organizational structures without strong hierarchical control, free flows of information, employee satisfaction and motivation, and innovation (Burns and Stalker 1961; Sarkar and Osiyevskyy 2018). Likewise, we can expect the opposite dynamics to create organizational climates that discourage empowerment, innovation and employee involvement (Wynen et al. 2020).

Empirical findings of threat-rigidity effects are widespread. Daly et al. (2011) find that principals in schools threatened by sanctions after insufficient scores on performance metrics were more likely to engage in threat-rigid responses. Studies also show that organizations with intense change histories exhibit less strategic policy autonomy (Kleizen, Verhoest, and Wynen 2018), less managerial support for innovative work behavior (Wynen et al. 2020), more defensive silence by employees (Wynen et al. 2019), and more absenteeism and turnover (Wynen, Verhoest, and Kleizen 2019). The present study builds on these insights to analyze the role of a hitherto neglected source of threat, linked to the reputation of public organizations, which may well result in similar threat-consistent organizational responses that generate rigidity. In the next section, we discuss the conditions under which reputations turn into reputational threats.

Reputational threats

In his 2001 book, Daniel Carpenter spelled out the foundations of a reputation-based framework for understanding political-administrative dynamics in the public sphere. His definition of an organizational reputation – as a set of beliefs about an organization's capacities, intentions, history, and mission that are embedded in a network of multiple audiences – remains undisputed in political science literature (Carpenter 2001, 2010). In the last decades, the reputational agenda has developed strongly (Boon, Salomonsen, and Verhoest 2021; Bustos 2021; Carpenter and Krause 2012). In this "reputation era" (Zavattaro and Eshuis 2021), reputation (and its management) has become a matter of high strategic importance that governs agency behavior

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(Carpenter 2004). This is particularly true for public organizations, who's performance – in contrast to businesses – is generally impossible to summarize in revenue but rather depends on more abstract notions of perceived performance. Therefore, reputational dynamics are closely monitored and, if necessary, responded to. Public managers are by necessity and training, acutely aware of their audiences and that their audiences monitor them (Carpenter and Krause 2012).

Threat – or: reputational threat – is a well-known concept in reputation studies (Bach et al. 2022; Maor and Sulitzeanu-Kenan 2016; Rimkutė 2018). It broadly captures the idea that under certain conditions reputations may destabilize organizations, and hence require an organizational response. Reputational threats also correspond to the threat construct as defined in threat-rigidity theory, being negative events that may harm organizational continuity over which an organization has relatively little control (Dutton and Jackson 1987; Staw, Sandelands, and Dutton 1981). First, reputations can have a strong impact on the continuity of organizations, for better or worse. Positive reputations hold a wide array of organizational benefits. They can be used to generate public support and trust, to achieve delegated autonomy and discretion from politicians, to protect the organization from political attack, accountability or termination, and to recruit and retain valued employees' (Busuioc and Lodge 2016; Carpenter 2002; Chen, Christensen, and Ma 2022; Willems, Faulk, and Boenigk 2020). Negative reputations, in contrast, may set in motion a reinforcing cycle of criticisms that endanger the continuity of the organization (Salomonsen, Boye, and Boon 2021). Second, reputations are inherently uncertain. They develop in the minds of stakeholders, over which an organization has little control and which may be prone to existing anti public sector biases (Hvidman and Andersen 2016; Waeraas and Byrkjeflot 2012).

The question then becomes under which conditions reputations turn into threats. Reputation scholars have operationalized threats in two interconnected ways. First, scholars have looked

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at the evolution of reputational sentiment towards the organizations. Reputations have stronger repercussions, and hence create organizational unrest, as the aggregated sentiment towards organizations evolves more negatively (Bellodi 2022; Salomonsen, Boye, and Boon 2021). Second, scholars have complemented the sentiment focus with an interest in the organizational domain that is targeted. For instance, Maor, Gilad, and Ben-Nun Bloom (2013) find that organizations can afford to remain silent to critiques towards domains of their functioning in which they enjoy a strong or established reputation, while the opposite is true for domains with weak or developing reputations. The present study will take a comparative cross-case focus with makes it difficult to take the second approach and compare domain-specific critiques between agencies (Carpenter 2020). Yet, building on the body of literature that has argued for the direction of negative sentiment to be perceived as reputational threats, we hypothesize that *public organizations with more negatively evolving reputations over time* (= threat) *will demonstrate higher levels of organizational rigidity* (= threat-consistent behavior)*, compared to organizations without negatively evolving reputations* (H1).

However, negative sentiment in itself may not be sufficient for reputational signals to be perceived as threats and provoke the hypothesized threat-consistent behavior. For several organizations, a negative reputation is a quasi-inherent part of the nature of their task or mission. In such cases, even accumulated negativity may not be perceived as uncertainty- and stress-increasing threats. Waeraas and Byrkjeflot (2012, 201) give the example of tax authorities: "Few people like or admire them, or are willing to ascribe a strong reputation to them, yet most people would agree that they need to exist". From a threat-rigidity perspective, negative reputations in themselves may not be necessary to provoke organizational stress.

Related, scholars have also discussed the risks of excellent reputations in a bureaucratic context. According to Luoma-aho (2007), excellency creates an expectation of future excellency which is hard and risky to maintain in a public sector characterized by ongoing changes in political

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leadership and expectations, but also in terms of funding and laws. As a result, she advocates for the long-term benefits of a neutral reputation, and the stability and certainty it provides. Rigidity, then, may be reduced as agencies and their employees operate in a risk-neutral and stable setting that leaves room for employee flexibility, experimentation and innovation. Similarly, Lee (2022) finds that reputational damage is more severe after a crisis when citizens have a favorable prior view of the agency's reputation. From a threat-rigidity perspective, then, positive reputations may provoke similar stress- and uncertainty- (and therefore rigidity-) increasing mechanisms as negative reputations.

