

Authority, Incentives, and Performance: Evidence from a Chinese Newspaper

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Abstract

This paper examines how the allocation of authority within an organization affects workers' incentives and performance, using personnel data from a Chinese newspaper. Relying on an authority change that transferred the right of making editorial decisions from mid-level editors to top editors in four of the eight divisions in the newspaper, I find that the authority change 1) improves reporters' performance, while reducing their activities for private gain; and 2) decreases mid-level editors' journalistic initiative. To reconcile these findings, a synthesis of two theories on authority and incentives – the vertical and the horizontal allocation of authority – is needed.

Key Words: Authority, Incentives, Agency Problems, Organizational Performance, Personnel Data, Media Economics

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1 Introduction

Economists have long viewed the allocation of authority, or decision rights, as a central determinant of organizational performance (Coase 1937, Simon 1947, and Williamson 1975). Yet, convincing evidence on the effects of the allocation of authority on individual behavior is scarce. This paper provides evidence on how the allocation of authority affects worker effort and action choice, based on an exogenous change in the assignment of editorial decision rights in a Chinese newspaper. The main findings are that when the right of making editorial decisions was transferred from mid-level managers to top managers, workers at the bottom of the hierarchy improved their performance, while decreasing their gains from private benefits, and that the mid-level managers reduced their effort. These results generally support the view of authority that has emerged in the recent theoretical literature, beginning with Aghion and Tirole (1997).¹

The primary innovation of this study lies in the assembly and exploration of a data set that allows for measurement of effort and action choices. The data come from a large commercial Chinese newspaper (hereafter, the Newspaper). Based on the assignment of the right of making editorial decisions (editorial authority, for short), the Newspaper is organized in a three-layer hierarchy with chief editors at the top, division editors in the middle, and reporters at the bottom. Chief editors have the right to modify and overrule the decisions of division editors, who in turn have the right to modify and overrule reporters' decisions. Preferences differ across the hierarchy: chief editors desire high-quality news stories that increase circulation and advertising revenues, whereas division editors and reporters are salaried workers and may care about private benefits such as perks, workplace favoritism, or "gray income" from interviewees. Reporters' performance is measured in terms of quantity, which is determined by the number of articles and words published, and in terms of quality, which is determined by monthly scores assigned by the Newspaper's internal evaluation committee. Reporters' action choices are measured with coded news content. Specifically, I

¹See Baker et al. (1999), Dessein (2002), and Armstrong and Vickers (2010), among many others.

use the number of investigative reports and feature stories that are written by a reporter as a proxy for his or her production activities. I use the number of articles with explicit advertising information that are authored by a reporter (advertising articles, for short) to capture his or her propensity to pursue private benefits. I also measure division editors' effort by using the number of articles that are originated or assigned by them. These content-based measures are useful for an examination of a worker's preference alignment with the Newspaper's goal.

Another important innovation is the identification strategy that exploits a sudden change in the assignment of editorial decision rights (hereafter, the authority change) in the Newspaper. Prior to the change, the Newspaper assigned editorial authority to division editors, who could make editorial decisions without approval from chief editors. In September 2005, the Newspaper's board of directors unexpectedly transferred editorial authority from division editors in four of the Newspaper's eight divisions to chief editors. Such a partial reform permits a difference-in-differences estimation of the effects of a change in the allocation of authority. The identification assumption is supported by the absence of a differentiated trend between the treatment group (the reformed divisions) and the control group (the unreformed divisions) for a long period before the authority change. A triple-differences estimation and a series of placebo tests exclude potential confounding factors such as the political influence on the Newspaper and changes in managerial style and editorial policies.

I find three main results with regard to the effects of reallocating editorial authority from division to chief editors. First, the quality measure of reporters' performance increases by 20%. Second, division editors' effort and involvement in journalistic activities decrease. Third, reporters' journalistic initiative, measured by reporters' writing of investigative and feature reports, improves while their writing of advertising articles diminishes.

I interpret the results in light of the Aghion-Tirole theory, which focuses on the vertical allocation of authority within a hierarchy. In this theory, the allocation of formal authority (decision rights) interacts with information asymmetry between managers and workers to affect their real authority (effective control) and their effort to collect information. In the

current empirical setting, when formal authority was transferred to chief editors, division editors decreased their incentive to collect information and originate news reports, as their decisions might be overruled by their superiors. Because chief editors had significantly less information about news events than division editors, the authority change increased the reporters' real authority over editorial decisions. In consequence, reporters exerted more effort in collecting information and thus improved their performance. The two results regarding workers' effort and performance are consistent with the Aghion-Tirole model. However, the result that the authority change induced reporters to choose actions more consonant with the Newspaper's goal is inconsistent with their model, which predicts that when obtaining greater real authority, workers tend to pursue projects that deliver more private benefits.

To reconcile the empirical findings, I invoke the job design aspect of authority - the horizontal allocation of authority, which is a central theme in the multi-tasking theory proposed by Holmstrom and Milgrom (1991). This theory posits that with decision rights, a manager can make workers subject to her preferences by restricting their authority over decisions that conflict her interests. In the setting of the Newspaper, although they were less informed of reporters' activities than division editors, chief editors had greater incentive to monitor editorial outcomes that are detrimental to the Newspaper. Therefore, shifting authority from the middle to the top of the hierarchy induced chief editors to increase monitoring effort so as to restrict reporters' use of the critical assets of the Newspaper (e.g., newspaper space or reputation) for their private purposes. As a result, reporters reallocated their effort from non-productive tasks, such as private networking, to productive tasks, such as journalistic activities. To test this possibility, I explore heterogeneous effects across reporters with different task assignments and under different work environments. First, the authority change has a larger positive effect on the performance of the economic and financial reporters, who have more opportunities to obtain private benefits from companies than those who report on public policy and scandals. Second, I find negligible effects of the authority change on reporters' performance during the months of the Chinese New Year and Mid-Autumn Fes-

tival, when social norms condone private networking or even rent-seeking behavior. These two findings are consistent with the Holmstrom-Milgrom theory.

This paper stands at the intersection of organizational economics and personnel economics. In the organizational economics literature, recent empirical studies (e.g., Colombo and Delmastro 2004; Rajan and Wulf 2006; Acemoglu et al. 2007; Guadalupe and Wulf 2010; Bloom et al. 2012; McElheran 2014) have demonstrated the economic importance of the internal allocation of authority. While these studies, using firm-level data, allow for significant breadth in exploring the impact of the allocation of authority on performance, my approach of looking within the firm has the advantage of being able to more precisely identify mechanisms that drive effects. By contrast, in the personnel economics literature, a thriving body of research uses personnel data to study the provision of incentives within organizations.² However, this strand of literature mainly focuses on the role of the wage system and leaves the role of authority mostly unexamined. My research combines personnel data with an exogenous organizational change to fill the gap between these two strands of literature. Compared to several existing studies (e.g., Liberti 2005; Liberti and Mian 2009; Natividad 2014) that use personnel data to examine the impact of a change in authority on organizational performance, the current paper provides not only evidence on workers' ultimate performance but also direct evidence on workers' action choices. Moreover, my study examines the behavior of workers across different hierarchical layers, rather than within a single hierarchical layer. These new results suggest that a synthesis of the vertical allocation of authority (the Aghion-Tirole theory) and the horizontal allocation of authority (the Holmstrom-Milgrom theory) is needed to reconcile the empirical findings. Such a synthesis echoes the recent theoretical proposal of Bolton and Dewatripont (2013).

Additionally, this research contributes to existing economic studies of the media. To the best of my knowledge, this paper provides some of the first systematic evidence on the effects of the internal organization of the media on news content. The evidence that the allocation

²See Oyer and Schaefer (2011), Bloom and Van Reenen (2011), Bandiera et al (2011), and Lazear and Oyer (2012) for recent surveys and the references therein.

of authority inside a firm affects conflicts of interest between journalists and media owners and that such conflicts, in turn, influence news content is consistent with the theory of media bias proposed by Baron (2006). Thus, the current study complements existing explanations of the determinants of media content that focus on ownership (e.g., Djankov et al 2003) and on consumer demand and market structure (e.g., George and Waldfogel 2003, Gentzkow and Shapiro 2006, 2010; Qin et al. 2015).

The remainder of the paper is organized as follows. The next section presents the institutional setting. Section 3 describes the data and the empirical strategies. Section 4 presents the main results. Section 5 explores various heterogeneous treatment effects to investigate the mechanisms underlying the effects. Section 6 provides further evidence to examine potential confounding factors and alternative explanations. Section 7 concludes. A more detailed description about the institutional background and data collection, together with additional results, are provided in an on-line appendix. All the tables and figures that appear in the appendix are labelled with a prefix **A**.

