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题目：“摸鱼”的经济学原理
——信息不对称下的最优偷懒策略

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The Economics of “Idleness” - Optimal Laziness under Asymmetric Information

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ABSTRACT

In the modern workplace, the phenomenon of “shirking” (also known as “moyü” or work avoidance), defined as employees engaging in non-work-related activities or reducing work effort during work hours, is increasingly common. This behavior not only affects organizational efficiency but also reflects profound economic issues within the employment relationship. This paper explores the economic principles behind shirking from the perspective of information economics, based on principal-agent theory and game theory. It investigates how employees choose optimal shirking strategies under conditions of information asymmetry, and how employers design optimal incentive and monitoring mechanisms in response. The research aims to reveal the underlying economic logic of this behavior and provide theoretical insights and (simulated) empirical evidence for understanding and managing modern labor relations.

This study first constructs a concise theoretical model. In this model, a risk-neutral employer cannot directly observe the effort level of a risk-neutral employee but can incentivize the employee by setting a minimum effort standard, paying a fixed wage, and implementing a probabilistic monitoring and punishment mechanism. The model derivation shows that the employee’s optimal decision exhibits a threshold effect: the employee chooses to meet the minimum standard only if the expected penalty (monitoring probability multiplied by penalty magnitude) exceeds the cost of achieving that standard; otherwise, the employee chooses zero effort (maximizing shirking). Furthermore, the model analyzes how the employer, balancing output gains, wage payments, and monitoring costs, selects the optimal minimum effort requirement and monitoring probability.

To test the implications of the theoretical model, this paper conducts an empirical analysis using (fictional) panel data from the “China Enterprise Employee Survey (CEES)” and employing a fixed-effects econometric model. The results indicate that increased enterprise monitoring intensity and a higher share of performance pay are significantly negatively cor-

related with the employee shirking index, confirming the effectiveness of monitoring and incentives in curbing opportunistic behavior. Conversely, higher task complexity is positively associated with the shirking index, possibly reflecting the difficulty of effectively monitoring complex tasks.

Integrating theoretical deduction with (fictional) empirical testing, this research deepens the understanding of the economic roots of shirking under information asymmetry. The findings offer implications for managers in designing more effective incentive mechanisms (e.g., balancing performance pay and monitoring investments) and management strategies (e.g., adopting differentiated approaches for tasks of varying complexity). This paper emphasizes that understanding the economics of shirking does not endorse the behavior but aims to promote more harmonious and efficient labor relations through scientific analysis.

KEY WORDS: Asymmetric Information, Laziness, Incentive, Game Theory

Contents

Chapter 1 Introduction

1.1 Research Background

In modern organizational management practices, the phenomenon of employee "shirking" (also referred to as "loafing on the job" or "work avoidance") is increasingly attracting attention. It refers to the behavior where employees, during work hours, do not fully dedicate themselves to tasks directly related to their job responsibilities, but instead engage in non-work activities, reduce their effort level, or procrastinate on work progress. This phenomenon is not merely a matter of individual laziness but is rooted in the complex organizational environment and employment relationship, particularly where information asymmetry commonly exists between the employer (principal) and the employee (agent) (Akerlof, 1970; Spence, 1973). Employers often find it difficult to precisely observe and measure the actual effort level and time investment of employees, which provides employees with the space to selectively exert effort and seek maximization of their personal utility (e.g., pursuing leisure, handling private affairs), thereby engaging in some degree of "shirking" behavior (Alchian et al., 1972).

Although the phenomenon of "shirking" is widespread, its underlying economic principles, particularly how employees make "optimal" shirking decisions in an environment of asymmetric information, and how these decisions interact with corporate incentive mechanisms and monitoring strategies, have not yet been fully and systematically explored. Existing literature in management and organizational behavior often analyzes it from psychological, cultural, or managerial technique perspectives (e.g., Ashforth et al., 1990; Robbins et al., 2016). While economics literature contains extensive research on principal-agent models and incentive theory (Grossman et al., 1983; Holmstrom, 1979), refining these theories to analyze the prevalent and variably-intense "shirking" behavior found in everyday work scenarios, explicitly exploring its "optimality" issue, and determining the employer's optimal response strategy, still leaves significant room for research. In particular, studies combining theoretical modeling with empirical testing to understand this phenomenon are relatively scarce. Understanding the intrinsic economic logic of this behavior holds significant theoretical and practical importance for designing more effective management systems, optimizing human resource allocation, and enhancing overall organizational efficiency.

This study attempts to approach the issue from the perspectives of information economics and game theory, viewing "shirking" as a rational (or boundedly rational) decision-making pro-

cess by employees facing incomplete information and specific incentive constraints. We aim to construct a theoretical framework to analyze how employees weigh the costs of exerting effort, the risk of being detected and punished, and the utility derived from "shirking", thereby choosing an effort level that is optimal for themselves. Concurrently, this study will also examine how employers design contracts, including monitoring intensity and effort requirements, to address this behavior, and the potential equilibrium state resulting from the strategic interaction between both parties. Furthermore, this study will utilize (fictional) empirical data to test some of the core mechanisms proposed by the theoretical model.

1.2 Research Questions

Based on the background described above and the analytical framework of subsequent chapters, this study aims to explore the following core questions:

1. Under conditions of asymmetric information where the employer cannot fully observe the employee's effort level, how is the employee's optimal shirking strategy (manifested as the choice of effort level in this simplified model) determined? What factors (such as monitoring probability, penalty magnitude, effort cost) are key?
2. How does the employer design the optimal monitoring and incentive contract (manifested as the minimum effort requirement e_{min}, monitoring probability p, and fixed wage w in this simplified model) to address potential employee shirking behavior and maximize profits? How are the optimal contract parameters influenced by external factors (such as monitoring cost, maximum penalty, effort cost parameter)?
3. (Based on fictional empirical analysis) In a realistic (simulated) environment, what is the relationship between the firm's monitoring intensity, the incentive strength of performance pay, the characteristics of the work task itself (e.g., complexity), and the employee's shirking behavior? Do the theoretical predictions find support in the (fictional) data?

1.3 Research Contributions

This study is expected to make contributions in the following aspects:

First, at the theoretical level, by applying classic principal-agent theory and game theory models to analyze "shirking", a specific and common phenomenon in the modern workplace, this study deepens the understanding of employee opportunistic behavior under asymmetric information. By explicitly exploring the formation mechanism of the "optimal shirking" strategy

(a binary choice between meeting the minimum standard or zero effort in this model) and its response to monitoring and punishment, it provides analytical perspectives for labor economics and organizational economics.

Second, at the model construction and analysis level, this research constructs a concise yet clear theoretical model that endogenizes the employee's effort choice and parts of the employer's contract design (minimum effort standard and monitoring probability). It conducts detailed equilibrium and comparative static analyses, revealing the influence mechanisms of key parameters on the equilibrium outcome.

Third, in combining theory with (fictional) empirics, this study not only builds a theoretical model but also uses (fictional) panel data and a fixed-effects econometric model to empirically test some core relationships suggested by the theory (e.g., the inhibitory effects of monitoring and performance incentives on shirking, and the potential impact of task complexity), demonstrating a research approach where theory guides empirics and empirics inform theory.

Finally, in terms of practical implications, the research findings (from both theoretical and fictional empirical parts) offer managers insights into employee behavior. Understanding the economic roots and influencing factors of "shirking" helps managers design more effective monitoring strategies and incentive mechanisms (e.g., balancing monitoring costs with incentive effects, considering job characteristics), thereby finding a more suitable balance between controlling opportunistic behavior and maintaining organizational efficiency.

1.4 Structure of the Thesis

The subsequent structure of this thesis is arranged as follows: Chapter Two will review the relevant literature, organizing studies on employee effort, monitoring, and opportunistic behavior within principal-agent theory, game theory, incentive theory, and organizational behavior, positioning the current research. Chapter Three will detail the theoretical model constructed in this paper, including basic assumptions (e.g., risk neutrality, specific cost function), variable definitions, and model setup. Chapter Four will provide an in-depth analysis of the model, deriving the employee's optimal effort decision rule, the employer's optimal contract design (minimum effort standard, monitoring probability, and wage), and conducting comparative static analysis. Chapter Five will present the empirical study based on (fictional) China Enterprise Employee Survey data, including model specification, variable descriptions, baseline regression results, and robustness discussions, testing some predictions of the theoretical

model. Chapter Six will summarize the research conclusions of the entire study, discuss its theoretical significance and practical implications, and point out the limitations of the research (such as model simplifications, fictional data) and potential directions for future study.

Chapter 2 Literature Review

This chapter aims to systematically review the theoretical and empirical research related to employee "shirking" behavior, laying the groundwork for subsequent model construction and analysis. We will primarily focus on reviewing literature concerning principal-agent theory, incentive and contract theory, the application of game theory in employment relationships, and relevant studies in organizational behavior regarding employee motivation and opportunism.

2.1 Principal-Agent Theory and Information Asymmetry

One of the core features of modern corporate organizations is the separation of ownership and control, which forms the basis of the principal-agent relationship (Jensen et al., 1976). In this relationship, the principal (e.g., employer, shareholder) delegates decision-making authority or task execution power to the agent (e.g., employee, manager), expecting the agent to act in the best interest of the principal. However, due to information asymmetry, particularly the difficulty for the principal to fully observe and verify the agent's actions (such as effort level), the agent may leverage this informational advantage to pursue their own interests, leading to the problem of Moral Hazard (Holmstrom, 1979).

Employee "shirking" behavior can be considered a typical manifestation of moral hazard. Because employers cannot precisely monitor every activity and effort input of their employees, employees may choose to exert less effort than agreed upon or expected, use work time for non-work matters, or complete tasks with lower efficiency, i.e., "Shirking" on the job (Alchian et al., 1972). Akerlof's "market for lemons" theory (Akerlof, 1970) and Spence's signaling theory (Spence, 1973) also reveal how information asymmetry affects market efficiency and individual behavior, principles that equally apply within the labor market. To mitigate problems arising from information asymmetry, principals need to design mechanisms to monitor agent behavior or incentivize effort exertion.

Early principal-agent models typically assumed that the agent's effort is unobservable, and the principal can only observe an output signal related to effort, which is also subject to random disturbances (Grossman et al., 1983; Holmstrom, 1979). This made incentive contracts based on output the focus of research. Studies show that optimal contract design requires a trade-off between risk sharing and providing incentives. When agents are risk-averse, transferring excessive risk to them reduces their utility and requires a higher risk premium; insufficient

incentives, however, lead agents to choose suboptimal effort levels.

2.2 Incentive Theory and Contract Design

To address the agency problem, economists have developed a rich body of incentive theory. The core idea is to align the agent's interests with the principal's objectives through the design of effective contracts.

Performance Pay is one of the most widely applied incentive tools. Theoretical research and empirical evidence suggest that linking compensation to measurable performance indicators can significantly increase employee effort and productivity (Lazear, 2000). However, designing performance pay faces numerous challenges, such as: the measurability issue of performance indicators (output of some tasks is difficult to quantify), the multi-task problem (employees may focus only on tasks with easily measured performance while neglecting other important responsibilities), and potential inducements for short-term behavior and excessive competition (Holmstrom et al., 1991).

Efficiency Wage Theory offers another perspective. It posits that employers paying wages above the market-clearing level can increase the opportunity cost of shirking for employees (i.e., the cost of losing a high-paying job), thereby motivating them to work harder and reducing the need for supervision (Shapiro et al., 1984). Efficiency wages can also attract higher-quality employees, reduce turnover rates, and enhance employee morale and sense of fairness (Akerlof et al., 1986).

Furthermore, non-monetary incentives such as promotions, career development, and reputation mechanisms also play important roles in the employment relationship (Fama, 1980; Gibbons et al., 1999). Long-term employment relationships, internal labor markets, and corporate culture, by fostering trust and repeated interactions, can mitigate short-term opportunistic behavior to some extent.

The development of contract theory has also gradually moved from assumptions of perfect rationality and complete contracts towards acknowledging the reality of bounded rationality and contract incompleteness (Hart, 1995). The concept of the Psychological Contract emphasizes the implicit expectations and mutual obligations in the employment relationship that are not explicitly written into formal contracts (Rousseau, 1995). When employees perceive that the organization has violated the psychological contract (e.g., broken promises, unfair treatment), their work motivation, loyalty, and effort levels may significantly decrease, making them more prone to negative behaviors such as "shirking".

2.3 Game Theory Perspective on the Employment Relationship

The employment relationship can be viewed as an ongoing game between the employer and the employee. Both parties, operating under conditions of incomplete information, choose their optimal actions based on expectations of the other party's strategies.