This study therefore not only looks at the sentiment of reputation, but also at its volatility. Reputational turbulence – that is: the extent to which reputational judgements change recurrently – may be more likely to trigger rigidity-increasing mechanisms. Events are more likely to be perceived as threats as they are more uncertain and less controllable and have a high potential impact (Lazarus and Folkman 1984); criteria which match closely to the nature of reputational turbulence. We therefore hypothesize that *public organizations that experienced more turbulent reputations over time* (= threat) *will demonstrate higher levels of organizational rigidity* (= threat-consistent behavior)*, compared to organizations that experienced less reputational turbulence* (H2).

Lastly, given that negatively evolving reputations and reputational turbulence in themselves can be reputational threats, we may also expect their simultaneous occurrence to particularly trigger threat dynamics and create an even stronger push towards organizational rigidity. We therefore hypothesize that *public organizations with both more negatively evolving and turbulent reputations over time* (= threat) *will demonstrate higher levels of organizational rigidity (= threat-consistent behavior), compared to organizations which are faced with only negatively evolving reputations over time or with only reputational turbulence (H3).*

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Data and Methods

Measuring reputational threats

Organizational reputation is often measured by looking at the sentiment towards organizations (Salomonsen, Boye, and Boon 2021), which poses challenges for comparative research; both in terms of workload and reliability (Lacy et al. 2015). This explains why most reputation scholarship has limited itself to non-comparative and/or non-longitudinal designs, which poses external validity concerns (Boon, Salomonsen, and Verhoest 2021). This paper overcomes this limitation by building on the recently developed and validated reputation data from Luca Bellodi (2022), published in the American Journal of Political Science. Exploiting recent advancements in natural language processing techniques, word-embedding techniques were used to estimate the reputation of 465 public organizations from more than 4.5 million parliamentary speeches over a period of almost 40 years. This study makes use of the US data (248 agencies, 36 years, 4806 observations).

The reputation data is based on congressional speeches, downloaded from the Social Science Data Collection of Stanford University (Gentzkow, Shapiro, and Taddy 2018). Reputational research is audience-sensitive research, which means that a focus on one type of audience (elected politicians) may pose dangers to the broader validity of findings. For this reason, Bellodi (2022) took several measures to ensure the validity of the data. Multiple quantitative and qualitative tests were performed to confirm that (a) the reputation estimates reflect critical events, (b) correlate with public opinion data, and (c) with reputation estimates derived from newspaper articles (Bellodi 2022, 8–11). In addition, we know from political-agenda setting studies that a substantial overlap exists between the parliamentary agenda and the media agenda and public opinion (Burstein 2003; Vliegenthart et al. 2016). Furthermore, we believe that the particular audience of elected politicians poses a most likely case to observe threat-rigidity

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effects. As Marvel and McGrath (2016) argue, negative congressional attention to agencies may have a demoralizing impact because it politicizes administrative work, often exhibits distrusting micromanagement tendencies, imposes opportunity costs on bureaucrats who need to prepare for oversight hearings, and is prone to publicly shame and scapegoat an organization in case of failure while taking credit for success. Also, discussions in Congress may have more direct consequences in terms of political control efforts compared to other audiences, particularly in case of accumulated negativity over time which pressures politicians towards action. Previous studies have even used parliamentary behavior as a proxy of political control (Koop 2011), though in our view the sentiment measure applied here corresponds more closely to reputation (after all, negative sentiment will not necessarily or even often translate in concrete political control efforts).

Reputational threats are measured in two ways that capture the theorized mechanisms. *Reputational threat_turbulence* is calculated by the standard deviation of the reputation data over a rolling-window of three years (cf. H2). Reputational turbulence equals the standard deviation (SD) of reputation over three years (the reputation value of the current year [T] and the previous two years [T-1 & T-2]). The SD shows how dispersed the data is in relation to the mean. The higher the SD, the more turbulent the reputation during this period. The lower the SD, the less turbulent reputation during this period. This is repeated each year for each organization, a process that is called a rolling window approach. In a rolling window approach, a fixed number of past observations is used to calculate a statistic – in our case an SD – for each year, which then 'rolls' forward to the next period. To illustrate our approach: to create a measure for reputational turbulence for the FDA in 2005, we looked at the value for reputation in 2005 and that of the previous two years (2003 and 2004) to calculate the SD of the mean during that period. Reputational turbulence for the FDA in 2006 in turn is based on the values of reputation in 2006, 2005 and 2004. This way we each time create a new value for reputational turbulence.

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We specifically selected a time period of three years as we will relate it to employee perceptions of organizational rigidity). The longer the time period, the harder it is to link it to current employee perceptions. Our three-year rolling window will create stronger moving averages than those calculated on longer time frames (the data gets more flattened), in turn causing our regression to pick up the effect of fluctuations in reputation on organizational rigidity more easily. Using a shorter period of two years may capture more immediate fluctuations in reputation, but could miss longer-term changes. It is important to note here that the reputation data are standardized, allowing for comparisons across organizations (Bellodi, 2022; see https://doi.org/10.7910/DVN/KL36TP within the Havard Dataverse Network for the procedures and analyses which allow the computational reproducibility of the results). This characteristic of the data also permits to compare the standard deviation across organizations.