2 Institutional Background

The Newspaper is an industry leader in a competitive regional market in China. It employs more than 300 journalists and has a daily circulation of about one million. Although owned by the state, the Newspaper is fully funded by advertising and sales revenues. After paying an annual fixed fee to the state, the board of the Newspaper has the freedom to distribute its residual profits. The board also enjoys high autonomy in managerial practices and editorial decisions, except for in reporting on major political issues.

The content of the Newspaper includes a front section covering important news, headlines, and editorial articles, followed by sections on Economy and Business, Politics and Law, Education and Health, and General Reports, and then by sections on Local News, Entertainment, Consumption Guides, and Sports. Approximately 80% of the news content is provided

by employed journalists, while the remainder is provided by news agencies, freelance writers, and other media.

2.1 The Organization of Production and Information Problems

News production involves three major players: chief editors, division editors, and reporters. The roles of these players are depicted in the organizational chart of the Newspaper (see Figure 1). Chief editors set the long-run editorial policies for the Newspaper, make major financial and personnel decisions, and supervise news production. Below chief editors are division editors, who are responsible for the editorial activities of a particular news section. At the bottom of the organization are reporters, whose main job is to collect information, initiate news reports, cover news events, and write articles. Reporters are organized into divisions corresponding to the news sections.

The major cost of news production is the cost of collecting and processing information. It is more costly to acquire information that is original, unique, and accurate. For this reason, editors whose main activities are confined to the office only engage in collecting information with a low cost, such as information on anticipated events and news columns designed in advance. Reporters are generally relied on to collect high-quality and original information, such as information for investigative reports and feature stories.

Information asymmetries occur between editors and reporters because of the division of labor between them in news production. For instance, if a reporter reports on an event without collecting details, an editor will not be able to verify the quality of the reporter's coverage without gathering information from other sources. Moreover, agency problems may occur when reporters and editors have goals that differ from those of the Newspaper. For example, an editor wants a reporter to write an in-depth report on an industry, but the reporter may simply write a report with positive impressions of favored companies.

2.2 The Provision of Incentives and Agency Problems

The Newspaper uses a high-powered payment scheme to motivate reporters whose output is measurable and separable from others. A reporter's wage income consists of two parts: 1) a fixed base-salary, which accounts for approximately one-third of his wage and 2) a piece-rate payment that is directly tied to his monthly performance, as measured by a score with a quantity component and a quality component. The quantity score is determined by the number of published articles and words. The quality score is determined by the quality of published articles, which is evaluated by an internal evaluation committee on a daily basis and aggregated to a monthly level.

Despite the performance pay, reporters may divert their effort to non-journalistic activities that bring them private benefits. Chinese reporters have substantial private networking and rent-seeking opportunities (see Zhao, 1998, 2008 for numerous examples). "Hongbao" – the Chinese word for money or gifts in exchange for favors – is pervasive in the Chinese media industry.³ Reporters may also spend time and effort establishing "guanxi" (social connections) to expand their career and business opportunities. A common example is for a reporter to submit information that is favorable to an interviewee. Some of this information, such as an advertising-type report, not only diminishes the quality of the news content but may also crowd out advertising revenues. Other less obvious examples include journalists taking advantage of a newspaper's reputation to enhance their personal career, conducting consulting work for interviewees, and colluding with public relations firms.

In contrast with the high-powered pay scheme for reporters, the payment scheme for division editors is a low-powered flat wage because their jobs largely involve multi-tasking and cooperative teamwork.⁴ Given this pay structure, division editors are primarily motivated

³Under Chinese media regulation, a journalist receiving "hongbao" from interviewees is viewed as corruption. However, unless the amount of money is large and verified, such behaviors are seldom punished.

⁴A division editor's job spans from supervising and coordinating subordinate reporters to monitoring the implementation of news coverage and ratifying reporters' proposals. On occasions of anticipated events, division editors may engage in collecting information and implementing news coverage. Division editors work an eight-hour shift, and teamwork is essential in their performance.

by career concerns and on-the-job benefits, such as their intrinsic valuation of the job and its perks. Unlike reporters, division editors have far fewer opportunities to seek rents because their activities are restricted to the office and are easier to monitor. An agency problem is more likely to occur when division editors have different preferences for news reports from chief editors, for instance, when they care more about perks or favoritism in the workplace.

Chief editors of the Newspaper are paid salaries according to their positions in the government hierarchy and bonuses depending on the yearly profits of the Newspaper. Similar to managers in many state-owned enterprises in China, chief editors aim to maximize the profits of the Newspaper after satisfying certain political constraints. Their preferences are largely captured by the performance measures for reporters, especially the quality scores.⁵

2.3 Authority and Control before the Reform

The distribution of editorial authority determines the hierarchical structure of the Newspaper: chief editors at the top, division editors in the middle, and reporters at the bottom. Without formal delegation of decision rights, chief editors have the right to modify and overrule the decisions made by both division editors and reporters. Division editors can overrule reporters' submitted decisions, while reporters have no formal decision rights and cannot approve their own decisions.

In the late 1990s, some Chinese newspapers experimented with a decentralized organizational arrangement under which editorial authority was delegated to division editors. The rationale is that chief editors, although having decision rights, may not effectively control actual editorial decisions, because they are unlikely to have sufficient time and the information to originate and monitor news coverage. By contrast, division editors are more informed of reporters' activities and thus in a better position to originate news coverage and monitor reporters' behavior. Therefore, delegating editorial authority to division editors would promote their initiative and facilitate the use of their local knowledge.

⁵Using monthly data from 2003 to 2010, I find that the reporters' quality scores are highly correlated with the Newspaper's advertising revenues.

In the early 2000s, the Newspaper formally delegated editorial authority to division editors in all divisions. Division editors possessed the rights to ratify news reports submitted from their subordinate reporters. Chief editors were committed not to intervening in editorial decisions except in unusual situations. Under this arrangement, the effective control of editorial decisions depends on the degree of information asymmetry between division editors and reports and also on the division editors' incentive to monitoring reporters. For instance, an editor sitting in an office would not have the information to intervene in an investigative report that a reporter initiates and implements. A division editor may not have sufficient incentive to clean up low-quality reports that cater to interviewees, because she may not care about the Newspaper's profitability or may show favoritism toward their subordinates.

2.4 Authority and Control after the Reform

In September 2005, the Newspaper decided to reallocate editorial authority from division editors to chief editors in four divisions, namely, Economy and Business, Politics and Law, Education and Health, and General Reports, but to maintain the previous authority arrangement in the other divisions, namely, Local News, Entertainment, Consumption Guides, and Photography.⁶ To implement this new managerial practice, the Newspaper created an editing center headed by two vice chief editors (Vice Chief Editors 1 and 2 in Figure 1). Three senior editors from the front section were assigned an additional task to assist these vice chief editors in managing the editing center. Under the new arrangement, division editors were required to submit their editorial decisions to the editing center for approval, although they still had the right to ratify proposals from their subordinate reporters. Because it lacked information sources to fulfill the need for rapid news delivery, the editing center played a limited role in initiating news coverage. Its function focused on monitoring and ratifying submitted news articles. For instance, one specified function of the editing center was to

⁶During the reform, the Sports division was treated differently: sports reporters were allowed to become involved in editorial decision making. Therefore, in the baseline sample, I exclude observations of sports reporters. The inclusion of these reporters barely affects the results.

clean up low-quality or even harmful news content (e.g., advertising-type information).

2.5 What Caused the Reform?

Internal documents of the Newspaper show that the organizational reform was triggered by the replacement of a chief editor. In June 2005, the local government appointed a new chief editor (Chief Editor A in Figure 1) when a previous chief editor reached the mandatory retirement age. As a regular appointment, the new chief editor was selected from among several candidates who were "hierarchically appropriate" to fill the vacancy.⁷ The new chief editor proposed a change that shifted editorial authority from division to chief editors, from among several possible changes in managerial practices considered by the board of the Newspaper. Some board members supported the proposal because they had been concerned about the loss of control when authority was delegated to division editors. Several members objected to this proposal, arguing that such an authority change was not particularly sensible because the chief editors were rarely informed of reporters' activities. With this dispute, the board ultimately decided to implement the authority change within the four divisions that the new chief editor took over from the retired one, while leaving the other divisions unaffected. The wage structure, evaluation system, and job assignments were deliberately kept unchanged to avoid too much disruption within the Newspaper.

In interviews, journalists of the Newspaper described the organizational change as a big surprise: "Nobody was talking about organizational change at that time." Several senior journalists indicated that the replacement and the authority change were unlikely to be driven by political influence. If the replacement had been intended as a means to strengthen political control, the government would have replaced the top personnel with propaganda officials or managers from a Party newspaper. However, the chair and other board members were not replaced during the sample period, and the new chief editor was neither from the

⁷The regulation of the media in China requires that top managers of every general-interest newspaper be appointed by a responsible government department and be selected from candidates at the same hierarchical level as the replaced managers.

propaganda department nor had any previous experience in the media industry.