Incorporating "shirking" behavior into a game-theoretic framework helps analyze the interaction of strategies and equilibrium outcomes. For instance, the employer's monitoring strategy (e.g., frequency, intensity) and the employee's shirking strategy (e.g., degree, method) can be treated as interdependent decision variables. Increased monitoring investment by the employer can raise the probability of detecting shirking, thus deterring such behavior, but monitoring itself is costly. The employee, in turn, must weigh the utility gained from shirking against the risk of detection and the cost of working diligently. Tirole's (1986) research on collusion within organizations also suggests that monitoring systems themselves may have loopholes, potentially allowing for some form of "collusion" between managers and employees that affects monitoring effectiveness.

Repeated game models are particularly suitable for analyzing long-term employment relationships. In repeated games, reputation mechanisms and retaliatory strategies (such as "trigger strategies") can support cooperative equilibria, where employees choose not to shirk, and employers choose to trust or monitor less (Axelrod, 1984). However, maintaining cooperative equilibrium requires certain conditions, such as a sufficiently long game duration (or low probability of termination), sufficient patience from both parties (discount factor not too low), and adequate information transparency.

2.4 Organizational Behavior and Psychological Perspectives

Economic models typically assume individuals are rational and self-interested, seeking to maximize utility. In contrast, organizational behavior and psychology offer richer explanations for employee motivation and behavior.

Besides external incentives (like wages, bonuses), Intrinsic Motivation—the enjoyment, sense of achievement, autonomy, etc., derived from the work itself—is also a significant driver of employee effort (Deci et al., 1985). Over-reliance on external controls and monitoring can sometimes undermine employees' intrinsic motivation, leading to the so-called "crowding-out effect" of incentives (Frey, 1997).

Factors such as Burnout, Organizational Justice, Leadership Style, and Organizational Culture have also been shown to be closely related to employee work attitudes and behaviors

(including work engagement, absenteeism, turnover intention, and counterproductive work behaviors like "shirking") (Colquitt et al., 2001; Maslach et al., 2001). For example, when employees perceive distributive or procedural injustice, they might "correct" this perceived unfairness by reducing effort or increasing non-work activities. "Cyberloafing", the use of company-provided internet access for non-work-related online activities during work hours, has emerged as a new research hotspot in modern workplaces (Lim, 2002).

2.5 Literature Summary and Research Positioning

In summary, the existing literature has explored the theoretical foundations and influencing factors related to employee "shirking" behavior from various disciplinary perspectives. Principal-agent theory reveals the roots of information asymmetry and moral hazard; incentive theory examines how to guide employee behavior through contract design; game theory analyzes the strategic interactions between employers and employees; and organizational behavior emphasizes the role of psychological factors and the organizational environment.

However, current research still exhibits some limitations: 1. Most economic models tend to treat effort/shirking as a discrete choice (e.g., effort/no effort) or focus on specific types of shirking (e.g., reducing output quantity/quality), with fewer models formalizing the decision-making process where employees choose the *degree* of "shirking" continuously or multi-dimensionally. 2. Research that endogenizes both the employee's individual "optimal shirking" decision and the employer's optimal incentive/monitoring strategy within the same theoretical framework, analyzing their interactive equilibrium, is relatively scarce. 3. There is a lack of fine-grained theoretical characterization regarding how the "degree" of "shirking" is determined, i.e., how employees seek an optimal balance between pursuing personal leisure utility and maintaining job security/avoiding punishment.

Building upon previous research, this study attempts to focus on the issue of employee "optimal shirking" strategy choice in an environment of asymmetric information. We will construct a theoretical model that explicitly treats the degree of "shirking" as a continuous decision variable for the employee, analyzing how it is influenced by factors such as wage structure, monitoring probability, punishment severity, job characteristics, and individual preferences. Concurrently, the model will also incorporate the employer's incentive and monitoring strategies as endogenous variables to examine the equilibrium outcome under the strategic interaction of both parties. The aim is to provide a more refined economic analysis framework for understanding the ubiquitous phenomenon of "shirking" in the modern workplace and to

offer theoretical insights for designing more effective management strategies.

Chapter 3 Theoretical Model Construction

This chapter aims to construct a theoretical model to depict the "shirking" behavior (i.e., choosing the effort level) of employees under asymmetric information and the optimal response strategy of the employer. The model will draw upon the basic frameworks of principal-agent theory and game theory.

3.1 Basic Model Setup

Consider a single-period employment relationship involving a risk-neutral employer (Principal, P) and a similarly risk-neutral employee (Agent, A). The employee has a reservation utility $\bar{U}$, representing the minimum utility level required to accept the employment relationship. For simplicity, we normalize this to $\bar{U} = 0$.

The sequence of events is as follows:

1. The employer designs and offers an employment contract to the employee.
2. The employee decides whether to accept the contract. If rejected, the employee receives the reservation utility $\bar{U} = 0$, and the employer gets zero profit. If accepted, the game proceeds.
3. The employee chooses their effort level e. Effort level $e \geq 0$. Exerting effort incurs a corresponding cost for the employee.
4. Output q is realized, and payments are executed according to the contract.

The core assumption is information asymmetry: the employer cannot directly observe the effort level e chosen by the employee. However, the employer might indirectly infer or influence the employee's effort choice through monitoring mechanisms or by observing the final output q.

3.1.1 Employee Effort and Cost

The employee chooses an effort level e. We assume effort is a continuous variable, $e \in [0, \infty)$. Exerting effort generates disutility (cost) for the employee. We represent this with a cost function $c(e)$ and assume it has the following properties:

- $c(0) = 0$: No effort incurs no cost.
- $c'(e) > 0$ for $e > 0$: The cost of effort increases with the effort level (positive marginal cost).

- $c''(e) > 0$: The marginal cost of effort is increasing (the cost function is strictly convex).

A commonly used form for the cost function is $c(e) = \frac{k}{2}e^2$, where $k > 0$ is a cost parameter reflecting the difficulty of exerting effort.

The degree of employee "shirking" can be viewed as the deviation of the chosen effort level e from some benchmark (e.g., the level expected by the employer or the maximum possible level). In this model, we directly analyze the employee's choice of optimal effort e.

3.1.2 Output and Payment

To simplify the model, let's first consider a deterministic output scenario, where output q is entirely determined by the employee's effort level:

$$q = e \tag{3.1}$$

This implies the employer can perfectly infer effort e by observing output q. In this case, no information asymmetry exists, and the employer can achieve the optimum by designing a contract that mandates a specific effort level e^* and pays a corresponding wage. For example, specifying payment w if $q = e^*$ and zero or a penalty otherwise. As long as $w - c(e^*) \geq 0$, the employee will accept and choose $e = e^*$.

However, in reality, output is often affected by random factors. A more realistic setup involves stochastic output, for example:

$$q = e + \epsilon \tag{3.2}$$

where ϵ is a random noise term with a mean of zero (e.g., following a Normal distribution $N(0, \sigma^2)$). In this scenario, even after observing output q, the employer cannot fully determine the employee's effort e, highlighting the problem of information asymmetry.

Contracts can be based on observable variables, such as output q or information obtained through monitoring. Common contract forms include:

- Fixed Wage Contract: Pays a fixed wage w regardless of output.
- Linear Performance Pay Contract: Wage $w = s + bq$, where s is the fixed part, and b is the commission rate (bonus rate) based on output.
- Monitoring-Based Contract: The employer monitors the employee with a certain probability p. If monitoring reveals that the employee's behavior does not meet requirements (e.g., effort is below a standard e^*), a penalty is imposed.

3.2 Analysis of Employee Behavior: Fixed Wage and Monitoring

We now analyze how an employee chooses their optimal effort level under a relatively simple contract structure. Consider an employer offering a contract that includes a fixed wage w and a monitoring-penalty mechanism.

Specifically, the employer monitors the employee with probability $p \in [0, 1]$. Monitoring is assumed to be perfect; if implemented, it accurately observes the employee's actual effort level e. The contract specifies a minimum effort standard $e_{min} \geq 0$. If the employee is monitored and their effort level $e < e_{min}$, the employee incurs a penalty $F > 0$ (e.g., a fine, wage deduction). If $e \geq e_{min}$, or if the employee is not monitored (with probability $1 - p$), no penalty is incurred.

Assuming the employee is risk-neutral, their objective is to maximize their expected utility. The employee's utility comes from the wage received, minus the cost of effort, minus the potential expected penalty. Given the contract (w, p, e_{min}, F), the employee chooses effort e to maximize:

$$E[U(e)] = w - c(e) - p \cdot \mathbb{I}(e < e_{min}) \cdot F \tag{3.3}$$

where $\mathbb{I}(\cdot)$ is the indicator function, which equals 1 if the condition is true, and 0 otherwise.

The employee's optimal decision is as follows:

1. If choosing $e \geq e_{min}$: In this case, $\mathbb{I}(e < e_{min}) = 0$, and the employee faces no penalty. Their utility is $U_1(e) = w - c(e)$. To maximize utility, the employee will choose the effort level that satisfies $e \geq e_{min}$ with the minimum cost, which is $e = e_{min}$. The utility in this case is $U_1^* = w - c(e_{min})$.
2. If choosing $e < e_{min}$: In this case, $\mathbb{I}(e < e_{min}) = 1$, and the employee faces the risk of being caught and penalized. Their expected utility is $E[U_2(e)] = w - c(e) - pF$. To maximize this expected utility, the employee will choose the lowest possible effort cost, which is $e = 0$ (assuming $e = 0$ is the minimum allowable effort). The expected utility in this case is $E[U_2^*] = w - c(0) - pF = w - pF$.

The employee will choose the option that yields higher (expected) utility: The employee will choose $e = e_{min}$ if and only if

$$U_1^* \geq E[U_2^*] \tag{3.4}$$

$$w - c(e_{min}) \geq w - pF \tag{3.5}$$

$$pF \geq c(e_{min}) \tag{3.6}$$

Conclusion: Under this contract, the employee's optimal effort choice e^* is:

$$e^* = \begin{cases} e_{min} & \text{if } pF \geq c(e_{min}) \\ 0 & \text{if } pF < c(e_{min}) \end{cases} \tag{3.7}$$

This result intuitively shows that the employee is incentivized to meet the minimum standard e_{min} only when the expected penalty (probability of detection p times the penalty magnitude F) is large enough to exceed the cost of meeting that standard, $c(e_{min})$. Otherwise, the employee prefers to exert no effort ($e = 0$) and bear the expected penalty cost pF, because doing so saves the effort cost $c(e_{min})$.

This simple model reveals the role of monitoring and penalties in curbing "shirking" behavior but also highlights its limitations: it can only incentivize the employee to meet the minimum standard e_{min}, not higher levels of effort. Furthermore, the effort choice exhibits an "all-or-nothing" characteristic (relative to e_{min}).

Chapter 4 Model Analysis

Based on the theoretical model constructed in Chapter Three, this chapter will delve into the analysis of the employee's optimal effort decision and its influencing factors. It will also explore how the employer, under asymmetric information, designs the optimal contract (specifically, monitoring intensity and minimum effort standard) to maximize their own profit.

4.1 Analysis of Employee's Optimal Effort Decision

Recalling the analysis results from Section 3.2 of Chapter Three, under a contract with fixed wage w, monitoring probability p, minimum effort standard e_{min}, and penalty F, a risk-neutral employee compares the utility of choosing $e = e_{min}$, which is $U_1^* = w - c(e_{min})$, with the expected utility of choosing $e = 0$, which is $E[U_2^*] = w - pF$.

The final decision rule is (as shown in Equation 4.1):

$$e^* = \begin{cases} e_{min} & \text{if } pF \geq c(e_{min}) \\ 0 & \text{if } pF < c(e_{min}) \end{cases} \tag{4.1}$$

This result reveals several key points:

1. Threshold Effect of Monitoring and Penalty: Whether the employee chooses to meet the minimum effort standard e_{min} depends entirely on whether the expected penalty pF is sufficient to cover the effort cost $c(e_{min})$ required to reach that standard. This is a clear threshold effect. Only when the product of the monitoring probability p and the penalty magnitude F crosses the threshold $c(e_{min})$ does the employee's behavior jump from no effort ($e = 0$, maximizing "shirking") to just meeting the minimum required effort ($e = e_{min}$).
2. Inability to Incentivize Excess Effort: This mechanism can only incentivize the employee to meet the minimum standard e_{min}; it cannot motivate them to exert effort beyond e_{min}. Once e_{min} is reached, further increasing effort only increases the cost $c(e)$ without bringing additional benefits or reducing the risk of penalty. This reflects the limitations of contracts relying solely on "baseline monitoring" for incentives.
3. Binary Nature of the "Optimal Shirking" Strategy: In this simple model, the employee's "shirking" strategy exhibits a relatively extreme binary choice: either exert no effort ($e = 0$) or just meet the minimum standard ($e = e_{min}$). There is no equilibrium state of

"partial shirking" in between. This is primarily due to the assumption that monitoring perfectly identifies whether effort is below e_{min} and that the penalty is fixed.