The variable *Reputational threat_direction* is a dummy variable that captures whether the reputations of federal agencies evolved more negatively or not during each of the 3-year periods analyzed in the study. To create the variable, the reputation values of each agency at the beginning and end of each 3-year period are compared. If the reputation value at the end of the period is lower than the value at the beginning of the period, this indicates a negative evolution of the agency's reputation over that time period, and the dummy variable is set to 1. If the reputation value at the end of the period is higher or similar to the value at the beginning of the period, this indicates a positive or neutral evolution of the agency's reputation over that time period, and the dummy variable is set to 0.

Measuring organizational rigidity

Figure 1 included both the *process* that leads organizations to become rigid due to managerial responses to threats (control constriction and restriction in information-processing) and the *outcome* of organizational rigidity. This paper looks at organizational rigidity as an outcome, and focuses on several characteristics that the literature has associated with rigid organizations:

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centralized decision-making with little employee involvement (Burns and Stalker 1961; Mintzberg 1979), lack of innovation and creativity and a tendency towards habitual approaches (Sarkar and Osiyevskyy 2018; Staw, Sandelands, and Dutton 1981) and lack of employee empowerment and flexibility (Pfeffer 1981).

We use the measure from Bertelli et al. (2015), who combined data from different surveys (Federal Human Capital Survey, Merit Principles, Reinventing Government) to aggregate individual employee perceptions of these characteristics of rigid organizations to an agency-level attribute. While the process of becoming rigid is more difficult to observe for employees (see Figure 1), the outcome of being rigid can be deduced from perceptions of employees of their daily work environment. These individual perceptions aggregate to an impression of a collectively felt organizational climate that discourages employee involvement, innovation, creativity, flexibility and empowerment (and hence: reflects organizational rigidity). The degree of organizational rigidity that employees perceive within an organization can thus be regarded as an agency-level attribute (Bertelli et al. 2015; Marvel & McGrath, 2016). Since many agency-level attributes are latent and not directly observable, many scholars have turned to employee surveys to find proxies hereof. However, the limited availability of such survey data has restricted inferences to specific samples, single organizations or short periods of time (Bertelli et al., 2015). In order to overcome this limitation, Bertelli et al. (2015) used a Bayesian item-response model (see also J. D. Clinton et al. 2012; J. Clinton, Jackman, and Rivers 2004) for putting agency-level summaries on a common scale for cross-agency and overtime comparisons. Building on this model, they developed a dataset capturing several agency attributes for a total of 71 US agencies from 1998 to 2010. In Table 1 the questions used to develop the rigidity measure are presented. We have reversed coded these data in order to reflect the degree of organizational rigidity.

Include Table 1 here

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Final dataset

When merging both the reputation and rigidity data, we end up with an unbalanced panel dataset of 332 observations clustered in 34 organizations and spanning a time period from 1998-2010 (the full list of organizations and their frequency – i.e. number of available waves per organization – is available in appendix, Table 3). An unbalanced panel dataset refers to a specific type of panel data where some organizations may have more observations than others, which occurs when data for reputation or organizational rigidity is missing in a year. Figure 2 displays temporal changes in reputation across the 34 organizations, demonstrating the variation that exists in the data. In figure 3 the rigidity measure and the variation that exists in each across the agencies is presented. A higher score in Figure 3 reflects a more rigid organization.

Include Figure 2 & Figure 3 here

Empirical strategy & results

Include Table 2 here

Using this panel dataset, we start our empirical exploration with the application of a pooled ordinary least square (OLS) approach (first column of Table 2). We include the first two lags of organizational rigidity, the reputational threat_turbulence ("turbulence") measure, the reputational threat_direction ("direction") measure, and a set of time dummies. The first two lags of organizational rigidity are added to our model since one can make the argument that the reputational threat measures, which are measured over a three-year period, will be affected by previous levels of organizational rigidity. Consequently, our measures of reputational threat can be expected to be correlated with past values of organizational rigidity. In order to avoid such

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an omitted variable bias, we therefore include two lags of organizational rigidity. The decision to incorporate two lags of the dependent variable aligns with our main independent variables, namely reputational direction and turbulence. These independent variables are based on three time periods: T, T-1, and T-2.

The results (Table 2, column 1) show that both lags are highly significant. Yet, also our two measures of reputational threat appear to be significant. The direction of the evolution of reputation matters. When reputations develop in a negative direction, organizational rigidity increases (supporting H1). The higher the reputational turbulence during the current and past 2 years, the more rigid organizations are perceived by their employees (supporting H2). Adding an interaction between the turbulence and direction of reputational threats did not significantly improve the model ($\chi^2(1)=0.19$).

However, applying an OLS approach to such a dynamic setup is problematic since $y_{i,t-1}$ (lagged rigidity) is correlated with the fixed effects in the error term. A correlation that, as described by Roodman (2009), will give rise to "dynamic panel bias" and will undermine the consistency of the OLS estimator. For instance, an organization may experience an exogenous shock that negatively and strongly affected organizational rigidity during our observed time period. This shock would appear in the error term. The fixed effect for that organization over the period 1998-2010 – the deviation of its average unexplained organizational rigidity from the sample average – will consequently be lower, causing a positive correlation between the explanatory variable $y_{i,t-1}$ and the error.

A first intuitive step in dealing with the fixed effects is to eliminate them from the error term by estimating a fixed effects model (second column of Table 2). This approach allows a limited form of endogeneity. More precisely, it permits x_{it} to be correlated with the time-invariant component of the error (Cameron and Trivedi 2010). The results confirm our initial findings.