3 Data and Empirical Strategy

3.1 Data

To measure reporters' effort and action choices, I construct a unique data set by combining the Newspaper's internal personnel records and external measures of news content. The Newspaper provided personal information on all its employees and monthly measures of all its reporters' performance. A team of Chinese research assistants were hired to classify all of the articles collected from the Newspaper's digital archives into news content categories, following a set of coding rules that an experienced journalist and I specified based on the Newspaper's evaluation system. The baseline sample spans from 2004 to 2006, during which the operating environment and the internal structure of the Newspaper, the volume of news content, and the quantity of advertising were stable.

3.1.1 Personnel Information

Among the 183 reporters in the baseline sample, 60 percent are men, more than 80 percent have college or above education, and approximately half are members of the Chinese Communist Party. The reporters are on average 33 years old, with an 8 year tenure at the Newspaper. The average levels of their hierarchical positions and journalism qualifications are both about 1.5 on a score scale of 1-2-3, which represents Assistant Reporter, Reporter, and Senior Reporter, respectively. Together with the tenure information, these data imply that most reporters are mature enough to understand well the evaluation system of the Newspaper and are able to work independently. Of the 56 division editors and copy editors, the gender ratio, education levels, and fraction of Party members are similar to those of the reporters. They are on average older, more experienced, and higher ranked than the reporters. Summary statistics on this personnel information are provided in Table A2.

3.1.2 Internal Measures of Quantity and Quality

The Newspaper’s internal measures include the numbers of articles and words and the scores of quantity and quality performance. The quantity score is a composite measure of the number of articles and words, rescaled with a score system. The quality score is calculated by nine members of an evaluation committee of the Newspaper. These members were regarded as the most skillful and loyal journalists at the Newspaper. After retiring from their ordinary work, they were rehired to evaluate reporters’ journalism performance, without involvement in day-to-day operations. Based on well-defined rules, which are designed to ensure an accurate and fair measure of a reporter’s individual contribution, they assigned a quality score to each article according to its subject, writing quality, and timing of reports. As summarized in Panel A of Table 1, in an average month, a reporter writes 32.5 articles and 18,356 Chinese words and earns a quantity score of 2,079, and a quality score of 1,476.

I use the quantity and quality scores as baseline outcome variables, because they are accurately measured to serve as a basis for performance pay and thus are good proxies for individual effort. In particular, when published articles are authored jointly with other reporters or editors, the scores are adjusted by a sharing rule to purify a reporter’s individual contribution. Moreover, these scores are comparable across different types of journalism, permitting a difference-in-differences identification strategy. I particularly stress the quality scores as the primary measure of a reporter’s effort and performance. First, the quality scores capture the part of journalism work that is most important for readership and that requires substantial effort from reporters. Second, unlike the quantity scores, the quality scores are not constrained by the available space for news content. Third, the quality scores mitigate concerns about the selection of articles for publication, as a high-quality article is unlikely to be screened out.⁸

⁸According to the interviews, on average about 20% of articles submitted to the editors are rejected. Most rejections are low-quality articles. A mature reporter is able to anticipate the probability of rejection and will usually only expend substantial effort on reports that are very likely to be published.

3.1.3 External Performance Measures Based on News Content

I construct content-based measures of reporters' performance for two purposes. First, the Newspaper does not have records breaking down their internal ratings of the articles that compose the quality scores. If the assignment of quality scores can be imitated by the external measures, its transparency and reliability can be better assessed. Second, the external measures contain information about a journalist's action choices. In practice, after reading its title, authorship, byline, and lead paragraph, the research assistants coded every article into mutually exclusive categories: investigative reports, feature stories, special reports⁹, propaganda, advertising articles¹⁰, and several others. These external measures are less compatible between different types of journalism. For instance, there are far fewer investigative reports in the controlled news sections (e.g., Entertainment or Consumption Guides). Therefore, the external measures only apply to the treatment group and the Local News division in the control group, between which common measures are plausible.

I will use investigative reports, feature stories, and special reports – in particular, the first two types of articles – to measure a reporter's journalistic initiative. Investigative and feature reports correspond to a common sense view of what constitutes good journalism. Initiating and implementing these reports requires substantial effort in collecting original information and conducting interviews. Special reports, to some extent, indicate the uniqueness of news coverage. To capture a reporter's attainment of private benefits, I will use the number of advertising articles, which are usually regarded as bad journalism. I will measure the political control of the Newspaper by propaganda articles – reporting on propaganda campaigns originated by the government.

Accurate measures of division editors' activities are difficult to obtain. Internal measures of their performance are not available because their pay is not based on performance

⁹An article is coded as a "special report" if it is a long article that contains key words like "special", "unique" and "first report", but not identified as an investigative report or a feature story.

¹⁰An article is coded as "advertising article" if it is a promotion of products and/or the image of a particular company, but not advertisement articles assigned by the Newspaper for business clients.

measures. Due to the teamwork nature of their job, division editors usually do not sign their names to reporters' articles to indicate their individual contribution. Nevertheless, two external measures provide a reasonable proxy for their journalistic activities: 1) "assigned by editor" articles, which explicitly indicate that a division editor assigns and organizes the news coverage; and 2) "column by content" articles, which indicate that the news coverage is originated by a division editor to fit columns designed in advance. Parallel to the classification of news content, I also categorize articles according to their authorship, which may contain information about the quality of journalism. For instance, articles containing the names of the external correspondents who provide the news source generally indicate low-quality journalism because the same information is likely to be provided to other media outlets.

Panel B of Table 1 summarizes the basic statistics for the external measures. Several points are worth noting. First, propaganda reports account for only approximately 1% of all articles written by reporters, verifying that the Newspaper aims to maximize profits after meeting a minimal level of political constraint. Second, a reporter on average writes approximately 2.5 investigative and feature reports per month, indicating that such articles require substantial effort. Third, the number of "assigned by editor" and "column by content" articles is small, confirming the limited role of division editors in news coverage.

The last column in Panel B shows the contributing factors to the quality scores, using the coefficients retrieved from the regression of the quality scores on the external performance measures.¹¹ The main contributing factors are investigative reports, feature stories, special reports, and propaganda articles. As expected, the advertising articles and articles with external correspondents are negatively correlated with the quality measure. So are the articles with internal coauthors, the "assigned by editor" articles, and the "column by content," because the assignment of scores intends to purify individual performance from joint work.

¹¹The complete regression results are reported in Table A5.

3.2 Empirical Strategies

The empirical investigation aims to estimate the causal effects of the authority change on reporters' effort and action choices, using a difference-in-differences (D-I-D) approach. The authority change creates a treatment group, comprising the four divisions in which editorial authority was reallocated from division editors to chief editors. To purge unobservable factors that are associated with the authority change and that commonly affect all reporters, I use the unreformed divisions as a control group.

3.2.1 Econometric Specification

The baseline D-I-D regression estimates the following panel specification:

$$P_{it} = \alpha_t + \lambda_i + \theta(C_i * R_t) + X_{it}\beta + \varepsilon_{it}, \quad (1)$$

where i indicates individual and t indicates time at the *year* \times *month* level. The dependent variable is a reporter's performance in terms of either an internal measure (i.e., the quantity or quality score) or an external measure based on news content. α_t is time fixed effects to control for aggregate fluctuations and time trends of worker performance. λ_i is individual fixed effects. C_i is a dummy that equals one for the reformed divisions, and zero for the remaining divisions. R_t is a timing dummy equal to one if a reporter's performance is observed in or after the month of the organizational reform.¹² $C_i * R_t$ is the interaction term between the two variables, and its coefficient θ identifies the average treatment effect. X_{it} includes time-variant individual characteristics such as age-squared, tenure-squared, position, and qualification.¹³ These covariables help to control for ability, career concerns, and other factors that may affect reporters' performance. ε_{it} is a stochastic error term.

¹²The coefficients on both C_i and R_t are not identifiable in the presence of both individual/division fixed effects and time fixed effects.

¹³The set of covariables also include division fixed effects to account for a few reporters who switch across divisions. The age and tenure variables, though time-variant, are not identified due to collinearity in the regression with both individual fixed effects and time fixed effects.