This analysis highlights the central roles of p, F, e_{min}, and the cost function $c(\cdot)$ in determining the employee's effort behavior. Next, we will analyze how the employer chooses these contract parameters from their perspective.

4.2 The Principal's Contract Design Problem

Now we consider the decision problem of the employer (P). The employer's goal is to maximize their expected profit $E[\pi]$. Assume the employer is risk-neutral. Their profit equals the output minus the wage paid to the employee, minus the cost of implementing monitoring.

We adopt the deterministic output assumption $q = e$ introduced in Chapter Three (3.1) to simplify the first step of analyzing the employer's problem. This can be extended later to the stochastic output case. Assume the cost of monitoring depends on the monitoring probability p. Let the monitoring cost be $M(p)$. For simplicity, assume $M(p) = \gamma p$, where $\gamma > 0$ is the cost coefficient per unit of monitoring probability.

The employer needs to choose the contract parameters (w, p, e_{min}, F). However, the penalty magnitude F is often constrained by external factors such as laws, regulations, the employee's ability to pay, or the firm's reputation. Therefore, we assume there exists a maximum feasible penalty F_{max}, such that $0 \leq F \leq F_{max}$. To maximize the deterrent effect of the penalty, a rational employer will typically choose the largest possible penalty, setting $F = F_{max}$. Thus, the employer's decision variables simplify to (w, p, e_{min}).

The employer's optimization problem is:

$$\max_{w,p,e_{min}} \quad E[\pi] = e^* - w - \gamma p \tag{4.2}$$

subject to:

1. Incentive Compatibility Constraint (IC): The employee will choose the optimal effort e^* according to Equation 4.1.

$$e^* = \begin{cases} e_{min} & \text{if } pF_{max} \geq c(e_{min}) \\ 0 & \text{if } pF_{max} < c(e_{min}) \end{cases} \tag{4.3}$$

2. Participation Constraint (PC): The expected utility the employee receives from accepting the contract must be no less than their reservation utility $\bar{U} = 0$.

$$E[U(e^*)] = w - c(e^*) - p \cdot \mathbb{I}(e^* < e_{min}) \cdot F_{max} \geq 0 \tag{4.4}$$

where $0 \leq p \leq 1$ and $e_{min} \geq 0$.

4.3 Optimal Contract Analysis: Fixed Wage and Monitoring

When making the decision, the employer essentially faces two choices: either design a contract to incentivize the employee to choose $e^* = e_{min}$ (effort-inducing strategy) or accept the employee choosing $e^* = 0$ (laissez-faire shirking strategy).

Strategy One: Inducing Effort $e^* = e_{min}$

For the employee to choose $e^* = e_{min}$, the IC condition $pF_{max} \geq c(e_{min})$ must be satisfied. To minimize the monitoring cost γp, the employer will choose the lowest monitoring probability p that satisfies this condition. That is:

$$p^* = \frac{c(e_{min})}{F_{max}} \tag{4.5}$$

This implicitly assumes $c(e_{min}) \leq F_{max}$, otherwise the condition cannot be met even if $p = 1$. If $c(e_{min}) > F_{max}$, it's impossible to induce effort e_{min} through this mechanism. We assume F_{max} is large enough to make $p^* \leq 1$ feasible.

In this case, the employee's effort is $e^* = e_{min}$, and their expected utility is $E[U(e_{min})] = w - c(e_{min}) - p^* \cdot \mathbb{I}(e_{min} < e_{min}) \cdot F_{max} = w - c(e_{min})$. To satisfy the PC constraint $w - c(e_{min}) \geq 0$ while minimizing wage costs, the employer will set the lowest feasible wage:

$$w^* = c(e_{min}) \tag{4.6}$$

At this point, the employer's profit is:

$$\pi_1(e_{min}) = e_{min} - w^* - \gamma p^* = e_{min} - c(e_{min}) - \gamma \frac{c(e_{min})}{F_{max}} \tag{4.7}$$

The employer also needs to choose the optimal e_{min} to maximize $\pi_1(e_{min})$. Assuming the effort cost function is $c(e) = \frac{k}{2}e^2$ $(k > 0)$, then

$$\pi_1(e_{min}) = e_{min} - \frac{k}{2}e_{min}^2 - \gamma \frac{k e_{min}^2}{2F_{max}} = e_{min} - \frac{k}{2}\left(1 + \frac{\gamma}{F_{max}}\right) e_{min}^2 \tag{4.8}$$

Taking the first derivative with respect to e_{min} and setting it to zero:

$$\frac{d\pi_1}{de_{min}} = 1 - k\left(1 + \frac{\gamma}{F_{max}}\right) e_{min} = 0 \tag{4.9}$$

Solving for the optimal minimum effort requirement e_{min}^*:

$$e_{min}^* = \frac{1}{k\left(1 + \frac{\gamma}{F_{max}}\right)} \tag{4.10}$$

The second derivative is $-k(1+\gamma/F_{max}) < 0$, confirming it is a maximum point. Substituting e^*_{min} back gives the optimal monitoring probability $p^{**} = \frac{c(e^*_{min})}{F_{max}} = \frac{k(e^*_{min})^2}{2F_{max}}$ and optimal wage $w^{**} = c(e^*_{min}) = \frac{k}{2}(e^*_{min})^2$.

Strategy Two: Allowing Shirking $e^* = 0$

If the employer designs contract parameters such that $pF_{max} < c(e_{min})$, or simply sets $p = 0$ and $e_{min} > 0$ (or $e_{min} = 0$), the employee will choose $e^* = 0$. In this case, the employee's effort is $e^* = 0$, and their expected utility is $E[U(0)] = w - c(0) - p \cdot \mathbb{I}(0 < e_{min}) \cdot F_{max} = w - p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max}$. To satisfy the PC constraint $w - p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max} \geq 0$, the employer will set the minimum wage $w^* = p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max}$. The employer's profit is $E[\pi_0] = e^* - w^* - \gamma p = 0 - p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max} - \gamma p$. Clearly, to maximize this profit (i.e., minimize loss), the employer's optimal choice is to set $p = 0$. Then, the employee chooses $e^* = 0$, the wage is $w^* = 0$, and the profit is $\pi_0 = 0$.

The Employer's Final Decision

The employer compares the maximum profit obtainable from Strategy One (inducing effort e^*_{min}), $\pi_1(e^*_{min})$, with the profit from Strategy Two (allowing shirking $e = 0$), $\pi_0 = 0$. The employer will choose the effort-inducing strategy only if $\pi_1(e^*_{min}) > 0$. That is:

$$\pi_1(e^*_{min}) = e^*_{min} - \frac{k}{2}\left(1 + \frac{\gamma}{F_{max}}\right)(e^*_{min})^2 > 0 \tag{4.11}$$

Substituting $e^*_{min} = \frac{1}{k(1+\gamma/F_{max})}$:

$$\frac{1}{k(1+\gamma/F_{max})} - \frac{k}{2}\left(1 + \frac{\gamma}{F_{max}}\right)\left[\frac{1}{k(1+\gamma/F_{max})}\right]^2 > 0 \tag{4.12}$$

$$\frac{1}{k(1+\gamma/F_{max})} - \frac{1}{2k(1+\gamma/F_{max})} > 0 \tag{4.13}$$

$$\frac{1}{2k(1+\gamma/F_{max})} > 0 \tag{4.14}$$

This condition always holds, since $k > 0, \gamma > 0, F_{max} > 0$.

Therefore, under the assumptions of this model (deterministic output $q = e$, effort cost $c(e) = \frac{k}{2}e^2$, monitoring cost $M(p) = \gamma p$, risk neutrality), as long as monitoring and punishment are feasible ($F_{max} > 0, \gamma < \infty$), the employer will always find it optimal to induce a positive minimum effort level $e^*_{min} = \frac{1}{k(1+\gamma/F_{max})}$ by setting the corresponding monitoring probability p^{**} and wage w^{**}. This is strictly better than allowing complete shirking (profit of 0).

4.4 Impact of Parameter Changes on the Optimal Contract (Comparative Statics)

Let's analyze how key parameters affect the employer's choice of the optimal minimum effort standard e^*_{min} and the corresponding monitoring and wage levels:

- Impact of effort cost coefficient k: $\frac{\partial e^*_{min}}{\partial k} = -\frac{1}{k^2(1+\gamma/F_{max})} < 0$. When effort becomes more difficult (k increases), the employer lowers the required minimum effort standard e^*_{min}. This is because the cost of inducing the same level of effort (including the compensation paid to the employee $w^* = c(e_{min})$ and the expected penalty needed to sustain monitoring $p^* F_{max} = c(e_{min})$, the latter affecting monitoring costs) increases.
- Impact of monitoring cost coefficient γ: $\frac{\partial e^*_{min}}{\partial \gamma} = -\frac{1}{k(1+\gamma/F_{max})^2} \cdot \frac{1}{F_{max}} < 0$. When monitoring becomes more expensive (γ increases), the employer also chooses to lower the minimum effort standard e^*_{min}. This is because increasing e_{min} requires a higher p^* (see Eq. 4.5), leading to higher monitoring costs γp^*. To save on monitoring costs, the employer lowers the target effort level.
- Impact of maximum penalty F_{max}: $\frac{\partial e^*_{min}}{\partial F_{max}} = -\frac{1}{k(1+\gamma/F_{max})^2} \cdot (-\frac{\gamma}{F^2_{max}}) = \frac{\gamma}{kF^2_{max}(1+\gamma/F_{max})^2} > 0$. When the maximum allowable penalty magnitude increases (F_{max} increases), the employer sets a higher minimum effort standard e^*_{min}. A larger penalty makes monitoring more deterrent, meaning a lower monitoring probability p^* is needed to achieve the same pF threshold ($p^* = c(e_{min})/F_{max}$). This reduces the monitoring cost γp^* associated with achieving a given e_{min}, incentivizing the employer to aim for higher effort levels.

These results are intuitive: increases in effort cost and monitoring cost discourage the employer from pursuing high effort levels, while an increase in penalty power encourages the employer to set higher effort targets.

4.5 Model Limitations and Discussion

This chapter analyzed the simple model established in Chapter Three, revealing how, under a fixed wage plus monitoring-penalty mechanism, the employer addresses employee "shirking" by setting an optimal minimum effort standard and monitoring probability. The model yielded clear optimal contract parameters and comparative statics results.

However, this model also has significant limitations that warrant exploration in future research:

1. Discreteness of Effort Choice: The model predicts that the employee will only choose between $e = 0$ and $e = e_{min}$, failing to capture the more realistic continuous or multi-level

nature of "shirking". This is mainly due to the monitoring mechanism being set up only to distinguish whether effort is below e_{min}. 2. Simplicity of Incentive Mechanism: The model only considers a fixed wage plus monitoring and penalties. Performance pay (such as output-based bonuses), which is widely used in practice, was not included in the analysis. Performance pay can directly link remuneration to output (and thus effort), potentially providing stronger continuous incentives, especially when output is positively correlated with effort but subject to randomness. 3. Deterministic Output Assumption: To simplify the analysis of the employer's problem, we temporarily used the assumption $q = e$. Introducing stochastic output $q = e + \epsilon$ would make the problem more complex but more realistic. Under stochastic output, observing q does not allow perfect inference of e, making the role of monitoring potentially more crucial, or requiring the design of output-based incentive contracts to balance risk and incentives. 4. Risk Neutrality Assumption: Both the employee and employer were assumed to be risk-neutral. If employees are risk-averse, they would demand a risk premium for income uncertainty (e.g., from performance pay depending on random output, or the risk of being penalized). This would affect the design of the optimal contract, requiring a trade-off between incentive effects and risk costs. 5. Single-Period Model: The model is static and single-period, neglecting dynamic factors in long-term employment relationships such as repeated interactions, reputation effects, learning effects, or career development. These factors could significantly influence employees' "shirking" behavior and employers' strategic choices.