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Again, the interaction term between the direction and turbulence of reputational threats did not improve our model ($\chi^2(1)=0.63$). Still, our approach does not relief us from dynamic panel bias (Roodman, 2009). While the fixed effects estimation does not suffer from inconsistency as the individual effect is removed, the correlation between the transformed lagged dependent variable and the transformed error term remains. Our model consequently still suffers from dynamic panel bias (see Nickell 1981 for thorough description).

In a final effort to tackle this bias, we turn to a GMM approach (Arellano & Bover 1995; Roodman 2009). A GMM estimator removes fixed effects by the method of first differencing (similar procedure as running a fixed-effects regression). Next, these first differenced inputs are instrumented with suitable lags of their levels. By exploiting the availability of 'internal' instruments (i.e. those from within the dataset) the difference-GMM estimator is able to overcome dynamic panel bias. The lagged level $y_{i,t-2}$ is after all mathematically correlated with ($y_{i,t-1}$-$y_{i,t-2}$) but not with (ε_{it}-$\varepsilon_{i,t-1}$). Unfortunately, this strategy suffers from a weak instrument problem (Arellano & Bover 1995). More precisely, the lagged instruments become weak as the autoregressive process becomes stronger (approaching a random walk). Therefore, in addition to the level instruments for the differenced equation, we use lagged differences (e.g. $y_{i,t-2}$-$y_{i,t-3}$) as instruments for the level equation. This approach is also called the system-GMM estimator. By applying this kind of estimator, we are able to deal with dynamic panel bias while it solves the issue of weak instruments, leading to a better performance of the model (Blundell & Bond 2000; Roodman 2009).

The results of our one-step system GMM analyses are presented in column 3 of Table 2. We treat our lagged one- and two-year dependent variable as potentially endogenous while we treat the direction and turbulence of reputational threats as well as the time dummies as strictly exogenous. The results again show that negatively evolving reputations and turbulent

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reputations lead to an increase in organizational rigidity. Again, the interaction term is not supported (χ^2 (1) =0.53).

Discussion of findings

The key finding of this study is that public organizations demonstrate higher degrees of organizational rigidity when they were exposed to reputational threats in the previous years. Supporting both H1 and H2, we observe increases in organizational rigidity when (a) reputations had evolved in a negative direction or (b) when reputations evolved in a more turbulent manner. Surprisingly, in light of H3, the observed effects operate independently: both kinds of reputational threats do not mutually reinforce each other in their negative effect on organizational rigidity. These findings contribute to the literatures on organizational rigidity and public sector reputation in several respects.

Our first contribution pertains to the broad literature on organizational rigidity and related concepts such as empowerment and workplace innovation. Scholars have repeatedly argued for the strong motivational and performance benefits of flexible and empowering workplaces (Fernandez and Moldogaziev 2013; Tummers et al. 2018; Mergel, Ganapati, and Whitford 2021). Despite the centrality of combating government rigidity in academic and practitioner discourse (OECD 2021), relatively little continues to be known about what makes workplaces more or less rigid. The few studies that have examined the antecedents of such workplaces focused on managerial practices and internal organizational dynamics that may impact autonomy (Bos-Nehles, Bondarouk, and Nijenhuis 2017; García-Juan, Escrig-Tena, and Roca-Puig 2020; Wynen et al. 2020).

This study brought in a new perspective by theorizing and testing the role of reputational threats, which captures the extent to which organizations lack a stable base of stakeholder support.

Rather than serving as an incentive to break out of rigidity, our results are suggestive of threat-rigidity dynamics' that lead public organizations to (further) ossify in response to either negatively evolving reputations or turbulent reputations. The results also call for further research into the environmental determinants of organizational rigidity. While our study was limited to studying organizational rigidity as an outcome, future scholarship can zoom in on the process of becoming rigid. Process-oriented research designs can more closely examine the proposed causal chain that runs through control constriction and information restriction.

Our second contribution is to the literature on public sector reputation. Reputation scholars tend to examine how organizations maintain their reputation towards external stakeholders. Little attention has gone to the implications of reputations for the attitudes and behaviors of public sector employees (Ahn 2022; Gilad, Bloom, and Assouline 2018). In addition, this study introduced a new conceptualization of reputational threats by looking at the both the direction and turbulence of how reputations evolve over time. While the direction measure builds on existing research (Bellodi 2022; Salomonsen, Boye, and Boon 2021), the turbulence measure is novel. Previous studies have debated the merits of reputational excellence, arguing that public organizations benefit more from a relatively neutral and stable reputation that is easier to maintain (Luoma-aho 2007; Waeraas and Byrkjeflot 2012). This study is the first to translate this idea, which also fits well with underlying notions of threat-rigidity theory, to an empirical and time-sensitive measure of reputational threats. While this study theorized the reputation-rigidity nexus from the perspective of threat-rigidity theory that assumes rigidifying tendencies as a result of risk-averse behavior, future studies could theorize the role of reputation more broadly by exploring how reputation impacts rigidity through other mechanisms than risk-aversiveness. One could, for instance, imagine positive reputation – which reflect stakeholder affirmations of existing practices – to stimulate agencies to avoid experimentation or innovation and opt for the safety of confirmed organizational practices.

A further important addition to the reputation literature is the finding that both kinds of reputational threats, each in themselves and independently of each other negatively impact organizational rigidity. On the one hand, negatively evolving reputations serve as threats that facilitate organizational rigidity, regardless of the degree of reputational turbulence. This finding supports a core argument of the reputation literature, which states that reputational threats in the form of negatively evolving reputations trigger an organizational response – albeit in this case an undesired one – and that public organizations are in general reputation-sensitive (Carpenter and Krause 2012; Wæraas and Maor 2015).