In all baseline D-I-D regressions, I include individual fixed effects to control for reporters' unobservable ability and preferences that are constant overtime. The inclusion of individual fixed effects excludes the variation from entries and exits so that I can focus on the intensive margin. Excluding entries and exits may bias the estimated effects on stayers if reporters' inputs are complementary or substitutes. Several pieces of information eliminate this concern. First, reporters perform their jobs independently in most of their news coverage; thus, the work of entries and exits has a limited impact on the performance of stayers. Second, the observations of entries and exits account for only a small fraction of all the observations. Third, as shown in Table A3, the observable characteristics of exits are similar to those of stayers. I will present the effects of the authority change on the performance of stayers, entries, and exits to analyze the selection pattern.

As noted by Bertrand et al. (2004), in the D-I-D estimation with many periods, the standard errors may be correlated over time or within certain clusters. Ideally, the standard errors would be clustered at the division level. However, such a small number of clusters may incorrectly inflate the standard errors, as noted in Angrist and Pischke (2009). As a compromise, I divide reporters in each division into two or three subdivisions based on a broad classification of their task assignments.¹⁴ Throughout the paper, I report the standard errors clustered by sub-divisions unless otherwise specified. The standard errors clustered by divisions (see Table A7) are moderately greater than their counterparts reported in the paper.

3.2.2 Identification

I use two control groups in the D-I-D estimation. First, when the outcome variables are the internal performance measures (i.e., the quantity and quality scores), all the four unreformed divisions, namely, Local News, Entertainment, Consumption Guides, and Photography, are

¹⁴For example, within the Economy and Finance division, I classify reporters into three subdivisions: 1) economic reporters who specialize in covering general economic issues, 2) industrial reporters who specialize in specific industries and firms, and 3) finance reporters who specialize in financial markets.

used as the control group. Second, I single out the Local News division as a control group because reporters in this division perform similar tasks and the external measures of their performance are comparable to the treated reporters. As shown in Table A4, before the organizational reform, the external performance measures for the Local News reporters and for the treated reporters are similar in most dimensions, whereas in terms of the internal performance measures, the four unreformed divisions as a whole are more comparable to the treatment group.

The key underlying assumption of the D-I-D estimation is that no differentiated trend is present across the treatment and control groups in the absence of the intervention. Figure 2 plots the monthly performance differences between the treatment group and each of the two control groups. Despite the volatile time series, the treatment-control differences in both the quantity and quality scores do not exhibit a trend before the reform using either control group.¹⁵ The absence of a pre-trend is reaffirmed when the time series is extended to one year earlier than the baseline sample (see Figure A1). This fact that the difference in performance between the treatment and control groups is stable for a long time before the reform makes it unlikely that the difference diverges for spurious reasons at the timing of the reform.

The D-I-D identification can be threatened by factors coinciding with the authority change that affect the performance of the treatment and control groups in a systematically different way. While leaving careful inspection of potential confounding factors to later sections, I here discuss two important threats to identification. First, the composition of both the treatment and control groups was stable before and after the reform: no division editor and only 6 reporters switched between the two groups.¹⁶

Second, because the organizational reform was triggered by the replacement of one chief

¹⁵The volatility across time is caused by seasonality and several exogenous shocks. For example, the substantial differentials in Marches 2005 and 2006 are driven by the Chinese National People's Congress.

¹⁶The two vice chief editors, who headed the editing center, were the individuals previously charged with supervising the four reformed divisions. Division editors all remained the same people. Apart from a small number of recruits and retirees, few reporters switched their job assignment. The composition of the evaluation committee did not change over the sample period.

editor, several concerns arise regarding the potential impact associated with this replacement through channels other than the authority change. One concern is that the authority change was caused by political control or a government mission. This concern is mitigated by the facts that the replacement was not driven by political consideration (recall Section 2.4) and by the evidence that the reform barely had any impact on propaganda-related news content. Another concern is that the new chief editor may affect reporters' performance through his leadership or management style. Internal documents and interviews suggest that chief editors did not micromanage journalistic activities and that any changes in editorial policies should be decided by the entire editorial board. Thus, the new chief editor's influence on reporters' performance was unlikely to discriminate between different news sections. In Section 6, I will exploit several placebo tests based on the replacements of top personnel in the Newspaper to test the potential impact of changing leadership.

4 Main Results

4.1 Effects on Internal Performance Measures

Table 2 displays reporters' average performance before and after the reform in the treatment and control groups and also the comparison between them. To focus on the effects on the same reporters, I restrict the sample to a balanced panel that includes 113 reporters observed both before and after the reform, excluding 6 reporters who switched between groups. Panel A shows that the D-I-D comparison of the quantity scores is small and statistically insignificant. This result is not surprising, given that the Newspaper's volume of content was stable. However, Panel B demonstrates that after the reform, the gap in the average quality scores between the treatment and control groups widens dramatically, amounting to a D-I-D comparison of 17.7% in the mean.

In the above D-I-D comparison of the quality scores, the result is mainly driven by the before-after difference in the control group. Such a result can arise if there was a negative

common shock to all reporters, as will be confirmed in the regression analysis. It is documented that in a board meeting shortly after the reform, the evaluation committee was urged to be more cautious about assigning high scores to articles in all news sections. Such a more stringent evaluation policy was verified by the decreased coefficients of several content measures that are primary contributing factors to the quality scores after the reform. Importantly, these decreases in coefficients appear in both the treatment group and the Local News division in a similar manner, relieving the concern that the Newspaper adjusted its evaluation policy against the control group after the authority change.

4.1.1 Baseline Estimates

The findings in Panel A of Table 3 confirm the previous descriptive evidence. The simplest estimation, controlling for only individual fixed effects (Column 1 and 5), shows that the average effect on reporters' quantity scores is positive, but economically small (5.4%) and statistically insignificant. The effect on the quality scores, however, is economically large (20.7%) and statistically significant at the 5% level. The results change little after controlling for time trends (Columns 2 and 6) and, in addition, time-variant personal characteristics (Columns 3 and 7).

When individual fixed effects are replaced with controls for time-invariant personal characteristics such as gender, education and Party membership (Columns 4 and 8), the effect on the quality score declines dramatically, to 6.2% and the effect on the quantity scores becomes negative. These results suggest a negative selection associated with the authority change, which I will analyze in Section 4.2.2.

4.1.2 Dynamic Effects

Panel B of Table 3 presents the dynamics of the D-I-D estimation of the average treatment effects. Before the reform, the estimates of both the quantity and quality scores are statistically insignificant, confirming the absence of a pre-trend effect. After the reform, the effects

on the quantity scores are always insignificant. The response of quality scores is not notable until November 2005 (two months after the reform) and becomes pronounced four months after the reform.¹⁷ The gradualness of the effect mitigates the concern that the reformers deliberately increased quality scores to reward (or compensate) the treatment group or to demonstrate the success of the organizational reform, in which case the response would be strong in the short run.

4.2 Estimates of Individual Fixed Effects

To complement the above evidence, I estimate the effects of the authority change for each individual reporter using the following panel data specification,

$$\text{Log}(P_{it}) = \alpha_t + \sum_i D_i [\lambda_i^{\text{before}}(1 - R_t) + \lambda_i^{\text{after}} R_t] + X_{it}\beta + \varepsilon_{it}, \quad (2)$$

where D_i equals one for worker i , and zero otherwise, and all the other variables are defined as in equation (1). $\lambda_i^{\text{before}}$ and λ_i^{after} are the estimates of fixed effects for each individual before and after the reform respectively. I focus on the individual fixed effects estimated from the regression of the log quality score – referred to as individual fixed effects of quality performance. Other results and a more detailed analysis can be found in the appendix.

4.2.1 Effects on Stayers

Table 4 reports the means of the estimated individual fixed effects of quality performance for the stayers – the reporters who are observed both before and after the reform. Among the 66 stayers in the treatment group, the average fixed effects are significantly greater after the reform; among the 47 stayers in the control group, the corresponding after-before difference is much smaller and statistically insignificant. This result is consistent with the previous D-I-D estimation. I view the increase in the average individual fixed effects of the treated

¹⁷The lack of response in September and October of 2005 is likely because these two months are among the special period in which social norms offset the effect of the reform, as I will examine in the next section.

reporters as an improvement in reporters' efforts for two reasons. First, the regression (2) controls for variables that measure time-variant experience and expertise. Second, as the stayers are mostly experienced reporters even before the sample period began, the differences in their individual fixed effects are likely to capture changes in incentive rather than changes in ability.

Figure A2 depicts the kernel density of the above estimated individual fixed effects of quality performance. In the treatment group, the distribution of the individual fixed effects significantly shifts to the right after the reform. Moreover, the distribution of the after-before differences in the estimated individual fixed effects for the treatment group is centered on a significantly larger number and features a much fatter right tail than that for the control group. These results are robust under formal statistical tests. In addition to lending further support to the regression results, they also eliminate the concern that the impact of the authority change was driven by a small number of workers.