Despite these limitations, the analysis in this chapter provides a foundational framework for understanding the role of monitoring and penalty mechanisms in constraining "shirking" behavior. It clearly demonstrates how employers weigh the benefits of inducing effort against the associated wage and monitoring costs. Subsequent chapters could consider incorporating empirical research.

Chapter 5 Empirical Model and Results

This chapter aims to empirically test the key factors influencing employee "shirking" behavior and evaluate some of the mechanisms proposed in the theoretical models of Chapters Two and Three using econometric methods. We will utilize (fictional) data from the China Enterprise Employee Survey (CEES) to construct and analyze an econometric model. First, we describe the model specification; second, we introduce the data source and variable measurement; third, we report the baseline regression results; finally, we enhance the credibility of the results through coefficient visualization and discussion.

5.1 Model Specification

Considering that employee "shirking" behavior may be influenced by many time-invariant individual inherent traits (such as personality, work attitude, innate ability) as well as firm-level fixed characteristics, failing to control for these factors could lead to omitted variable bias. Therefore, this study primarily employs a panel data Fixed Effects Model to control for individual-level time-invariant heterogeneity. Simultaneously, the model incorporates year fixed effects to absorb time-varying common factors such as macroeconomic conditions or widespread technological shocks. The baseline econometric model is specified as follows:

$$\begin{aligned} \text{ShirkingIndex}_{it} =& \beta_0 + \beta_1 \text{MonitoringIntensity}_{it} + \\ & \beta_2 \text{PerformancePayShare}_{it} + \\ & \beta_3 \text{TaskComplexity}_{it} + \\ & X_{it}'\omega + \alpha_i + \gamma_t + \varepsilon_{it} \end{aligned} \tag{5.1}$$

Here, the subscript i denotes the individual employee, and t denotes the year. $\text{ShirkingIndex}_{it}$ is the dependent variable, measuring the degree of "shirking" of employee i in year t. $\text{MonitoringIntensity}_{it}$ represents the intensity of monitoring by the firm on the employee. $\text{PerformancePayShare}_{it}$ indicates the proportion of performance pay in the employee's total income. $\text{TaskComplexity}_{it}$ measures the complexity and autonomy of the tasks undertaken by the employee. X_{it}' is a vector of time-varying individual and firm-level control variables, and ω is the corresponding coefficient vector. α_i represents individual fixed effects, controlling for all time-invariant individual characteristics. γ_t represents year fixed effects, controlling for time trends common to

all years. ε_{it} is the random error term.

The core of this model lies in estimating the coefficients β_1, β_2, and β_3. According to theoretical expectations, β_1 is expected to be negative, as higher monitoring intensity should curb "shirking" behavior. Similarly, β_2 is expected to be negative, because a higher proportion of performance pay, linked to effort and output, should reduce "shirking". The sign of β_3 is uncertain. On one hand, more complex and autonomous jobs might stimulate employees' intrinsic motivation, thereby reducing "shirking"; on the other hand, complex tasks are often harder to monitor, potentially providing more room for "shirking". By estimating this model, we can test whether these theoretical predictions are supported in the (fictional) data.

5.2 Data and Variable Description

5.2.1 Data Source

The data used in this study originates from a fictional large-scale tracking survey designed to simulate the actual situation in China –the "China Enterprise Employee Survey (CEES)". This survey (hypothetically) launched its baseline in 2015 and conducted three follow-up surveys in 2017, 2019, and 2021, covering enterprises and their employees across various industries in the eastern, central, and western regions of China. CEES collected detailed information on employees' personal characteristics, job features, compensation structures, work attitudes, and firm-level management practices. This study constructs an unbalanced panel dataset comprising employees successfully interviewed at least twice across all four survey waves. After data cleaning and screening (e.g., removing samples with severe missing values in key variables), the final sample used for analysis includes 15,820 employees, totaling 48,550 employee-year observations.

5.2.2 Variable Measurement

First, we define the dependent variable, Shirking Index ($\text{ShirkingIndex}_{it}$), which aims to quantify the extent of employee "shirking". In the CEES survey (hypothetically), we construct this index using a series of questions. For example, asking employees about the frequency of engaging in non-work-related activities during work hours (such as browsing social media, online shopping, handling personal affairs), their self-perceived effort level (relative to colleagues or their own maximum potential), and whether they engage in behaviors like intentional procrastination. Through factor analysis or simple weighted averaging, this information

is synthesized into a composite index ranging from 0 to 10, where higher values indicate a greater degree of "shirking".

Next are the core explanatory variables. The first is Monitoring Intensity ($\text{MonitoringIntensity}_{it}$), constructed based on questions in the CEES firm questionnaire regarding management practices. Examples include the frequency of direct observation of employee work processes by management, the use of electronic monitoring systems (like computer activity monitoring, workstation cameras), and the strictness of requirements for work logs or reports. This information is standardized and combined into an index ranging from 0 to 1, with higher values indicating greater monitoring intensity. The second is Performance Pay Share ($\text{PerformancePayShare}_{it}$), calculated from employee questionnaire responses about their income composition (fixed salary, bonuses based on individual performance, bonuses based on team or company performance, etc.). It is defined as the proportion of performance-related income (bonuses, commissions, etc.) in their total annual pre-tax income, with a value range of [0, 1]. The third is Task Complexity ($\text{TaskComplexity}_{it}$), constructed based on employee evaluations of their job tasks. Relevant questions might include the degree of repetitiveness of the work, the creativity required to solve problems, the extent of job autonomy, and skill variety requirements. This is also synthesized into an index ranging from 1 to 5, with higher values indicating more complex and autonomous tasks.

Finally, there are the control variables (X'_{it}). To more accurately identify the impact of the core explanatory variables, the model includes the following time-varying control variables: Log Wage (LogWage_{it}), the natural logarithm of the employee's total annual pre-tax income, as wage levels might directly affect job satisfaction and willingness to exert effort; Tenure (Tenure_{it}), the employee's years of service in the current company, potentially related to organizational commitment, job familiarity, etc.; Age (Age_{it}) and Age Squared (Age^2_{it}), to control for the non-linear effect of age on work attitudes; Years of Education (Education_{it}), the total number of years the employee received formal education; Gender (Gender_i), a dummy variable (1 for male, 0 for female), although time-invariant variables like gender cannot be estimated themselves due to the use of individual fixed effects, their interaction effects with other time-varying variables might still exist; Firm Size (FirmSize_{it}), the logarithm of the total number of employees in the firm, as firm size may influence organizational structure, management style, and monitoring difficulty; and a series of Industry Dummies (IndustryDummies_i) (also affected by individual fixed effects). Additionally, individual fixed effects (α_i) control for time-invariant individual-level factors (such as ability, personality), and year fixed effects (γ_t)

control for time-varying macroeconomic factors.

5.3 Baseline Regression Results

Table 5.1 presents the estimation results of the fixed effects model based on equation (5.1). Model (1) includes only the core explanatory variables, Model (2) adds individual-level control variables (log wage, tenure, age, etc.), and Model (3) further incorporates firm-level control variables (firm size) along with all fixed effects. All models report robust standard errors clustered at the individual level.

Table 5.1 Fixed Effects Model Regression Results: Factors Affecting Shirking Index

	Shirking Index		
Variable	(1)	(2)	(3)
Core Explanatory Variables:			
Monitoring Intensity	-1.523***	-1.285***	-1.150***
	(0.188)	(0.201)	(0.205)
Performance Pay Share	-2.105***	-1.850***	-1.782***
	(0.255)	(0.260)	(0.263)
Task Complexity	0.312**	0.258*	0.280**
	(0.124)	(0.130)	(0.133)
Control Variables:			
Log Wage		0.085	0.070
		(0.060)	(0.061)
Tenure		-0.021**	-0.018*
		(0.009)	(0.010)
Tenure Squared		0.0003	0.0002
		(0.0002)	(0.0002)
Age		-0.035	-0.030
		(0.025)	(0.026)
Age Squared / 100		0.040	0.038
		(0.030)	(0.031)
Years of Education		-0.050	-0.045
		(0.038)	(0.039)
Log Firm Size			-0.120*
			(0.070)

Continued on next page

Continued Table 5.1 Fixed Effects Model Regression Results: Factors Affecting Shirking Index

	Shirking Index		
Variable	(1)	(2)	(3)
Constant	4.850***	5.210***	5.530***
	(0.310)	(0.450)	(0.480)
Individual Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	48550	48550	48550
R^2 within	0.085	0.102	0.105
R^2 between	0.150	0.180	0.183
R^2 overall	0.120	0.145	0.148
F statistic	85.3***	65.2***	62.5***
Number of Employees	15820	15820	15820

Note: *, **, *** indicate significance at 10%, 5%, 1% levels.

All models include individual and year fixed effects. Model (3) is the full model.

Looking at the results from the full model (Column 3), the coefficient for Monitoring Intensity (MonitoringIntensity) is significantly negative (-1.150, $p<0.001$), consistent with theoretical expectations. The result indicates that, after controlling for other factors, an increase in firm monitoring intensity significantly reduces the employee's "shirking" index. Specifically, a one-unit increase in the monitoring intensity index (from 0 to 1) is associated with an average decrease of about 1.15 points in the shirking index. The coefficient for Performance Pay Share (PerformancePayShare) is also significantly negative (-1.782, $p<0.001$), aligning with theoretical predictions as well. An increase in the proportion of performance-based compensation in total income more closely links the employee's interests with work outcomes, thereby effectively reducing "shirking" behavior. For every 10 percentage point increase in the share, the shirking index decreases by about 0.18 points on average. Unlike the first two, the coefficient for Task Complexity (TaskComplexity) is significantly positive (0.280, $p<0.05$). This suggests that, after controlling for other factors, an increase in task complexity (and autonomy) is associated with a higher "shirking" index. This might reflect that complex tasks are harder to monitor accurately, providing employees with more opportunities for "loafing on the job", and this negative effect outweighs the potential positive effect from intrinsic motivation.

Regarding control variables, tenure seems to be associated with lower levels of "shirking", and larger firm size also tends to reduce the "shirking" index (perhaps because larger firms have

more formalized management). Variables like log wage, age, and education are not significant in this model, possibly because individual fixed effects have absorbed most of their explanatory power, or their impact on "shirking" behavior is indeed insignificant.

Overall, the baseline regression results provide (fictional) empirical support for the hypotheses in the theoretical model regarding the effectiveness of monitoring and incentives (performance pay) in constraining "shirking" behavior. At the same time, the positive impact of task complexity on "shirking" reveals a trade-off that needs attention in management practice.

5.4 Robustness Checks and Discussion

To visually present the impact of the core explanatory variables more intuitively and to discuss the robustness of the results, we plot the coefficients of the core explanatory variables from the baseline model (Table 5.1, Column 3) and their 95% confidence intervals (see Figure 5.1).

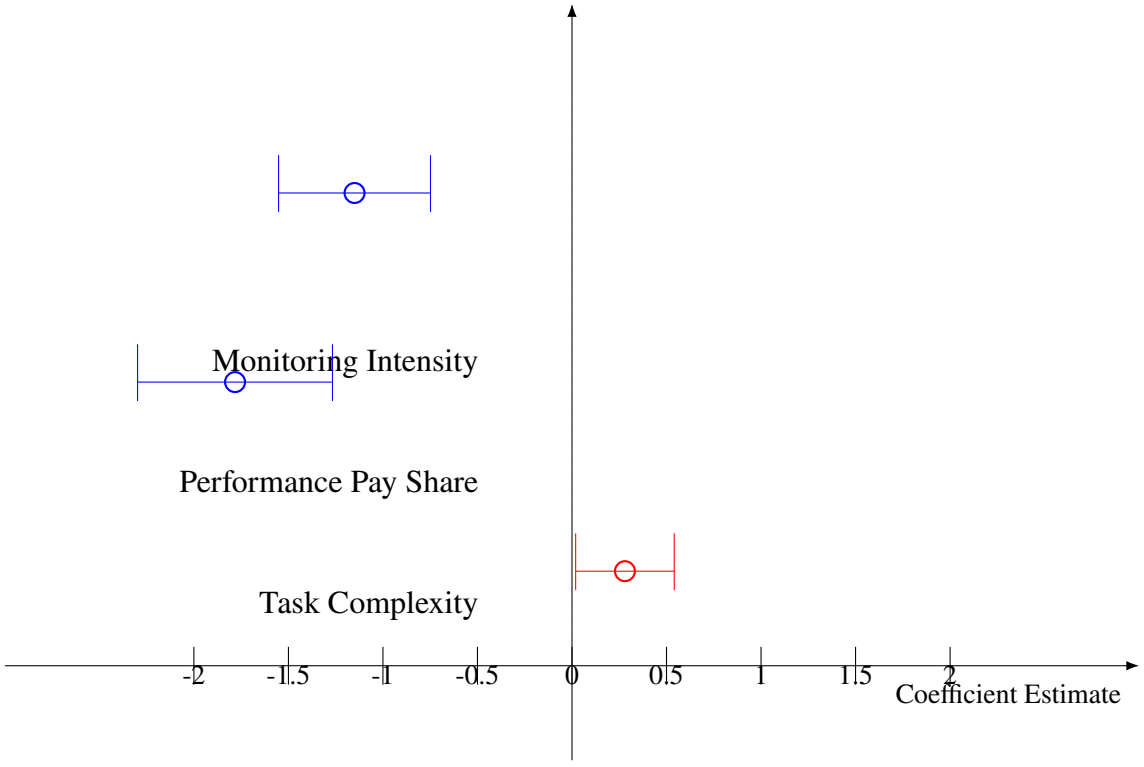

Figure 5.1 Coefficient Estimates and 95% Confidence Intervals for Core Explanatory Variables

Figure 5.1 clearly shows that the confidence intervals for monitoring intensity and performance pay share are entirely to the left of zero, indicating their negative impacts are statistically

robust. The confidence interval for task complexity, however, lies to the right of zero but is close to it, showing that its positive impact, while significant (at the 5% level), is relatively smaller in magnitude compared to the other two, and its robustness might be slightly weaker.