Our finding adds the element that a negatively evolving reputation triggers an organizational response, even when the organizational reputation is overall rather stable over time. On the other hand, reputational turbulence has a negative effect on organizational rigidity, regardless of whether the change in reputation over time is negative or not. Our analysis shows that a highly unstable reputation in itself functions as a threat which triggers organizational rigidity, even if the reputational change over time is positive or neutral. This observation corresponds to the previously identified danger of reputational excellence; or: the inherent difficulties – and stress – that the maintenance of reputational excellence may accompany (Luoma-aho 2007; Wæraas and Dahle 2020). Our results also contribute to these studies by showing that reputational stability may be an important ambition in itself for public organizations, irrespective of whether this reputation is predominantly neutral or not over time. Further research should delve more into the independent effect of reputational turbulence over time and explore whether this effect also affects other outcomes.

Remarkably, and in contrast to H3, the direction and turbulence of reputation do not strengthen their respective negative effect on organizational rigidity. The interaction effect does not add explanatory power to the model. This absence of an interaction effect cannot be due to a high correlation of both kinds of reputational threats, given that the correlation is very low and

negative (-0.036). It also cannot be caused by a skewed distribution of the direction measure: the mean is 0.479 and standard deviation is 0.500, which implies that the number of occurrences of negatively evolving reputations is about equal to the number of occurrences of neutrally or positively evolving reputations. Hence, both kind of reputational threats have their own independent effect but do not significantly reinforce each other's effect. This calls for further research, both in terms of replicating this finding as applying it to other outcomes of organizational reputation.

Third, we want to highlight some methodological contributions. Our data and approach allowed to study the link between reputation and organizational rigidity across multiple organizations and over a time period spanning 13 years. In addition, the data structure allowed to include reputation data (current and previous 2 years) prior to our rigidity measure. To shed some light on causality, we tested for Granger causality using the methodology developed by Juodis, Karavias, and Sarafidis (2021). The Granger causality test is a statistical test that helps determine the causal relationship between two variables. It evaluates whether the past values of one variable provide useful information in predicting the future values of another variable. To perform this test, we utilized the methodology developed by Juodis, Karavias, and Sarafidis (2021), which provides a rigorous framework for assessing Granger causality. The results of the test were consistent with our main findings, with a Wald test statistic of 7.05 and a p-value of 0.029. These results indicate that there is evidence to support the claim of a causal relationship between the variables of interest in our study. It is important to note that the Granger causality test requires balanced panel data, meaning that the number of observations for each entity (organization) and each time period should be consistent. As a result, we had to reduce our initially unbalanced dataset to include 18 organizations over a span of 13 years to meet this requirement. Finally, our paper employs a system-GMM approach in order to avoid dynamic panel bias and thus to correctly deal with the inclusion of lagged dependent variables.

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Although this method is commonly used within economics, it is still relatively unknown within the field of public administration. Given the calls and need for more attention to inter-temporal dynamics and relationships (Ritz, Brewer, and Neumann 2016), and the use of panel data, awareness of dynamic panel bias and the techniques to deal with it are becoming increasingly important.

The study also has limitations. First, our study focused on the relation between reputational threats (as independent) and organizational rigidity (as dependent), using threat-rigidity as a guiding framework to theorize how reputational threats set in motion rigidifying processes (see Fig. 1). The opposite causal relation – from organizational rigidity to negative reputation – is equally plausible, yet has been given little attention. We recognize that reputations are partly shaped internally by an organization's own decisions, strategies and behaviors (Maor and Sulitzeanu-Kenan 2016), that many public organizations operate in politicized and regulated contexts that complicate reputation management (Waeraas and Byrkjeflot 2012), and that – therefore – internal rigidity characteristics are both likely to occur *and* to affect organizational reputations in a causal way. However, for the purposes of this paper we choose to develop a focused theoretical argument focused on one side of the relation between reputation and rigidity. That said, we do recognize the need to empirically demonstrate the validity of the specific causal claim that is made. In order to empirically establish the validity of the specific causal claim made in our study, we conducted a Granger causality test. By conducting the Granger causality test, we provide additional empirical evidence to support the causal claim made in our study. The results, consistent with our main findings, lend further credibility to the relationships and conclusions drawn from our analysis. However, it is important to consider the limitations associated with the need for balanced panel data and the reduction in the number of organizations in our dataset.

Second, our paper employs a System-GMM approach to address endogeneity issues. Endogeneity refers to the situation where one or more independent variables in a regression model are correlated with the error term, leading to biased or inconsistent estimates of the coefficients of the independent variables. One specific form of endogeneity in panel data models is the omission of lagged dependent variables as explanatory variables. This can lead to biased estimates since the current value of the dependent variable may be influenced by its past values, which are not accounted for in the model. While dynamic panel data models have been developed to include lagged dependent variables as regressors, doing so incorrectly can lead to dynamic panel bias. To avoid this, a System-GMM approach can be used to correctly include lagged dependent variables in the model, and to address endogeneity resulting from their omission. While the System-GMM estimator is a widely used and effective method for addressing endogeneity in dynamic panel data models, it is not without its weaknesses. The GMM method ignores cross-sectional dependence and assumes that the panel observations have homogenous slope coefficients. Additionally, mis-specified instruments can lead to biased estimates. Alternative strategies for dealing with dynamic panel bias include the Anderson-Hsiao estimator and the Arellano-Bond estimator, which address endogeneity by using instrumental variables. However, these estimators also have their own limitations and assumptions (Baltagi 2001)

Third, there is the issue of generalizability. On the one hand, we theorized that negative reputations create a sense of uncertainty and risk aversion within agencies, leading to centralized control and restrictions in information-processing as a means of managing the perceived risks. These mechanisms reflect basic human (and managerial) tendencies to manage uncertainty and risk, as evidenced by threat-rigidity scholars in a variety of contexts (Kleizen et al., 2018; Staw et al., 1981; Wynen et al., 2020). On the other hand, managers and employees in federal public agencies in the US operate within a specific regulatory and cultural context.