4.2.2 Selection Pattern: Effects on Exits and Entries

Previous results in Table 3 indicate a selection effect: the effects of the authority change on the quantity and quality scores decrease substantially when individual fixed effects are excluded. To unpack this selection effect, I compare the estimated individual fixed effects for entry and exit reporters.¹⁸ As shown in Table 4, the difference in the individual fixed effects between entries and exits in the treatment group is much smaller than that in the control group. This negative effect on the extensive margin offsets the positive effect of on stayers. Moreover, in the treatment group, the individual fixed effects of quality performance for exits are dramatically smaller than those of stayers. In the control group, however, the difference is negligible. These results provide suggestive evidence that the authority change hinders the participation of the reporters whose interests are less aligned with the Newspaper's goal.

¹⁸In the reported results, I define exits as the reporters who leave their jobs within three months of the reform, and entries as the ones whose performance is only observed after the reform. The results are similar when exits are defined as reporters whose performance is observed only before the reform.

4.3 Effects on External Performance Measures

In this subsection, I present the average treatment effects on the external measures of reporters' performance using the baseline D-I-D econometric specification (1). However, the control group now only includes reporters in the Local News division whose content output is comparable to that of the treated reporters. Table 5 reports the estimates.

To assess the comparability between the two control groups, I first report the effects on the reporters' quantity and quality scores using the Local News division as the control group in the first two columns of Table 5. The increase in the quantity score is a mere 2.7% and statistically insignificant, and the increase in the quality score is 21.7% and statistically significant. Both results are similar to the previous estimates using the entire four unreformed divisions as a control group.

Consistent with the effect on the quality score, the effect on the reporters' journalistic initiative is positive and sizeable. In particular, the number of investigative reports increases by 0.360 standard deviations, and the number of feature stories increases by 0.263 standard deviations. At the same time, the effect on the number of advertising articles, which captures the reporters' attainment of private benefits, decreases by 0.320 standard deviations. All these effects are significant at the 5% confidence level. They demonstrate a substitution between reporters' journalistic initiative and their attainment of private benefits. As shown in Table A9, the effects of the authority change on other external measures are small and statistically insignificant.

4.4 Effects on Division Editors

I have thus far focused on the effects of the authority change on reporters' performance. Division editors, however, also play a role in news production. As previously discussed, I use the numbers of "assigned by editor" and "column by content" articles to capture division editors' effort to collect information and initiate news coverage. The last column in Table 5 shows that the authority change reduces this measure of division editors' journalistic

initiative by 0.303 standard deviations, and the result is statistically significant at the 1% level.

In addition to initiating news coverage on some occasions, division editors also coordinate and mentor subordinates. How does the authority change affect the functioning of division editors in these dimensions? As a measure of division editors' coordination effort, the number of articles coauthored by reporters barely changes after the reform (see Table A9).¹⁹ To assess the impact on division editors' mentoring function, I estimate the effect of the reform on junior reporters whose tenure is three years or less and whose performance is more dependent on division editors' initiative.²⁰ As shown in Table A10, relative to the performance changes of senior reporters, both the quantity and quality scores of junior reporters are substantially reduced after the reform. Moreover, the negative effect on division editors' initiative is significantly stronger for junior reporters than for senior reporters. All these results consistently indicate that the authority change reduces division editors' journalistic initiative.

4.5 Discussion

To what extent can the above results be explained by theory? As described in Section 2.3, in the setting of the Newspaper, the assignment of decision rights interacts with the distribution of information across layers in a hierarchy to affect workers' behavior. A theoretical framework that fits this setting is the Aghion-Tirole (1997) theory of formal and real authority. In their theory, the distribution of effective control (real authority) is determined by the information structure between a manager and a worker, which, in turn, depends on the assignment of decision rights (formal authority) between the two parties. The basic Aghion-Tirole model predicts that assigning decision right to the manager tends to better align decisions with her preferences, but diminishes the worker's initiative to collect infor-

¹⁹Because coauthorship will reduce a reporter's performance scores according to the score assignment rule, the number of coauthored articles, to some extent, reveals division editors' coordination effort.

²⁰Insider insights suggest that in the first two or three years of their careers, reporters rely heavily on task assignments and instructions from their supervisors.

mation that is useful for production. This insight can be applied to a three-layer hierarchy with a top manager, a mid-level manager, and a worker at the bottom, one that is used by the Newspaper. In such a hierarchy, the amount of real authority that workers can obtain hinges on the aggregate information that can be acquired by both the mid-level and top managers. When decision rights are transferred from the middle to the top of the hierarchy, the mid-level manager decreases his incentive to collect information, whereas the top manager increases her incentive to collect information. The consequence of the aggregate information acquired by these two upper-layer managers depends on their incentive and ability to collect information.

In the current empirical setting, a chief editor (top manager) is less efficient in information collection than a division editor (mid-level manager), because chief editors are far away from news sources, are overloaded with other tasks, and have limited task-specific expertise. Therefore, the aggregate information for production acquired by the two upper-layer managers is likely lower after the authority change. Reporters then obtain more real authority and exert more effort. The finding that the authority change reduces division editors' journalistic initiative squares with the basic Aghion-Tirole model. Moreover, the finding that the authority change improves reporters' performance is consistent with their model, as extended to a three-layer hierarchy.

However, puzzling results arise when one examines the effects on reporters' action choices, captured by the content measures. Given that reporters are likely to have more real authority after the authority change, the Aghion-Tirole theory would predict that reporters are more inclined to pursue projects that provide themselves with private benefits. However, the finding that the authority change reduces the number of advertising articles seem opposed to this prediction. One explanation is that reallocating authority to top managers may create greater incentive for them to monitor certain aspects of workers' jobs. For instance, chief editors, after having editorial authority, may selectively monitor low-quality and even harmful news reports (e.g., advertising articles). This selective monitoring may then direct

reporters from private activities to production activities (e.g., writing investigative reports). In the next section, I will focus on testing this explanation, which is absent in the Aghion-Tirole theory.

5 Heterogeneous Treatment Effects

The effects of the authority change on the external performance measures suggest that shifting authority from division to chief editors induces reporters to reallocate their effort from private to productive activities, leading to a hypothesis: when the cost, relative to the benefit, of conducting private activities is higher, the effect of the authority change on worker productive activities is smaller. To test this hypothesis, I explore two heterogeneous treatment effects: one concerning the cost of pursuing private benefits and the other concerning the benefit of private networking.

5.1 Private Benefits Condoned by Social Norms

In China, the Spring Festival (the Chinese New Year) and the Mid-Autumn Festival are two special time periods in which Chinese people conventionally exchange gifts, establish social connections, and expand business networks. Anecdotal evidence suggests that restrictions on journalists' engagement in private activities are much more relaxed than usual during this period. Moreover, chief editors are likely to be overloaded during this period, as they are involved with numerous external social activities, in addition to the management of internal activities. Therefore, if the authority change improved workers' journalistic initiative through restricting their engagement in private benefits, the effect should be muted during these two periods.

The Spring Festival often occurs in late January and sometimes early February, and the Mid-Autumn Festival usually occurs in September and occasionally early October. Considering private networking takes place several weeks before the festivals, I construct a "special

months" dummy equal to one for January and September and zero for all the other months. Table 6 reports the results from the triple-differences regressions in which I add an additional interaction term between `reform_treatment` and the dummy of "special months" to the baseline estimation (1). The first two columns demonstrate two important results. First, the effect on the quality scores is a 16.3% reduction during the special months relative to the effect during the normal months, which is a 22% increase. The F-test cannot reject the hypothesis that the sum of these two coefficients is zero, suggesting that the positive effect on the quality score is largely offset in the special months. Second, the impact on the quantity score is small and insignificant in either the special or the normal months. Thus, the result is likely driven by an adjustment in reporters' efforts rather than by changes in the volume of the Newspaper and editorial policies during these periods.

The last three columns of Table 6 show the effects on the external performance measures. Consistent with the effects on reporters' quality scores, the increase in reporters' journalistic initiative, measured by the sum of the investigative, feature, and special reports, is substantially offset in the special months. Meanwhile, the effect on the number of advertising articles is positive in the special months, while it is negative in normal months, precisely opposite to the effects on reporters' journalistic initiative. These results lend further support to the hypothesis that the authority change directs workers' effort from non-production activities to production activities.