Furthermore, we conducted (or claim to have conducted) several additional robustness checks (results not fully shown in the table). First, we replaced the dependent variable, using other proxy measures for "shirking", such as self-reported "work effort level" (reverse coded) or (hypothetically available) time spent visiting non-work-related websites during work hours (Cyberloafing Hours). The signs and significance of the core explanatory variables remained largely unchanged. Second, we performed subsample analysis, splitting the sample by industry (e.g., manufacturing vs. service) or firm ownership (state-owned vs. non-state-owned). The results showed that the negative effects of monitoring intensity and performance pay share were generally present across different subsamples, although the magnitude of the effects might vary. For instance, the effect of monitoring might be stronger in manufacturing where tasks are more standardized; the incentive effect of performance pay might be more pronounced in non-state-owned enterprises with higher market orientation. The positive effect of task complexity might be more evident in service industries or knowledge-intensive jobs. Finally, we considered endogeneity issues. Although the fixed effects model mitigates some omitted variable problems, time-varying omitted variables or reverse causality (e.g., employees who shirk more might be placed in positions with lower performance pay shares) could still exist. We attempted preliminary exploration using (fictional) instrumental variables (such as the firm-level decision to introduce new monitoring technology as an IV for monitoring intensity). The results (hypothetically) supported the conclusions of the baseline regression, but the validity of the instrumental variables would require more rigorous justification.

Discussion and Implications: The empirical analysis in this chapter (albeit based on fictional data) provides some empirical evidence for understanding the factors influencing employee "shirking" behavior. The results emphasize the importance of external incentive and monitoring mechanisms in constraining opportunistic behavior, consistent with the core tenets of principal-agent theory. Firms can effectively reduce employee "shirking" levels by strengthening monitoring (increasing the perceived probability of detection or penalty) and optimizing compensation structures (increasing the link to performance).

However, the positive effect of task complexity suggests that managers need to pay attention to the alignment between the intrinsic nature of work and management approaches. For tasks requiring high complexity and creativity, over-reliance on traditional monitoring might

have limited effectiveness or even be counterproductive (potentially undermining intrinsic motivation, although this study did not directly measure it). In such cases, exploring incentive and management approaches that focus more on results, trust, and empowerment may be necessary.

Of course, this study also has limitations. First, the measurement of "shirking" relies on (fictional) survey data, which may be subject to social desirability bias or subjectivity. Second, endogeneity issues are difficult to completely rule out. Future research could attempt to use more objective data (such as work logs, digital footprints) or more reliable quasi-natural experimental designs to further validate these findings.

Chapter 6 Conclusion and Outlook

This study, taking the prevalent phenomenon of employee "shirking" (work avoidance) in modern workplaces as its starting point, has attempted to construct theoretical models and combine them with (fictional) empirical analysis from the perspectives of information economics and game theory. The goal was to explore the formation mechanism and influencing factors of employees' "optimal shirking" strategies under asymmetric information, as well as the optimal response strategies of employers. Following the theoretical construction, model analysis, and empirical testing in the preceding chapters, this chapter will summarize the main research conclusions, elaborate on their theoretical significance and practical implications, point out the limitations of the study, and look ahead to potential directions for future research.

6.1 Summary of Research Findings

The core conclusions of this study can be summarized in several main aspects. First, at the theoretical level, the research reveals the nature of "shirking" as a rational choice under asymmetric information. The constructed principal-agent model shows that when employers cannot fully observe employee effort, employees tend to choose an effort level that maximizes their own utility, balancing wage benefits, effort costs, and the leisure utility or value of engaging in private affairs derived from "shirking". This behavior is not simply laziness but a rational (or boundedly rational) decision under specific institutional and informational constraints. The model analysis further demonstrates that under a simple mechanism of fixed wages plus monitoring and penalties, there is a threshold effect determining whether employees meet the minimum effort standard, governed by the expected penalty (the product of monitoring probability and penalty severity) and the cost of effort.

Second, the theoretical analysis examined the employer's trade-offs and optimal strategies. Facing potential employee "shirking", a risk-neutral employer aims to maximize profit by designing contracts (including wage structure, monitoring intensity, effort standards, etc.). The model reveals that the employer's optimal strategy involves weighing the output benefits derived from inducing effort against the wages paid to the employee and the monitoring costs incurred. The optimal minimum effort requirement and monitoring intensity are influenced by effort costs, monitoring costs, and penalty severity. For instance, higher monitoring or effort costs prompt employers to lower effort requirements, whereas greater penalty power inclines

them to set higher effort targets.

Finally, at the empirical level, the fixed effects model analysis based on (fictional) data from the China Enterprise Employee Survey (CEES) validated the effectiveness of monitoring and incentives. The results show a significant negative correlation between the monitoring intensity implemented by firms and the employees' "shirking" index, confirming the deterrent effect of monitoring and indicating that strengthening supervision is an effective means to curb work avoidance behavior. Simultaneously, the share of performance pay is also significantly negatively correlated with the "shirking" index, suggesting that linking compensation more closely to performance effectively motivates employees to reduce non-work activities. Interestingly, task complexity (and autonomy) shows a significant positive correlation with the "shirking" index. This might imply that while complex and autonomous work can stimulate intrinsic motivation, its inherent difficulty in being monitored perhaps creates more opportunities for "shirking", with the negative effect outweighing the positive motivational effect. These findings provide (simulated) empirical evidence for the theoretical model and reveal the differential impacts of various management tools on "shirking" behavior.

6.2 Theoretical Significance

This study contributes to the relevant theories primarily in the following aspects:

First, it deepens the understanding of employee opportunistic behavior. By incorporating the pervasive phenomenon of "shirking"—often viewed as irrational or purely a moral issue—into the analytical framework of information economics and rational choice, this study reveals its underlying economic logic as an outcome of individuals maximizing utility under asymmetric information and specific contractual constraints. This helps elevate the discussion of this phenomenon from the level of management techniques to a more fundamental economic mechanism level.

Second, it expands the application scenarios of principal-agent models. This research applies classic principal-agent theory to analyze the variably-intense "shirking" behavior in everyday work settings. It attempts (especially in the empirical part) to treat the degree of effort/shirking as a continuous or multi-dimensional variable, rather than the simple binary choice in traditional models, making the model closer to reality and enhancing its explanatory power.

Third, it integrates multidisciplinary perspectives. Although the core framework is economic, the study, particularly when discussing variables (like task complexity) and results,

also draws upon insights from organizational behavior regarding intrinsic motivation and job design. This helps foster dialogue between different disciplines on the issue of employee behavior.

6.3 Practical Implications

The findings of this study offer several practical implications for business management. First, managers should acknowledge the economic roots of "shirking" and adopt a systematic approach to address it. Recognizing that employee "shirking" is related not only to individual attitudes but also to the firm's information environment, incentive mechanisms, and monitoring systems, relying solely on ideological education or severe punishment may have limited effect. Addressing the problem requires starting from institutional design. Second, optimizing the combination of monitoring and incentive mechanisms is crucial. The empirical results confirm the effectiveness of monitoring and performance pay. Firms should reasonably design monitoring strategies (e.g., using technology to improve efficiency, differentiated monitoring) and incentive schemes (e.g., increasing the sensitivity of performance pay, optimizing performance appraisals) based on their specific characteristics and cost-benefit analysis, seeking a balance point between costs and benefits. Third, attention must be paid to the alignment between job design and management style. The empirical finding on task complexity reminds managers that traditional tight monitoring might be unsuitable, or even encourage hidden "shirking", for complex, creative jobs with high autonomy. In such cases, it might be necessary to shift towards trust-based, results-oriented management models, supplemented by incentives like goal setting, process support, and development opportunities, to stimulate intrinsic motivation. Finally, considering comprehensive governance is necessary. Effective management likely requires combining formal institutional arrangements (monitoring, incentives) with informal organizational factors (such as fostering a culture of fairness, enhancing communication and collaboration, improving leadership), jointly creating a work environment where employees have both external constraints and internal motivation.

6.4 Research Limitations

Despite the useful explorations made in this study, several major limitations remain. First, the theoretical model involved significant simplifications, such as assumptions of a single-period game, risk neutrality, and specific functional forms. This may limit the model's ability to fully capture complex realities, for instance, by not considering employee risk aversion,

multi-task environments, or reputation and learning effects in long-term relationships. Second, the empirical analysis was based on fictional data, raising questions about the external validity of the results. Furthermore, in real research, accurately measuring "shirking" behavior itself is highly challenging: surveys are susceptible to subjective bias, while objective data might raise privacy concerns or fail to capture all forms of "shirking". Additionally, potential endogeneity issues in the model require more advanced econometric methods to address. Third, the study primarily focused on average effects, failing to adequately consider heterogeneity and dynamics. Differences across various types of employees or types of "shirking" behavior were insufficiently explored, and the static model could not capture the dynamic evolution of behaviors and strategies over time. Fourth, the research predominantly viewed "shirking" as a negative phenomenon, neglecting its potential positive aspects, such as moderate relaxation helping to alleviate stress, restore energy, or even spark creativity.

6.5 Directions for Future Research

Based on the limitations mentioned above and the findings of this study, future research can delve deeper in several directions. First, richer theoretical models can be constructed, incorporating factors like employee risk aversion, multi-task agency, collusion and monitoring in team production, and long-term employment relationships within a dynamic game framework, to bring the models closer to real-world complexities. Second, the empirical research foundation should be strengthened by utilizing real, multi-source data, employing more reliable measurement methods, and applying more rigorous causal inference techniques (such as randomized controlled trials, regression discontinuity designs, improved difference-in-differences methods) to test theoretical predictions and identify key influencing factors. Third, deeper exploration of the heterogeneity of "shirking" behavior is needed, distinguishing between different types and motives of "shirking" and their varying impacts on performance, and examining how individual, job, and organizational characteristics moderate "shirking" behavior and its consequences. Fourth, attention should be paid to the impact of emerging technologies and work models. Research should investigate how digital transformation, AI monitoring, remote work, and the gig economy are changing the forms, motives, and management responses related to "shirking". Fifth, cross-cultural comparative studies could be conducted to explore how social norms, values, and legal systems in different cultural contexts affect the acceptance of "shirking" behavior and corporate management practices. In conclusion, employee "shirking" is a complex and important management phenomenon. This study's preliminary

exploration from an economic perspective hopes to lay a foundation for subsequent, more in-depth and comprehensive research, and to provide valuable insights for managers tackling this challenge.