US agencies are particular in their organizational form. Although they often reside within cabinet departments, they do tend to have their own public law status, own budgets and staff allocations (Peters 2012). Having an own legal standing makes these agencies more visible, more able to create intense relations with interest groups, and hence more prone to reputational dynamics. Furthermore, US federal agencies are different to public law agencies in other countries in the sense that both parliament and the president have substantive instruments and power to control agencies. For instance, parliament has the power to block certain decisions of agencies, while the president has rather large powers in appointing top management on a political basis (see Peters 2012 for an overview). Therefore, while we generally expect to see the theorized reputational threat-inducing mechanisms across institutional contexts, the US context is a particularly likely case due to the generally higher visibility and control efforts regulators are faced with.

Conclusion

The main ambition of this study was to theorize and test the relation between reputational turbulence and organizational rigidity. In line with expectations derived from threat-rigidity theory, we found that reputational threats – operationalized as either negatively evolving reputations or turbulent reputations – led to significant increases in organizational rigidity. Both kinds of reputational threats increase organizational rigidity, and do so independently of each other. But both kinds of reputational threats do not mutually reinforce each other in their negative effect on organizational rigidity.

For practitioners, our study provides an important insight. Despite longstanding calls for harnessing governmental flexibility and agility, the reality in which many civil servants are working continues to be one of relatively high levels of centralization and formalization. Our

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findings suggest that the climate of reputational negativity that many agencies face leads to an organizational climate that is more rigid, top-down, and nonparticipatory. If workplace autonomy continues to be a normatively desirable organizational trait, this finding is problematic. Managers have a clear role to play in these tendencies, by avoiding the urge in situations of uncertainty to centralize control, formalize procedures and apply pressure on employees to conform to their directions.

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Tables & Figures

Table 1 Questions used for the latent construct organizational rigidity

	Federal Human Capital Survey	Merit Principles	Reinventing Government
Question	Year (Q.)	Year (Q.)	Year (Q.)
I feel encouraged to come up with new and better ways of doing things.	2004 (4)		
	2006 (4)		
	2008 (4)		
	2010 (3)		
Employees have a feeling of personal empowerment with respect to work processes.	2004 (26)		
	2006 (24)		
	2008 (24)		
	2010 (30)		
Creativity and innovation are rewarded.	2004 (29)		1998 (11)
	2006 (26)		1999 (11)
	2008 (26)		2000 (11)
	2010 (32)		
How satisfied are you with decisions that affect your work?	2004 (59)		
	2006 (54)		
	2008 (55)		
	2010 (63)		
How satisfied are you with your involvement in decisions that affect your work?			1998 (30)
			1999 (29)
			2000 (29)
I have been given more flexibility in how I accomplish my work.		2000 (6)	
Creativity and innovation are important		2005 (2H)	
In the past two years, I have been given more flexibility in how I accomplish my work.			1999 (18)
			2000 (18)

Adapted from Bertelli et al. 2015

Table 2 Regression results

Variables	Organizational rigidity		
	(1)	(2)	(3)
	OLS	FE	System-GMM
Organizational rigidity (L1)	1.655***	1.325***	1.705***
	(0.0648)	(0.0819)	(0.0583)
Organizational rigidity (L2)	-0.665***	-0.452***	-0.726***
	(0.0686)	(0.0760)	(0.0691)
Reputational threat_turbulence	0.755***	0.622**	0.882***
	(0.246)	(0.248)	(0.240)
Reputational threat_direction	0.0737**	0.0618**	0.0619**
	(0.0287)	(0.0260)	(0.0283)
Year dummies	Included	Included	Included
Constant	0.0629	0.114***	
	(0.103)	(0.0406)	
Observations	261	261	261
R-squared	0.989	0.954	
Number of organizations		34	34
Number of instruments			38
AR(1)			-3.66***
AR(2)			-1.54
Hansen's J test			$\chi^2(23)=27.21$
Proportion of variance explained by the components			0.941
LR test addition interaction between degree & direction	$\chi^2(1)=0.19$	$\chi^2(1)=0.63$	$\chi^2(1)=0.53$

Note: Time dummies are included in OLS, FE and SYSTEM-GMM estimates; robust standard errors are used (making them consistent in the presence of any pattern of heteroskedasticity a); p-values in parenthesis; *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively; Hansen J-test tests the validity of the overidentifying restrictions (robust to heteroskedasticity); AR(1) and AR(2) items show the values associated with the Arellano/ Bond test for (respectively) first and second order autocorrelation in the first-differenced residuals. In column 3 a one year lagged and a two-year lagged dependent variable are treated as endogenous while the time dummies and reputational turbulence are treated as strictly exogenous. Small sample correction has been done to the covariance estimate. Given the high number of instruments, the GMM-style instruments are replaced with their principal components in order to reduce the instrument count in a minimally arbitrary way (see Kapetanios and Marcellino 2010; Bai and Ng 2010; Mehrhoff 2009). This reduced the number of instruments to 38. Results using the initial GMM-style instruments are similar, see Table 4 in appendix.