5.2 Access to Private Benefits across Task Assignments

Workers with different job assignments are often exposed to different opportunities of private benefits. It is well known in the Chinese media industry that economic and financial reporters, who specialize in covering news about companies and products, have access to large pecuniary private benefits and business opportunities. In developing countries, rent seeking behavior is often more common in the sectors that experience drastic commercialization and privatization. Educational institutions, hospitals and pharmacies in China have,

since 2000, fallen into this category. In contrast, reporters in the divisions of Politics and Law and General Reports, who focus on government policies and routines, investigative reports, and sudden events, have far more limited access to private benefits.²¹ A natural proxy for the extent of reporters' access to private benefits is their allocation to divisions, which is based on task assignment.²²

Table 7 reports the results of a D-I-D regression that splits the treatment group into four divisions, with the control group being the same four unreformed divisions as in the baseline estimation. As shown in the first two columns, the Economy and Business reporters improve their performance substantially after the reform – about 19% in quantity and 35% in quality; the Education and Health reporters improve their quantity scores by more than 12% and their quality scores by more than 27%. In contrast, the Politics and Law reporters respond negatively to the authority change, although the effects are not statistically significant. The General reporters improve their quality scores modestly, but experience a substantial drop in their quantity scores.

The above heterogeneous treatment effects raise a concern that the Newspaper, in response to changes in market demand, might grow the Economy and Business division and the Education and Health division. To test this possibility, I gather monthly data on the number of articles containing keywords related to "economy," "finance," and "firms" and keywords related to "education" and "health," published in the Newspaper and its three major competitors. As the time series in Figure A3 shows, the number of articles in these two subject matters is stable in both the Newspaper and the three competitor newspapers during the sample period. Therefore, the heterogeneous treatment effects are not caused by space reallocation favoring some types of journalism at the expense of other news types. Rather, they are evidence of reporters' increased efforts, which bring about more high-quality publications

²¹It may be that reporters receive private benefits from governments or blackmail interviewees who are involved in scandals. But these activities are either very risky for a reporter to undertake or are difficult to monitor under either organizational structure.

²²The task assignment of a reporter usually stabilizes after a two or three year tenure at the Newspaper. For most reporters, their tasks are assigned before the sample year.

that substitute for low-quality publications produced by newly-recruited reporters, reporters in other divisions, and non-employee writers.

The last three columns present the heterogeneous treatment effects on the external measures. In the Economy and Business division, the opposing effects on the measure of reporters' journalistic initiative and the number of advertising articles are pronounced, and the measure of division editors' initiative drops significantly. These two results indicate that the performance improvement in this division is driven by both the reduction in reporters' pursuit of private benefits and the decline of division editors' initiative. Similar results appear in the Education and Health division, but the magnitude of the effects is smaller, consistent with a smaller effect on the quality score than seen in the Economy and Business division. In the Politics and Law division, in which the effect on reporters' quality scores is reversed, reporters' journalistic initiative decreases after the reform, and both the number of advertising articles and the measure of editors' initiative do not decrease. In the General Reports division, in which the effect on reporters' quality scores is muted, reporters' journalistic initiative hardly changes, and the effects on reporters' attainment of private benefit and division editors' initiative are insignificant. All these results confirm the mechanism through which the authority change improves reporters' efforts by restricting their rent-seeking behavior.

5.3 Discussion

The heterogeneous treatment effects presented above strongly support the hypothesis that the reallocation of authority from mid-level to top managers has an effect on directing workers' action choices from private activities to productive activities. Such an effect precisely reflects the job design aspect of authority in the Holmstrom-Milgrom (1991) theory. In the spirit of this theory, the authority change imposes a "tax" on workers' tasks that are less valuable for or even detrimental to the organizational goal and thus directs their effort to tasks that are more desirable.

The effects of the authority change on reporters' action choices (Section 4.3) and the heterogeneous treatment effects (Sections 5.1 and 5.2) do not necessarily reject the Aghion-Tirole theory as an explanation of the empirical results. Rather, these results suggest a refinement of their theory to incorporate the job design aspect of authority. For instance, one can extend the Aghion-Tirole model to a three-layer hierarchy with multi-tasking agents. In such a model, reallocating authority from mid-level to top managers improves workers' performance by 1) diminishing mid-level managers' initiative to collect information, which in turn gives workers' more real authority and increases their efforts and 2) inducing top managers to monitor workers' pursuit of private benefits and thus motivating workers to change their action choice toward production activities. Such a model can reconcile the full set of empirical results that are presented in Sections 4 and 5.

Furthermore, the empirical results suggest that when studying the provision of incentives in a multi-layer hierarchy, one should pay particular attention to the role of middle management. In the current setting, the gain of shifting editorial authority from division to chief editors was in part driven by division editors' insufficient incentive to monitor reporters' pursuit of private benefits when the editorial authority was delegated. In settings in which the provision of incentives for mid-level managers is more effective, assigning authority to top managers may be less efficient. Conversely, in settings in which top managers can use technology to directly supervise and coordinate low-level workers, it would be more efficient to limit the authority of mid-level managers or even eliminate the entire middle layer.

6 Further Evidence

I have shown that the authority change at the Newspaper has profound effects on reporters' efforts and action choices. The effects are robust in various samples (see Table A11). In this section, I briefly address some potentially confounding factors and alternative explanations, leaving details to the appendix.

Political Influence. As a common view, political control affects the editorial policy of every major Chinese newspaper to some degree. If the Newspaper experienced changes in political influence at the time of the authority change and the treated reporters may be more sensitive to political influence, then the effects of the authority change may be spurious. Various evidence excludes this concern. First, as an important measure of political influence, the number of propaganda articles remains barely changed after the authority change. Second, I do not find any systematic differences in the effects of the authority change between reporters who are members of the Communist Party and those who are not. Third, the authority change has little effect on the performance of the Politics and Law reporters, whose reporting is most sensitive to political influence (recall Table 7).

Leadership and Management Style. The authority change was triggered by the replacement of one chief editor, who I refer to as **CEA** (Chief Editor A in Figure 1) for expositional simplicity. To what extent did the new chief editor affect the Newspaper’s style? How would his influence differ systematically between the treatment and control groups? Arguably, the appointment process of CEA and his job assignment on the board limited his personal impact on news content and reporters’ behavior (recall Section 2.4). To further assess the potential impact of the top managers, I explore three major replacements on the board of the Newspaper outside the baseline sample period. As shown in Table A12, a replacement of the board Chair and other chief editors in 2003 and two changes in top managers after 2006 – the resignation of **CEA** in October 2008 and the appointment of a Chair in February 2010 – did not have any significantly differentiated impact on the performance of reporters in the treatment and control groups.

Evaluation System and Editorial Policies. According to the Newspaper’s documentation, the evaluation methods in terms of the evaluation procedure and the classification of good articles remained the same after the authority change. Moreover, all the nine committee members were the same individuals, and the division of labor among them and the flat-wage pay scheme applied to them did not change. To test the stability of the evaluation

system, I examine the correlation between the quality score and the external measures of news content before and after the reform. As shown in Table A6, within the treatment group, none of the external measures that make a notable contribution to the quality score change significantly after the reform. Similar results appear in the control group.

7 Conclusion

This paper presents evidence from a commercial Chinese newspaper on how workers' efforts and action choices responded to an organizational change that shifted the rights of making editorial decisions from middle to top managers. I find that the authority change improved reporters' quality performance by 20%, which amounts to a 5% increase in wages. While improving the journalistic activities of reporters, who are at the bottom of the hierarchy, the authority change diminished the journalistic effort of division editors, who are mid-level managers. I also find that the authority change reduced reporters' pursuit of private benefits. Overall, the reallocation of authority improved the Newspaper's performance. My estimation shows that compared to its rivals, the Newspaper increased approximately 57 pages of advertising per month – equivalent to a monthly revenue of about 500,000 USD – after the reform. Several costs, however, arose from the authority change. In addition to the negative effect on division editors' journalistic initiative, the exit of reporters who view private benefits as a source of compensation might increase turnovers and disrupt the Newspaper's business operations, at least in the short run.

The evidence generally supports a central premise of the literature that the allocation of authority influences workers' incentives to exert effort and choose efficient activities, when other instruments to motivate workers such as performance pay are limited. Specifically, the overall empirical findings suggest that to better understand the role of authority in the real world organizations, a synthesis of two seemingly parallel theories of authority would be valuable: 1) the Aghion-Tirole theory that emphasizes the vertical allocation of

authority and 2) the Holmstrom-Milgrom theory that emphasizes the horizontal allocation of authority. The result that keeping authority at the top of the hierarchy suppresses mid-level managers' initiative, which in turn promotes low-level workers' initiative, also raises subtle issues regarding the role of mid-level managers in multi-layer hierarchies.