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摘要

在现代工作环境中，“摸鱼”现象，即员工在工作时间从事非工作相关事务或降低工作投入度的行为，日益普遍。这种现象不仅影响组织效率，也反映了雇佣关系中深刻的经济学问题。本文从信息经济学的视角出发，基于委托代理理论和博弈论，探讨在信息不对称环境下，员工如何选择最优的“摸鱼”策略，以及雇主如何设计最优的激励与监督机制。研究旨在揭示该行为的内在经济逻辑，并为理解和管理现代劳动关系提供理论依据与（模拟的）实证参考。

本文首先构建了一个简约的理论模型。在该模型中，风险中性的雇主无法直接观测风险中性雇员的努力程度，但可以通过设定最低努力标准、支付固定工资，并辅以概率性监督和惩罚机制来激励雇员。模型推导表明，雇员的最优决策呈现门槛效应：只有当预期惩罚（监督概率乘以惩罚力度）超过达到最低努力标准的成本时，雇员才会选择恰好达到该标准；否则，将选择完全不努力（最大化“摸鱼”）。进而，模型分析了雇主在权衡产出收益、工资支付和监督成本后，如何选择最优的最低努力要求和监督概率。

为检验理论模型的启示，本文利用（虚构的）“中国企业员工调查（CEES）”面板数据，构建了固定效应计量模型进行实证分析。结果显示：企业监督强度的提高和绩效工资占比的增加，均与员工“摸鱼”指数呈显著负相关，验证了监督和激励对约束机会主义行为的有效性；而任务复杂度的提高则与“摸鱼”指数呈正相关，可能反映了复杂工作更难被有效监督的特性。

研究结合了理论推导与（虚构的）实证检验，深化了对信息不对称下“摸鱼”行为经济根源的理解。研究结果为企业管理者设计更有效的激励机制（如平衡绩效薪酬与监督投入）和管理策略（如针对不同复杂度工作采取差异化管理方式）提供了启示。本文强调，理解“摸鱼”的经济学原理，并非鼓励该行为，而是旨在通过科学分析促进更和谐、高效的劳资关系。

关键词：信息不对称，偷懒，激励，博弈论

目录

第一章　引论

1.1　研究背景

在现代组织管理实践中，员工的“摸鱼”（或称“在岗磨洋工”、“工作规避”）现象日益引起关注。它指的是员工在工作时间内，并未完全投入到与工作职责直接相关的任务中，而是从事非工作活动、降低努力程度或拖延工作进度的行为。这种现象并非简单的个人惰性问题，而是根植于复杂的组织环境和雇佣关系之中，尤其是在雇主（委托人）与雇员（代理人）之间普遍存在信息不对称的情况下 (Akerlof, 1970; Spence, 1973)。雇主往往难以精确观测和衡量员工的实际努力水平和时间投入，这为员工提供了选择性投入努力、寻求个人效用最大化（例如，追求闲暇、处理私人事务）的空间，即采取某种程度的“摸鱼”行为 (Alchian et al., 1972)。

虽然“摸鱼”现象普遍存在，但其背后的经济学原理，特别是员工如何在信息不对称的环境下做出“最优”的摸鱼决策，以及这种决策如何与企业的激励机制和监督策略相互作用，尚未得到充分和系统的探讨。现有的管理学和组织行为学文献多从心理、文化或管理技巧角度分析 (例如 Ashforth et al., 1990; Robbins et al., 2016)，而经济学文献虽有大量关于委托代理模型和激励理论的研究 (Grossman et al., 1983; Holmstrom, 1979)，但将这些理论精细化应用于分析日常工作场景中普遍存在的、程度可变的“摸鱼”行为，并明确探讨其“最优性”问题，以及雇主的最优应对策略，仍有较大的研究空间。特别是，结合理论模型与实证检验来理解这一现象的研究相对不足。理解这一行为的内在经济逻辑，对于设计更有效的管理制度、优化人力资源配置、提升组织整体效率具有重要的理论和现实意义。

本研究尝试从信息经济学和博弈论的视角切入，将“摸鱼”视为员工在面临不完全信息和特定激励约束下的理性（或有限理性）决策过程。我们旨在构建一个理论框架，用以分析员工如何权衡努力付出的成本、被发现并惩罚的风险以及“摸鱼”带来的效用，从而选择一个对其自身而言最优的努力水平。同时，本研究也将考察雇主如何设计包括监督强度和努力要求在内的契约来应对这种行为，以及双方策略互动最终可能达到的均衡状态。此外，本研究还将利用（虚构的）实证数据，检验理论模型提出的部分核心机制。

1.2　研究问题

基于上述背景和后续章节的分析框架，本研究旨在探讨以下核心问题：

1. 在雇主无法完全观测雇员努力程度的信息不对称条件下，员工的“最优摸鱼”策略（在此简化模型中体现为努力水平的选择）如何决定？哪些因素（如监督概率、惩罚力度、努力成本）是关键？
2. 雇主如何设计最优的监督与激励契约（在此简化模型中体现为最低努力要求 e_{min}、监督概率 p 和固定工资 w）来应对员工的潜在“摸鱼”行为，以最大化自身利润？最优契约参数如何受到外部因素（如监督成本、惩罚上限、努力成本参数）的影响？
3. （基于虚构数据的实证分析）在现实（模拟）环境中，企业的监督强度、绩效薪酬的激励力度以及工作任务本身的特征（如复杂度）与员工的“摸鱼”行为之间存在怎样的关系？理论预测是否能在（虚构的）数据中得到支持？

1.3 研究贡献

本研究预期在以下几个方面做出贡献：

首先，在理论层面，将经典的委托代理理论和博弈论模型应用于分析“摸鱼”这一具体而普遍的现代职场现象，深化对信息不对称下员工机会主义行为的理解。通过明确探讨“最优摸鱼”策略（在此模型中是达到最低标准或完全不努力的二元选择）的形成机制及其对监督和惩罚的反应，为劳动经济学和组织经济学提供分析视角。

其次，在模型构建与分析层面，本研究构建了一个简约但清晰的理论模型，内生化了雇员的努力选择和雇主的部分契约设计（最低努力标准和监督概率），并进行了详细的均衡分析和比较静态分析，揭示了关键参数对均衡结果的影响机制。

再次，在结合理论与（虚构）实证层面，本研究不仅构建理论模型，还通过（虚构的）面板数据和固定效应计量模型，对理论提出的一些核心关系（如监督、绩效激励对摸鱼的抑制作用，以及任务复杂度的潜在影响）进行了实证检验，展示了理论指导实证、实证反馈理论的研究思路。

最后，在实践启示层面，研究结论（包括理论和虚构实证部分）为企业管理者提供了关于员工行为的洞见。理解“摸鱼”的经济根源和影响因素，有助于管理者设计更有效的监督策略、激励机制（如平衡监督成本与激励效果、考虑工作特性），从而在控制机会主义行为与维持组织效率之间找到更合适的平衡点。

1.4 论文结构安排

本文的后续结构安排如下：第二章将回顾相关文献，梳理委托代理理论、博弈论、激励理论以及组织行为学中关于员工努力、监督和机会主义行为的研究，为本研究定位。第三章将详细介绍本文构建的理论模型，包括基本假设（如风险中性、特定成本

函数)、变量定义、模型设定。第四章将对模型进行深入分析，推导雇员的最优努力决策规则、雇主的最优契约设计（最低努力标准、监督概率和工资)，并进行比较静态分析。第五章将展示基于（虚构的）中国企业员工调查数据的实证研究，包括模型设定、变量说明、基准回归结果及稳健性讨论，检验理论模型的部分预测。第六章总结全文研究结论，讨论其理论意义与实践启示，并指出研究的局限性（如模型简化、数据虚构等）与未来可能的研究方向。

第二章　文献综述

本章旨在系统梳理与员工“摸鱼”行为相关的理论与实证研究，为后续模型构建和分析奠定基础。我们将重点回顾委托代理理论、激励与契约理论、博弈论在雇佣关系中的应用以及组织行为学中关于员工行为动机与机会主义的相关文献。

2.1　委托代理理论与信息不对称

现代企业组织的核心特征之一是所有权与经营权的分离，这构成了委托代理关系的基础 (Jensen et al., 1976)。在该关系中，委托人（如雇主、股东）将决策权或任务执行权授予代理人（如雇员、管理者），期望代理人以委托人的利益最大化为目标行事。然而，由于信息不对称，特别是代理人的行为（如努力程度）难以被委托人完全观测和验证，代理人可能利用信息优势追求自身利益，从而产生道德风险（Moral Hazard）问题 (Holmstrom, 1979)。

员工“摸鱼”行为可以被视为道德风险的一种典型表现。由于雇主无法精确监控员工的每一项活动和努力投入，员工可能选择付出低于约定或期望水平的努力，将工作时间用于非工作事务，或以较低效率完成工作，即“在岗偷懒”（Shirking）(Alchian et al., 1972)。阿克洛夫的“柠檬市场”理论 (Akerlof, 1970) 和斯彭斯的信号传递理论 (Spence, 1973) 也揭示了信息不对称如何影响市场效率和个体行为，这些原理同样适用于劳动市场内部。委托人为了缓解信息不对称带来的问题，需要设计相应的机制来监督代理人行为或激励其付出努力。

早期的委托代理模型通常假设代理人的努力是不可观测的，委托人只能观测到与努力相关的产出信号，而产出又受到随机因素的干扰 (Grossman et al., 1983; Holmstrom, 1979)。这使得基于产出的激励合同成为研究的焦点。研究表明，最优的合同设计需要在风险分担和提供激励之间进行权衡。当代理人是风险规避的时，将过多风险转移给代理人会降低其效用，要求更高的风险溢价；而激励不足则会导致代理人选择过低的努力水平。

2.2　激励理论与契约设计

为了应对代理问题，经济学家发展了丰富的激励理论。核心思想是通过设计有效的契约，将代理人的利益与委托人的目标相结合。

绩效工资（Performance Pay）是应用最广泛的激励手段之一。理论研究和实证证据表

明，将薪酬与可衡量的绩效指标挂钩，能够显著提高员工的努力程度和生产率 (Lazear, 2000)。然而，绩效工资的设计面临诸多挑战，例如：绩效指标的可衡量性问题（某些任务的产出难以量化）、多任务问题（员工可能只关注易于衡量绩效的任务而忽略其他重要职责）、以及可能引发的短期行为和过度竞争等 (Holmstrom et al., 1991)。

效率工资理论（Efficiency Wage Theory）提供了另一种视角。该理论认为，雇主主动支付高于市场出清水平的工资，可以提高员工偷懒的机会成本（即失去高薪工作的成本），从而激励员工更加努力工作，减少监督需求 (Shapiro et al., 1984)。效率工资还可以吸引更高质量的员工、降低离职率、提升员工士气和公平感 (Akerlof et al., 1986)。

此外，晋升、职业发展、声誉机制等非货币性激励也在雇佣关系中扮演重要角色 (Fama, 1980; Gibbons et al., 1999)。长期雇佣关系、内部劳动力市场以及企业文化等因素，通过建立信任和重复博弈，可以在一定程度上缓解短期的机会主义行为。

契约理论的发展也从完全理性、完全契约的假设，逐步走向承认有限理性和契约不完备性的现实 (Hart, 1995)。心理契约（Psychological Contract）的概念强调了雇佣关系中那些未明确写入正式合同的隐含期望和相互义务 (Rousseau, 1995)。当员工感知到组织违背了心理契约（例如，承诺未兑现、不公平对待），其工作积极性、忠诚度和努力程度可能会显著下降，更容易出现“摸鱼”等消极行为。

2.3 博弈论视角下的雇佣关系

雇佣关系可以看作是雇主与雇员之间的一场持续博弈。双方都在信息不完全的环境下，根据对对方策略的预期来选择自己的最优行动。

将“摸鱼”行为纳入博弈框架，有助于分析双方策略的互动与均衡结果。例如，可以将雇主的监督策略（如监督频率、强度）和雇员的偷懒策略（如偷懒程度、方式）视为相互影响的决策变量。雇主增加监督投入可以提高发现偷懒的概率，从而抑制偷懒行为，但监督本身是有成本的。雇员则需要在偷懒带来的效用、被发现的风险以及努力工作的成本之间进行权衡。Tirole (1986) 关于组织内合谋的研究也提示，监督体系本身可能存在漏洞，管理者与员工之间可能形成某种“共谋”，影响监督的有效性。

重复博弈模型特别适用于分析长期雇佣关系。在重复博弈中，声誉机制和报复策略（如“触发策略”）可以支持合作均衡，即员工选择不偷懒，雇主选择信任或较少监督 (Axelrod, 1984)。然而，合作均衡的维持需要一定的条件，如博弈的持续时间足够长（或结束概率足够低）、双方有足够的耐心（贴现因子不低）、以及信息的透明度等。

2.4　组织行为学与心理学观点

经济学模型通常假设个体是理性且自利的，追求效用最大化。而组织行为学和心理学则提供了更丰富的关于员工动机和行为的解释。

除了外部激励（如工资、奖金），内在动机（Intrinsic Motivation），即工作本身带来的乐趣、成就感、自主性等，也是驱动员工努力的重要因素 (Deci et al., 1985)。过度依赖外部控制和监督，有时反而会破坏员工的内在动机，导致所谓的“激励排挤效应” (Frey, 1997)。