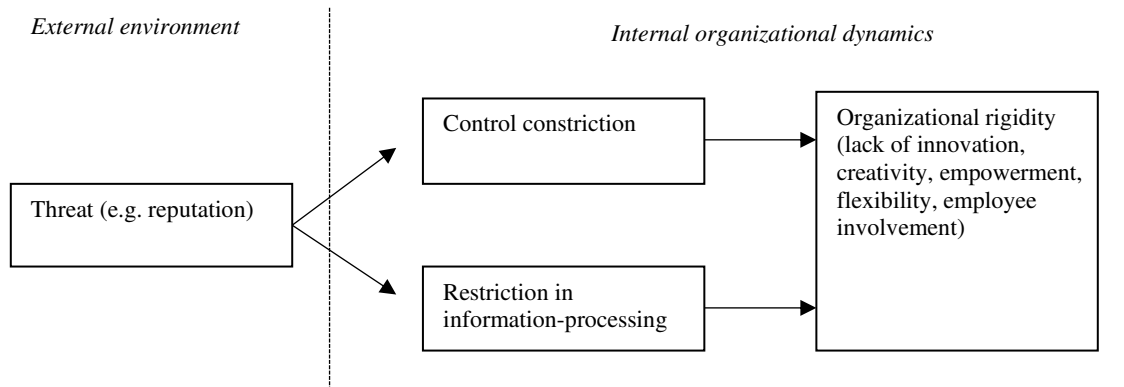Figure 1: Theoretical model (threat-rigidity theory)

External environment

Internal organizational dynamics

Threat (e.g. reputation)