Although Chinese newspapers are state-owned and subject to various political constraints, the key aspects of the empirical setting are pertinent to media in other countries. In media firms, "knowledge is power" is generally true: workers who have the informational advantage effectively control the editorial outcomes. Moreover, the agency problem that journalists may write articles for interviewees in exchange of private benefits is common in developing countries.²³ Even in developed countries with press freedom, it is not unusual for a journalist to engage in private networking that may distract them from production activities.²⁴

The allocation of authority and economic incentives within the organization in the Newspaper are similar to those in profit-maximizing firms, so the results of this paper may be applicable to non-media firms. The organizational problems at the Newspaper have a direct bearing on state-owned enterprises in developing countries. In these firms, the government-appointed top managers often lack managerial expertise and have to delegate decision rights to mid-level managers. When the mid-level managers do not have sufficient incentive to monitor workers' pursuit of private benefits, shirking and corruption may occur among low-level workers. The interplay between the allocation of authority due to information structure and agency problems due to job design is also relevant to private firms. For example, the organizational structure of a typical bank can be viewed as a three-layer hierarchy: CEOs at the top, branch managers in the middle, and loan officers at the bottom. The production critically relies on loan officers' collection of information about customers. A powerful middle

²³Ristow (2010) and Transparency International (2011) provide numerous recent examples of media bribery in developing countries. Di Tella and Franceschelli (2011) show striking evidence on media corruption caused by government advertisements in Argentina.

²⁴Baron (2006) provides anecdotal evidence of the interest conflicts between journalists and the media and how they affect media bias.

layer may diminish loan officers' initiative to collect useful information. However, keeping decision rights to top managers who are remote from customers may reduce the effectiveness of monitoring loan officers, who may then use the bank's reputation and client information to pursue private benefits. Another example is the franchiser-franchisee-worker relationship, in which workers' potential misuse of the franchiser's assets is an important concern in the assignment of decision rights between contracting parties.

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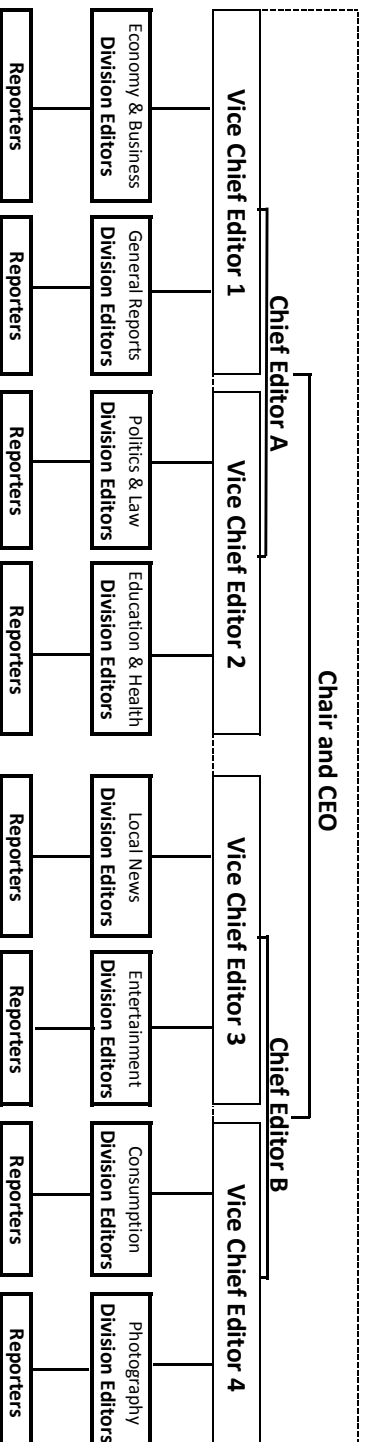
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Figure 1. Organizational Structure of the Newspaper



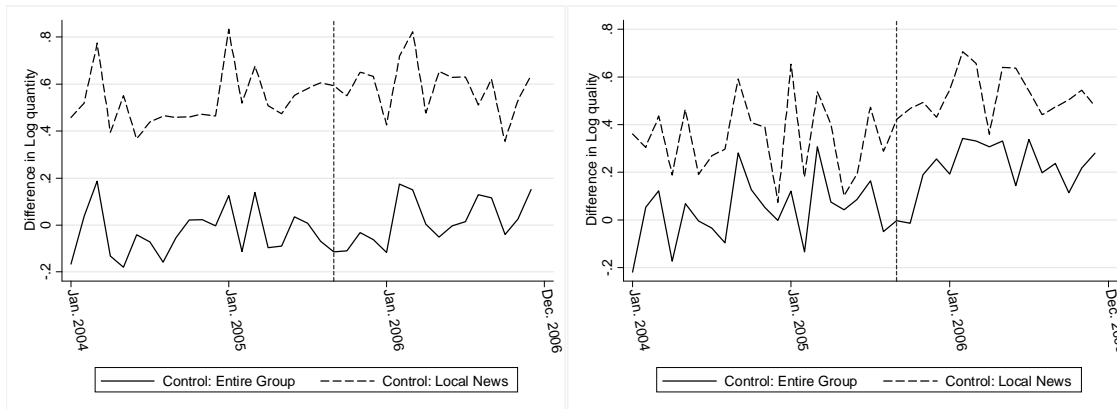
Notes:

1. The Editorial Board includes the Chair, the CEO, Chief Editors A and B, and Vice Chief Editors 1-4 in the chart. The Chair, CEO, and Chief Editors A and B do not engage in the daily operation of editorial activities.
2. The basic hierarchy involved in the production of news is defined by the distribution of editorial authority – the right of ratifying and monitoring editorial decisions: chief editors at the top, division editors in the middle, and reporters at the bottom. The same hierarchy is organized in all divisions, which are designed based on news sections.
3. Before September 2005, the Newspaper delegated editorial authority to division editors in all the eight divisions. After that, the four divisions at the left (under the supervision of Chief Editor A) - Economy and Business, General Reports, Politics and Law, Education and Health – experienced an organizational reform during which editorial authority was shifted from division editors to chief editors. The four divisions at the right (under the supervision of Chief Editor B) remained unchanged.
4. Three groups of individuals who were not involved in editorial decisions are omitted from this chart: 1) three vice chief editors who were members of the board but in charge of non-news sections (e.g., literature, digest); 2) the Evaluation Committee who were subject to the leadership of the board; 3) copy editors and other supporting staff. The job assignments of these individuals remained unchanged over the sample period.

Figure 2: Comparison in Performance between Treatment and Control

Panel A: Difference in Quantity Score

Panel B: Difference in Quality Score



Notes: All the observations are at the monthly level over the sample period. Panel A (and B) plots the difference of the average log quantity (quality) between the control and the treatment groups. “Treatment” indicates the reporters from the divisions in which editorial authority was transferred from division to chief editors. “Control” indicates the reporters from the divisions in which editorial authority remained delegated. The solid line depicts the treatment-control difference using the four unreformed divisions as the control group; the dashed line depicts the treatment-control difference using only the Local News division as the control group. The vertical dotted line indicates the timing of reform: September 2005.

Table 1: Summary Statistics of Individual Performance Measures**Panel A: Internal Performance Measures**

variables	mean	std. dev.	median	min	max
#articles	32.50	21.56	28.00	1.00	241.00
#words	18,356	13,233	16,136	230	144,280
quantity score	2,079	1,274	1805	140	14,850
quality score	1,476	1,097	1,200	0	12,300

number of reporters: 183; number of observations (individual_month): 4,459

Panel B: External Outcome Measures

variables	mean	std. dev.	min	max	contribution
Measures of Reporter Activities					
good journalistic initiative					
# investigative reports	1.37	1.54	0.00	19.00	166.18***
# feature stories	1.01	1.27	0.00	11.00	169.26***
# special reports	4.34	7.17	0.00	136.00	74.15***
attainment of private benefits					
# advertising articles	0.51	1.07	0.00	11.00	-33.26***
influence from government					
# propaganda articles	0.30	0.83	0.00	14.00	131.67***
cooperation between reporters					
# coauthored articles	3.58	9.72	0.00	164.00	-23.95***
assistance by external authors					
# articles with external authors	8.71	8.91	0.00	79.00	-11.41***
Measures of Editor Activities					
# articles assigned by editor	0.86	1.75	0.00	27.00	-44.37***
# articles column by content	1.29	2.62	0.00	29.00	-29.28*

number of reporters: 131; number of observations (individual_month): 3,273

Notes: Observations in Panel A include the reporters in all the divisions. Observations in Panel B include the reporters in the reformed divisions (Economy and Business, Politics and Law, Education and Health, and General Reports) and the Local News division. The last column in Panel B reports the contributions of the content-based measures to the quality score, retrieved from regressing the quality score on the external measures (see Tables A5 and A6 in the appendix for details). ***denotes significance at 1%, **at 5%, and * at 10%.