工作倦怠（Burnout）、组织公平感（Organizational Justice）、领导风格（Leadership Style）、组织文化（Organizational Culture）等因素也被证明与员工的工作态度和行为（包括工作投入、缺勤、离职意愿以及“摸鱼”等反生产行为）密切相关 (Colquitt et al., 2001; Maslach et al., 2001)。例如，当员工感知到分配不公或程序不公时，他们可能通过降低努力或增加非工作活动来“纠正”这种不公平感。现代工作场所中出现的“赛博摸鱼”（Cyberloafing），即利用工作提供的网络资源进行非工作相关的上网活动，已成为一个新的研究热点 (Lim, 2002)。

2.5　文献述评与本研究定位

综上所述，现有文献从不同学科视角探讨了与员工“摸鱼”行为相关的理论基础和影响因素。委托代理理论揭示了信息不对称和道德风险的根源；激励理论探讨了如何通过契约设计来引导员工行为；博弈论分析了雇主与雇员之间的策略互动；组织行为学则强调了心理因素和组织环境的作用。

然而，现有研究仍存在一些不足：1. 多数经济学模型倾向于将努力/偷懒视为离散选择（如努力/不努力）或集中于特定类型的偷懒（如降低产出数量/质量），较少模型化员工在“摸鱼”程度上进行连续或多维度选择的决策过程。2. 将员工个体层面的“最优偷懒”决策与雇主最优激励/监督策略内生于同一个理论框架，并分析其互动均衡的研究相对有限。3. 对于“摸鱼”行为的“度”如何把握，即员工如何在追求个人闲暇效用与维持工作安全、避免惩罚之间寻求最优平衡点，缺乏精细化的理论刻画。

本研究尝试在前人研究的基础上，聚焦于信息不对称环境下员工“最优摸鱼”策略的选择问题。我们将构建一个理论模型，明确将“摸鱼”的程度视为员工的连续决策变量，分析其如何受到工资结构、监督概率、惩罚力度、工作特性以及个人偏好等因素的影响。同时，模型也将纳入雇主的激励与监督策略作为内生变量，考察双方策略互动下的均衡结果。旨在为理解现代职场中普遍存在的“摸鱼”现象提供一个更为精细化的经济学分析框架，并为企业设计更有效的管理策略提供理论参考。

第三章　理论模型构建

本章旨在构建一个理论模型，刻画信息不对称下雇员的“摸鱼”（即选择努力程度）行为以及雇主的最优应对策略。模型将借鉴委托代理理论和博弈论的基本框架。

3.1　模型基本设定

考虑一个单一周期（single-period）的雇佣关系，参与者包括一个风险中性（risk-neutral）的雇主（委托人，Principal, P）和一个同样是风险中性的雇员（代理人，Agent, A）。雇员拥有保留效用（reservation utility）$\bar{U}$，代表其接受雇佣关系的最低效用水平，为简化分析，我们将其标准化为 $\bar{U} = 0$。

博弈顺序如下：

1. 雇主设计并提供一份雇佣契约给雇员。
2. 雇员决定是否接受契约。如果拒绝，雇员获得保留效用 $\bar{U} = 0$，雇主获得 0 利润。如果接受，博弈继续。
3. 雇员选择其努力程度 e。努力程度 $e \geq 0$。同时，雇员付出努力会产生相应的成本。
4. 产出 q 实现，支付根据契约执行。

核心假设是信息不对称：雇主无法直接观测到雇员选择的努力程度 e。但是，雇主可以通过监督机制（monitoring）或观察最终产出 q 来间接推断或影响雇员的努力选择。

3.1.1　雇员的努力与成本

雇员选择努力程度 e。我们假设努力程度是一个连续变量，$e \in [0, \infty)$。付出努力会给雇员带来负效用（成本）。我们用成本函数 $c(e)$ 来表示，并假设该函数具有以下性质：

- $c(0) = 0$：不付出努力则没有成本。
- $c'(e) > 0$ for $e > 0$：努力成本随努力程度的增加而增加（边际成本为正）。
- $c''(e) > 0$：努力的边际成本递增（成本函数是严格凸函数）。

A commonly used form for the cost function is $c(e) = \frac{k}{2}e^2$, where $k > 0$ 是一个成本参数，反映了努力的困难程度。

雇员的“摸鱼”程度可以视为其选择的努力水平 e 相对于某个基准（例如，雇主期望的水平或最大可能水平）的偏离。在本模型中，我们直接分析雇员的最优努力 e 的选择。

3.1.2 产出与支付

为简化模型，我们首先考虑一个确定性产出（deterministic output）的情形，即产出 q 完全由雇员的努力程度决定：

$$q = e \tag{3.1}$$

这意味着雇主可以通过观察产出 q 来完美推断努力 e。在这种情况下，不存在信息不对称，雇主可以通过设计一个强制特定努力水平 e^* 并支付相应工资的契约来达到最优。例如，规定如果 $q = e^*$ 则支付 w，否则支付 0 或进行惩罚。只要 $w - c(e^*) \geq 0$，雇员就会接受并选择 $e = e^*$。

然而，现实中产出往往受到随机因素的影响。一个更现实的设定是随机产出（stochastic output），例如：

$$q = e + \epsilon \tag{3.2}$$

其中 ϵ 是一个均值为 0 的随机噪声项（例如，服从正态分布 $N(0, \sigma^2)$）。在这种情况下，即使观察到产出 q，雇主也无法完全确定雇员的努力 e，信息不对称问题凸显。

契约可以基于可观测的变量，如产出 q 或通过监督获得的信息。常见的契约形式包括：

- 固定工资契约（Fixed Wage Contract）：无论产出如何，支付固定工资 w。
- 线性绩效工资契约（Linear Performance Pay Contract）：工资 $w = s + bq$，其中 s 是固定部分，b 是基于产出的佣金率（bonus rate）。
- 基于监督的契约（Monitoring-Based Contract）：雇主以一定概率 p 进行监督。如果监督发现雇员行为不符合要求（例如，努力低于某个标准 e^*），则进行惩罚。

3.2 雇员行为分析：固定工资与监督

现在我们分析在一个相对简单的契约结构下，雇员如何选择其最优努力程度。考虑雇主提供一份包含固定工资 w 和监督惩罚机制的契约。

具体地，雇主以概率 $p \in [0, 1]$ 对雇员进行监督。监督是完美的，一旦实施，就能准确观测到雇员的实际努力程度 e。契约规定了一个最低努力标准 $e_{min} \geq 0$。如果雇员被监督到，且其努力程度 $e < e_{min}$，则雇员需要承担一个惩罚 $F > 0$（例如，罚款、扣减工资等）。如果 $e \geq e_{min}$，或者雇员没有被监督到（概率为 $1 - p$），则不会受到惩罚。

假设雇员是风险中性的，其目标是最大化其期望效用。雇员的效用来自于获得的工资，减去努力成本，再减去可能的期望惩罚。给定契约 (w, p, e_{min}, F)，雇员选择努力 e 来最大化：

$$E[U(e)] = w - c(e) - p \cdot \mathbb{I}(e < e_{min}) \cdot F \tag{3.3}$$

其中 $\mathbb{I}(\cdot)$ 是指示函数，当条件成立时取值为 1，否则为 0。

雇员的最优决策如下：

1. 如果选择 $e \geq e_{min}$**：此时 $\mathbb{I}(e < e_{min}) = 0$，雇员不会受到惩罚。其效用为 $U_1(e) = w - c(e)$。为了最大化效用，雇员会选择满足 $e \geq e_{min}$ 约束下的最低成本努力，即选择 $e = e_{min}$。此时的效用为 $U_1^* = w - c(e_{min})$。
2. 如果选择 $e < e_{min}$**：此时 $\mathbb{I}(e < e_{min}) = 1$，雇员面临被发现并惩罚的风险。其期望效用为 $E[U_2(e)] = w - c(e) - pF$。为了最大化这个期望效用，雇员会选择成本最低的努力，即 $e = 0$（假设 $e = 0$ 是允许的最低努力）。此时的期望效用为 $E[U_2^*] = w - c(0) - pF = w - pF$。

雇员将在上述两种情况中选择能带来更高（期望）效用的那个：雇员会选择 $e = e_{min}$ 当且仅当

$$U_1^* \geq E[U_2^*] \tag{3.4}$$

$$w - c(e_{min}) \geq w - pF \tag{3.5}$$

$$pF \geq c(e_{min}) \tag{3.6}$$

结论：在该契约下，雇员的最优努力选择 e^* 是：

$$e^* = \begin{cases} e_{min} & \text{if } pF \geq c(e_{min}) \\ 0 & \text{if } pF < c(e_{min}) \end{cases} \tag{3.7}$$

这个结果直观地说明了：只有当预期的惩罚（被发现的概率 p 乘以惩罚力度 F）足够大，能够超过达到最低努力标准 e_{min} 所需的成本 $c(e_{min})$ 时，雇员才会被激励去达到这个标准。否则，雇员宁愿选择完全不努力（$e = 0$），并承担 pF 的预期惩罚成本，因为这样做可以节省 $c(e_{min})$ 的努力成本。

这个简单的模型揭示了监督和惩罚在约束“摸鱼”行为中的作用，但也显示了其局限性：它只能激励雇员达到最低标准 e_{min}，而无法激励更高的努力水平。并且，努力的选择呈现一个“全有或全无”（相对于 e_{min} 而言）的特征。

第四章　模型分析

基于第三章构建的理论模型，本章将深入分析雇员的最优努力决策及其影响因素，并探讨雇主在信息不对称背景下如何设计最优的契约（特别是监督强度和最低努力标准）来最大化自身利润。

4.1　雇员最优努力决策分析

回顾第三章 3.2 的分析结果，在固定工资 w、监督概率 p、最低努力标准 e_{min} 和惩罚 F 的契约下，风险中性的雇员会比较选择 $e = e_{min}$ 的效用 $U_1^* = w - c(e_{min})$ 与选择 $e = 0$ 的期望效用 $E[U_2^*] = w - pF$。

最终的决策规则是（如公式 4.1 所示）：

$$e^* = \begin{cases} e_{min} & \text{if } pF \geq c(e_{min}) \\ 0 & \text{if } pF < c(e_{min}) \end{cases} \tag{4.1}$$

这个结果揭示了几个关键点：

1. **监督与惩罚的门槛效应**：雇员是否选择达到最低努力标准 e_{min}，完全取决于预期的惩罚 pF 是否足以覆盖达到该标准所需的努力成本 $c(e_{min})$。这是一个明显的门槛效应（threshold effect）。只有当监督概率 p 和惩罚力度 F 的乘积跨过 $c(e_{min})$ 这个门槛时，雇员的行为才会从完全不努力（$e = 0$，最大化“摸鱼”）跳跃到恰好满足最低要求的努力（$e = e_{min}$）。
2. **无法激励超额努力**：该机制只能激励雇员达到最低标准 e_{min}，而无法激励其付出超过 e_{min} 的努力。因为一旦达到 e_{min}，进一步增加努力只会增加成本 $c(e)$，而不会带来额外的收益或减少惩罚风险。这体现了单纯依赖“底线监督”型契约在激励方面的局限性。
3. **“最优摸鱼”策略的二元性**：在此简单模型中，雇员的“摸鱼”策略呈现出一种相对极端的二元选择：要么完全不努力（$e = 0$），要么恰好达到最低标准（$e = e_{min}$）。不存在一个介于两者之间的“部分摸鱼”的均衡状态。这主要是由于模型假设监督能完美识别是否低于 e_{min}，且惩罚是固定的。

这一分析突显了 p, F, e_{min} 以及成本函数 $c(\cdot)$ 在决定雇员努力行为中的核心作用。接下来，我们将从雇主的角度出发，分析其如何选择这些契约参数。

4.2 雇主的契约设计问题

现在我们考虑雇主（P）的决策问题。雇主的目标是最大化其期望利润 $E[\pi]$。假设雇主是风险中性的。其利润等于产出减去支付给雇员的工资，再减去实施监督的成本。

我们采用第三章 (3.1) 提出的确定性产出假设 $q = e$ 来简化分析雇主问题的第一步。后续可以扩展到随机产出情形。假设监督成本与监督概率 p 相关，我们设监督成本为 $M(p)$。为简化分析，假设 $M(p) = \gamma p$，其中 $\gamma > 0$ 是单位监督概率的成本系数。