Control constriction

Restriction in information-processing

Organizational rigidity (lack of innovation, creativity, empowerment, flexibility, employee involvement)
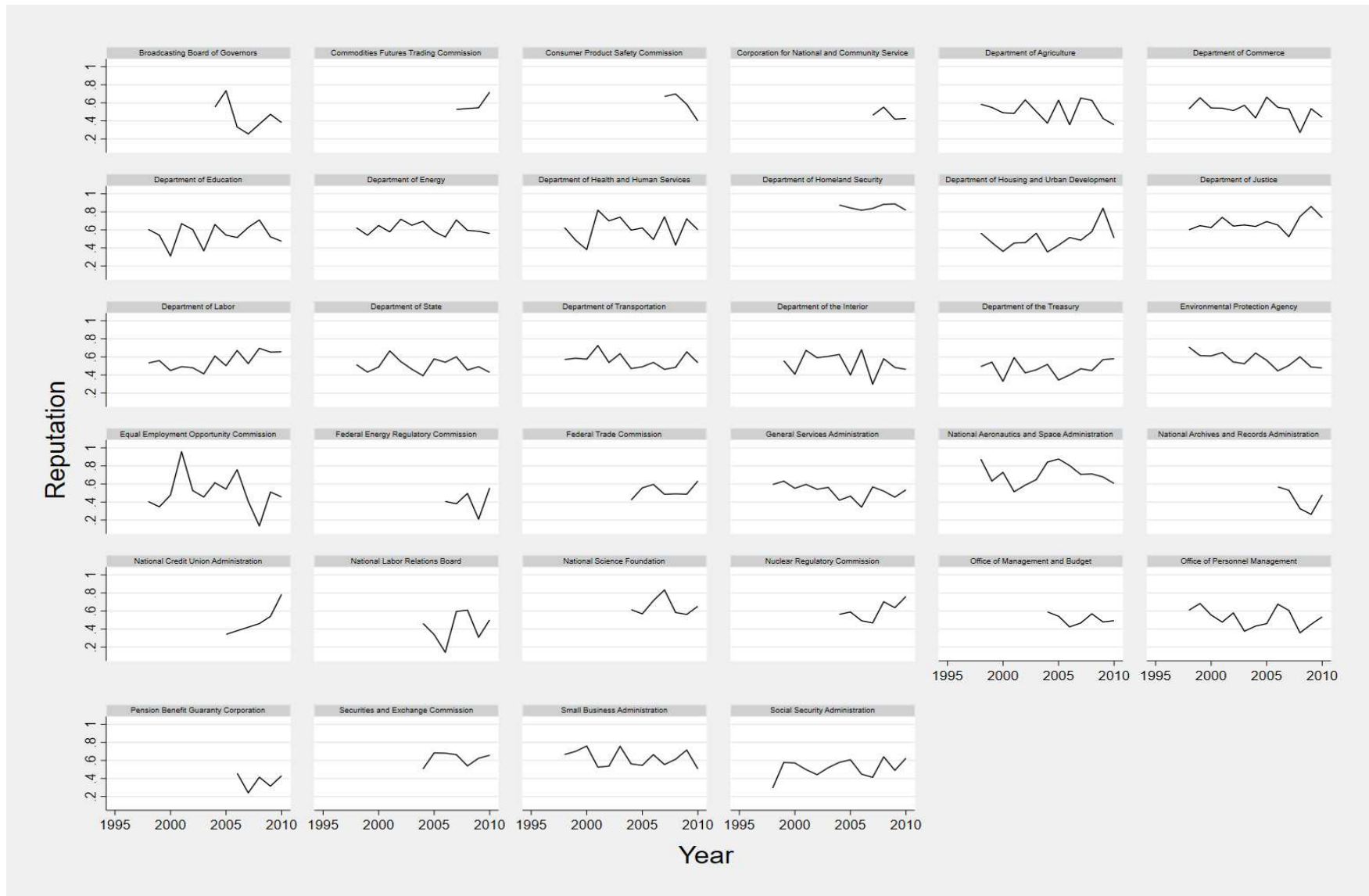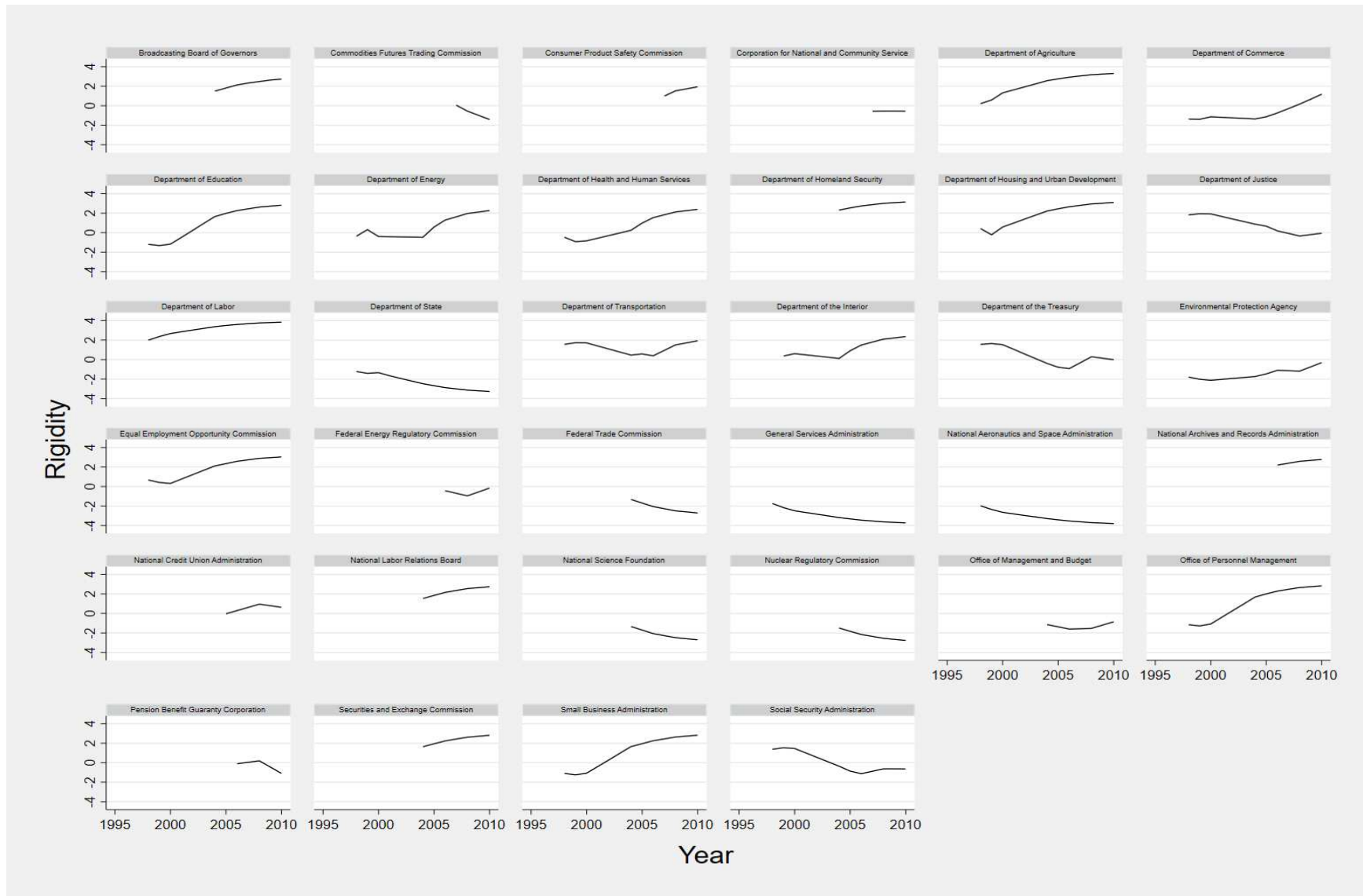
Figure 2 Time Trends in Reputation, 1998-2010

Figure 3 Time Trends in Organizational rigidity, 1998-2010

Appendix

Table 3 Included organizations & their frequency

Organization	Freq.
Broadcasting Board of Governors	6
Commodities Futures Trading Commission	4
Consumer Product Safety Commission	4
Corporation for National and Community Service	4
Department of Agriculture	13
Department of Commerce	13
Department of Education	13
Department of Energy	13
Department of Health and Human Services	13
Department of Homeland Security	7
Department of Housing and Urban Development	13
Department of Justice	13
Department of Labor	13
Department of State	13
Department of Transportation	13
Department of the Interior	12
Department of the Treasury	13
Environmental Protection Agency	13
Equal Employment Opportunity Commission	13
Federal Energy Regulatory Commission	5
Federal Trade Commission	7
General Services Administration	13
National Aeronautics and Space Administration	13
National Archives and Records Administration	5
National Credit Union Administration	4
National Labor Relations Board	7
National Science Foundation	7
Nuclear Regulatory Commission	7
Office of Management and Budget	7
Office of Personnel Management	13
Pension Benefit Guaranty Corporation	5
Securities and Exchange Commission	7
Small Business Administration	13
Social Security Administration	13
Total observations	332
Total org	34

Note: The railroad retirement board was initially also matched, but had to be dropped as it only had to 2 observations. This was too little to create the rolling window of 3 years.