Table 2: Reporter Performance in Balanced Panel by Treatment and Reform
Panel A: Average Log Quantity Score

	treatment group	control group	difference (treatment-control)
before reform	7.495 (0.521)	7.524 (0.551)	-0.029 (0.168)
after reform	7.518 (0.554)	7.502 (0.484)	0.016 (0.150)
difference (after-before)	0.023 (0.093)	-0.022 (0.089)	0.045 (0.124)

Panel B: Average Log Quality Score

	treatment group	control group	difference (treatment-control)
before reform	7.194 (0.599)	7.153 (0.650)	0.041 (0.152)
after reform	7.238 (0.611)	7.020 (0.728)	0.218 (0.181)
difference (after-before)	0.044 (0.079)	-0.133 (0.059)	0.177 (0.095)

Notes: The tables report the means and standard deviations (in parentheses) of the reporters' performance in terms of the logarithm of the quantity and quality scores at the individual-month level. The sample is a balanced panel that includes only the reporters who are observed both before and after the reform and excludes 6 reporters who switched between treatment and control. Reform is the timing of the organizational change. The treatment group is the reporters from the reformed divisions: Economy and Business, Politics and Law, Education and Health, and General Reports; the control group is the reporters from the divisions where editorial authority remained delegated to division editors: Local News, Entertainment, Consumption Guides, and Photography. The standard errors of the difference and the difference-in-differences are estimated from running the corresponding OLS regression, clustering by subdivisions (#clusters=21).

Table 3: Average Treatment Effects on Internal Performance Measures**Panel A: Baseline D-I-D Estimation**

	log quantity score				log quality score			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
reform× treatment	0.054 (0.124)	0.052 (0.126)	0.053 (0.104)	-0.065 (0.103)	0.207** (0.095)	0.205** (0.096)	0.194* (0.103)	0.061 (0.087)
reform	-0.040 (0.064)				-0.152** (0.059)			
individual fixed effects	yes	yes	yes		yes	yes	yes	
time fixed effects		yes	yes	yes		yes	yes	yes
time-variant covariates			yes	yes			yes	yes
#obs.	4,459	4,459	4,459	4,459	4,440	4,440	4,440	4,440
adj-R ²	0.488	0.518	0.542	0.279	0.372	0.402	0.404	0.206

Panel B: Dynamic Effects

	Jul. 2005	Aug. 2005	Reform Start	Oct. 2005	Nov. 2005	Dec. 2005	Jan-2006 onwards	adj-R ²
log quantity	0.057 (0.078)	-0.007 (0.085)	-0.018 (0.077)	-0.032 (0.108)	0.075 (0.129)	-0.054 (0.128)	0.080 (0.109)	0.542
log quality	0.012 (0.113)	-0.07 (0.101)	0.049 (0.100)	-0.024 (0.133)	0.224 (0.171)	0.103 (0.119)	0.229** (0.111)	0.404

Notes: ***denotes significance at 1%, **at 5%, and * at 10%. In Panel A, reform is a dummy for the observations in or after the month of the authority change. Treatment is a dummy that equals one for reporters from the reformed divisions (Economy and Business, Education and Health, Politics and Law, and General Reports) and that equals zero for reporters from the four unreformed divisions. Time fixed effects are 36 year_month dummies. The time-variant covariates include age-squared, tenure-squared, position, qualification, and division fixed effects. In Column [4] and [8], the regressions control for gender, education, Party membership, age, and tenure. Standard errors (in parentheses) are clustered by subdivisions (#clusters=21). In Panel B, the regressions are the same as in Panel A, except that the term reform×treatment is replaced by a series of interactions between the timing dummies and the treatment dummy. “Reformstart” is a dummy for observations in the treatment group in the month of the reform (Sept. 2005). Similar definitions apply to "Jul. 2005,"..., "Dec. 2005." “Jan-2006onwards” is a dummy for observations in the treatment group from January 2006 and onwards.

Table 4: Comparison of Individual Fixed Effects: Exits, Stayers and Entries

	treatment group			control group		
	exits	stayers	entries	exits	stayers	entries
before reform	4.057 (1.490)	4.519 (1.451)		3.485 (0.856)	3.484 (1.805)	
after reform		5.165 (1.368)	5.128 (1.100)		3.949 (1.922)	5.048 (1.415)
# reporters	15	66	17	13	47	16
Difference		0.646** (0.251)			0.465 (0.389)	

Notes: In the statistics of all the variables, the first line reports the means and the second line reports the standard errors (in parentheses). "reform" is the timing of the authority change in September 2005. Treatment is the reporters from the divisions in which editorial decision rights were transferred from division editors to chief editors. Control is the reporters from the divisions in which authority remained delegated to division editors. The individual fixed effects are retrieved by running a regression of the log quality score on the individual dummies and their interactions with the reform dummy, together with controls as in the baseline D-I-D regression.

Table 5: Average Treatment Effects on External Performance Measures

	internal measures		journalistic initiative		private benefits	editor initiative
	log quantity	log quality	#investigative reports	#feature stories	#advertising articles	#originated by division editors
reform× treatment	0.027 (0.085)	0.216* (0.112)	0.555** (0.207)	0.334** (0.127)	-0.342** (0.154)	-0.653*** (0.192)
#obs.	3,300	3,259	3,265	3,265	3,265	3,265
adj-R ²	0.547	0.371	0.240	0.233	0.498	0.499

Notes: These regressions use the reporters in the Local News division as the control group. Treatment is a dummy for the reporters from the reformed divisions: Economy and Business, Education and Health, Politics and Law, and General Reports. "Reform" is a dummy for the observations in and after the month of the organizational reform. All the regressions control for individual fixed effects, time (year_month) fixed effects, time-variant individual characteristics defined as in the baseline D-I-D estimation. Standard errors (in parentheses) are clustered by subdivisions (#clusters=16). ***denotes significance at 1%, **at 5%, and * at 10%.

Table 6: Impact of Social Norms on the Effects of Reallocating Authority

	entire control		Local News division as control		
	log quantity	log quality	#reporter initiative	#advertising articles	#editor initiative
reform × treatment	0.062 (0.104)	0.220** (0.105)	1.225* (0.703)	-0.334* (0.173)	-0.749*** (0.208)
reform × treatment × special months (Jan. and Sept.)	-0.058 (0.052)	-0.163** (0.068)	-1.014** (0.372)	0.097 (0.144)	0.637** (0.238)
F-test on zero sum of the two coefficients (p-value)	0.969	0.641	0.790	0.067	0.658
Covariates: individual fixed effects, time fixed effects, and time-variant individual characteristics.					
#observations	4,459	4,440	3,265	3,265	3,265
adj-R ²	0.542	0.404	0.275	0.502	0.500

Notes: This table reports the results from triple-differences regressions. "Treatment" is a dummy for the reporters from the reformed divisions: Economy and Business, Education and Health, Politics and Law, and General Reports. "Reform" is a dummy for the observations in and after the month of the authority change. Special_months is a dummy for January and September, in which social norms condone rent seeking behavior. "#reporter initiative" is the monthly number of the investigative, feature, and special reports combined. "#editor initiative" is the monthly number of articles assigned by division editor. The regressions in the first two columns use reporters in all the four unreformed divisions as a control group; the regressions in the last three columns use reporters in the Local News division as a control group. Standard errors (in parentheses) are clustered by subdivisions. ***denotes significance at 1%, **at 5%, and * at 10%.

Table 7: Heterogeneous Effects Across Task Assignments

	entire control group		Local News division as control		
	log quantity	log quality	#reporter initiative	#advertising articles	#editor initiative
Economy and Business	0.189** (0.085)	0.344*** (0.080)	2.32*** (0.230)	-0.706** (0.281)	-1.155*** (0.227)
Education and Health	0.121 (0.111)	0.278** (0.110)	1.910** (0.859)	-0.100 (0.113)	-.282 (0.220)
Politics and Law	-0.031 (0.096)	-0.091 (0.105)	-1.852* (0.967)	0.071 (0.129)	0.438 (0.599)
General Reports	-0.319** (0.117)	0.041 (0.124)	-0.136 (1.221)	0.109 (0.083)	-0.797 (0.674)
#observations	4,459	4,440	3,265	3,265	3,265
Adj-R Squared	0.552	0.411	0.281	0.514	0.504

Notes: The table reports the D-I-D estimation of the effects of the authority change on reporters in each reformed division. All the regressions control for individual fixed effects, time (year_month) fixed effects, time-variant individual characteristics defined as in the baseline D-I-D regression. "#reporter initiative" is the monthly number of the investigative, feature, and special reports combined. "#editor initiative" is the monthly number of articles assigned by division editor. The first two columns use reporters in all the four unreformed divisions as a control group; the last three columns use reporters in the Local News division as a control group. Standard errors (in parentheses) are clustered by subdivisions. ***denotes significance at 1%, **at 5%, and * at 10%.