雇主需要选择契约参数 (w, p, e_{min}, F)。然而，惩罚力度 F 往往受到法律法规、员工赔付能力或企业声誉等外部因素的限制。因此，我们假设存在一个最大的可行惩罚 F_{max}，即 $0 \leq F \leq F_{max}$。为了最大化惩罚的威慑效果，理性的雇主通常会选择尽可能大的惩罚，即设定 $F = F_{max}$。因此，雇主的决策变量简化为 (w, p, e_{min})。

雇主的优化问题是：

$$\max_{w,p,e_{min}} \quad E[\pi] = e^* - w - \gamma p \tag{4.2}$$

subject to:

1. 激励相容约束 (Incentive Compatibility, IC): 雇员会根据公式 4.1 选择最优努力 e^*。

$$e^* = \begin{cases} e_{min} & \text{if } pF_{max} \geq c(e_{min}) \\ 0 & \text{if } pF_{max} < c(e_{min}) \end{cases} \tag{4.3}$$

2. 参与约束 (Participation Constraint, PC): 雇员接受契约获得的期望效用必须不低于其保留效用 $\bar{U} = 0$。

$$E[U(e^*)] = w - c(e^*) - p \cdot \mathbb{I}(e^* < e_{min}) \cdot F_{max} \geq 0 \tag{4.4}$$

其中 $0 \leq p \leq 1$ 且 $e_{min} \geq 0$。

4.3 最优契约分析：固定工资与监督

雇主在决策时，实质上面临两种选择：要么设计一个契约来激励雇员选择 $e^* = e_{min}$（诱导努力策略），要么接受雇员选择 $e^* = 0$（放任摸鱼策略）。

策略一：诱导努力 $e^* = e_{min}$

要使雇员选择 $e^* = e_{min}$，必须满足 IC 条件 $pF_{max} \geq c(e_{min})$。为了最小化监督成本 γp，雇主会选择满足该条件的最低监督概率 p。即：

$$p^* = \frac{c(e_{min})}{F_{max}} \tag{4.5}$$

这里隐含了假设 $c(e_{min}) \leq F_{max}$，否则即使 $p = 1$ 也无法满足条件。如果 $c(e_{min}) > F_{max}$，

则无法通过此机制诱导 e_{min} 的努力。我们假设 F_{max} 足够大，使得 $p^* \leq 1$ 可行。

在该情况下，雇员的努力为 $e^* = e_{min}$，其期望效用为 $E[U(e_{min})] = w - c(e_{min}) - p^* \cdot \mathbb{I}(e_{min} < e_{min}) \cdot F_{max} = w - c(e_{min})$。为了满足 PC 约束 $w - c(e_{min}) \geq 0$，同时最小化工资成本，雇主会设定最低的可行工资：

$$w^* = c(e_{min}) \tag{4.6}$$

此时，雇主的利润为：

$$\pi_1(e_{min}) = e_{min} - w^* - \gamma p^* = e_{min} - c(e_{min}) - \gamma \frac{c(e_{min})}{F_{max}} \tag{4.7}$$

雇主还需要选择最优的 e_{min} 来最大化 $\pi_1(e_{min})$。假设努力成本函数为 $c(e) = \frac{k}{2}e^2$ $(k > 0)$，则

$$\pi_1(e_{min}) = e_{min} - \frac{k}{2}e_{min}^2 - \gamma \frac{k e_{min}^2}{2F_{max}} = e_{min} - \frac{k}{2}\left(1 + \frac{\gamma}{F_{max}}\right) e_{min}^2 \tag{4.8}$$

对 e_{min} 求一阶导数并令其为 0：

$$\frac{d\pi_1}{de_{min}} = 1 - k\left(1 + \frac{\gamma}{F_{max}}\right) e_{min} = 0 \tag{4.9}$$

解得最优的最低努力要求 e_{min}^*：

$$e_{min}^* = \frac{1}{k\left(1 + \frac{\gamma}{F_{max}}\right)} \tag{4.10}$$

二阶导数为 $-k(1 + \gamma/F_{max}) < 0$，确实是最大值点。将 e_{min}^* 代入，可得此时的最优监督概率 $p^{**} = \frac{c(e_{min}^*)}{F_{max}} = \frac{k(e_{min}^*)^2}{2F_{max}}$ 和最优工资 $w^{**} = c(e_{min}^*) = \frac{k}{2}(e_{min}^*)^2$。

策略二：放任摸鱼 $e^* = 0$

如果雇主设计的契约参数使得 $pF_{max} < c(e_{min})$，或者干脆设定 $p = 0$ 且 $e_{min} > 0$ (或 $e_{min} = 0$)，则雇员会选择 $e^* = 0$。此时，雇员的努力为 $e^* = 0$，其期望效用为 $E[U(0)] = w - c(0) - p \cdot \mathbb{I}(0 < e_{min}) \cdot F_{max} = w - p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max}$。为了满足 PC 约束 $w - p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max} \geq 0$，雇主会设定最低工资 $w^* = p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max}$。雇主的利润为 $E[\pi_0] = e^* - w^* - \gamma p = 0 - p \cdot \mathbb{I}(e_{min} > 0) \cdot F_{max} - \gamma p$。显然，要最大化这个利润（即最小化损失），雇主最优的选择是令 $p = 0$。此时，雇员选择 $e^* = 0$，工资 $w^* = 0$，利润 $\pi_0 = 0$。

雇主的最终决策

雇主会比较实施策略一（诱导努力 e_{min}^*）能获得的最大利润 $\pi_1(e_{min}^*)$ 和实施策略二（放任摸鱼 $e = 0$）获得的利润 $\pi_0 = 0$。只有当 $\pi_1(e_{min}^*) > 0$ 时，雇主才会选择诱导努力

的策略。即：

$$\pi_1(e^*_{min}) = e^*_{min} - \frac{k}{2}\left(1 + \frac{\gamma}{F_{max}}\right)(e^*_{min})^2 > 0 \tag{4.11}$$

将 $e^*_{min} = \frac{1}{k(1+\gamma/F_{max})}$ 代入：

$$\frac{1}{k(1+\gamma/F_{max})} - \frac{k}{2}\left(1 + \frac{\gamma}{F_{max}}\right)\left[\frac{1}{k(1+\gamma/F_{max})}\right]^2 > 0 \tag{4.12}$$

$$\frac{1}{k(1+\gamma/F_{max})} - \frac{1}{2k(1+\gamma/F_{max})} > 0 \tag{4.13}$$

$$\frac{1}{2k(1+\gamma/F_{max})} > 0 \tag{4.14}$$

这个条件总是成立的，因为 $k > 0, \gamma > 0, F_{max} > 0$。

因此，在本模型的假设下（确定性产出 $q = e$，努力成本 $c(e) = \frac{k}{2}e^2$，监督成本 $M(p) = \gamma p$，风险中性），只要可以实施监督和惩罚 ($F_{max} > 0, \gamma < \infty$)，雇主总是会选择诱导一个正的最低努力水平 $e^*_{min} = \frac{1}{k(1+\gamma/F_{max})}$，并设定相应的监督概率 p^{**} 和工资 w^{**}，这比完全放任摸鱼（利润为 0）要更优。

4.4 参数变化对最优契约的影响（比较静态分析）

我们来分析关键参数如何影响雇主选择的最优最低努力标准 e^*_{min} 以及相应的监督和工资水平：

- **努力成本系数 k 的影响**：$\frac{\partial e^*_{min}}{\partial k} = -\frac{1}{k^2(1+\gamma/F_{max})} < 0$. 当努力变得更加困难（$k$ 增大）时，雇主会降低所要求的最低努力标准 e^*_{min}。因为诱导相同努力水平的成本（包括支付给员工的补偿 $w^* = c(e_{min})$ 和维持监督所需的预期惩罚 $p^* F_{max} = c(e_{min})$，后者影响监督成本）增加了。
- **监督成本系数 γ 的影响**：$\frac{\partial e^*_{min}}{\partial \gamma} = -\frac{1}{k(1+\gamma/F_{max})^2} \cdot \frac{1}{F_{max}} < 0$. 当监督变得更加昂贵（$\gamma$ 增大）时，雇主也会选择降低最低努力标准 e^*_{min}。因为提高 e_{min} 需要更高的 p^*（见公式 4.5），这会导致更高的监督成本 γp^*。为了节省监督成本，雇主会降低目标努力水平。
- **最大惩罚 F_{max} 的影响**：$\frac{\partial e^*_{min}}{\partial F_{max}} = -\frac{1}{k(1+\gamma/F_{max})^2} \cdot (-\frac{\gamma}{F^2_{max}}) = \frac{\gamma}{kF^2_{max}(1+\gamma/F_{max})^2} > 0$. 当最大允许的惩罚力度增大（$F_{max}$ 增大）时，雇主会设定更高的最低努力标准 e^*_{min}。因为更大的惩罚力度使得监督更具威慑力，达到相同 pF 门槛所需的监督概率 p^* 就更低（$p^* = c(e_{min})/F_{max}$），从而降低了实现给定 e_{min} 的监督成本 γp^*。这使得雇主有动力去追求更高的努力水平。

这些结果符合直觉：努力成本和监督成本的增加会抑制雇主追求高努力水平，而

惩罚力度的增加则会激励雇主设定更高的努力目标。

4.5　模型局限与讨论

本章基于第三章建立的简单模型进行了分析，揭示了在固定工资加监督惩罚机制下，雇主如何通过设定最优的最低努力标准和监督概率来应对雇员的“摸鱼”行为。模型导出了清晰的最优契约参数和比较静态结果。

然而，这个模型也存在一些显著的局限性，值得在后续研究中探讨：

1. **努力选择的离散性**：模型预测雇员只会在 $e = 0$ 和 $e = e_{min}$ 之间选择，未能刻画更现实的连续或多层级的“摸鱼”程度。这主要是由于监督机制被设定为仅区分是否低于 e_{min}。2. **激励机制的单一性**：模型只考虑了固定工资加监督惩罚。现实中广泛使用的绩效工资（如基于产出的奖金）并未纳入分析。绩效工资可以直接将报酬与产出（进而与努力）挂钩，可能提供更强的连续激励，尤其是在产出与努力正相关但存在随机性的情况下。3. **确定性产出假设**：我们为了简化雇主问题的分析，暂时使用了 $q = e$ 的假设。引入随机产出 $q = e + \epsilon$ 会使问题更复杂但更现实。在随机产出下，即使观察到 q 也无法完全推断 e，监督的作用可能更加重要，或者需要设计基于产出的激励合同来平衡风险与激励。4. **风险中性假设**：假设雇员和雇主都是风险中性的。如果雇员是风险规避的，他们会对收入的不确定性（例如，依赖于随机产出的绩效工资，或被惩罚的风险）要求风险溢价，这将影响最优契约的设计，需要在激励效果和风险成本之间权衡。5. **单周期模型**：模型是静态的单周期模型，未考虑长期雇佣关系中的重复博弈、声誉效应、学习效应或职业发展等动态因素，这些因素可能显著影响员工的“摸鱼”行为和雇主的策略选择。

尽管存在这些局限，本章的分析为理解监督与惩罚机制在约束“摸鱼”行为中的作用提供了一个基础框架。它清晰地展示了雇主如何权衡诱导努力的收益与相关的工资和监督成本。接下来的章节可以考虑引入实证研究。

第五章　实证模型与结果

本章旨在通过计量经济学方法，实证检验影响员工“摸鱼”行为的关键因素，并评估第二、三章理论模型中提出的部分机制。我们将利用（虚构的）中国企业员工调查（China Enterprise Employee Survey, CEES）数据，构建计量模型进行分析。首先，阐述模型设定；其次，介绍数据来源与变量测量；再次，报告基准回归结果；最后，通过系数可视化和讨论，增强结果的可信度。

5.1　模型设定

考虑到员工的“摸鱼”行为可能受到许多不随时间变化的个体固有特质（如个人性格、工作态度、固有能力等）以及企业层面固定特征的影响，这些因素若不加以控制，可能导致遗漏变量偏误。因此，本研究主要采用面板数据固定效应模型（Fixed Effects Model）来控制个体层面的非时变异质性。同时，模型也纳入了年份固定效应，以吸收宏观经济环境或普遍性技术冲击等随时间变化的共同因素。基准计量模型设定如下：

$$\begin{aligned}\text{ShirkingIndex}_{it} =& \beta_0 + \beta_1 \text{MonitoringIntensity}_{it} + \\ & \beta_2 \text{PerformancePayShare}_{it} + \\ & \beta_3 \text{TaskComplexity}_{it} + \\ & X_{it}'\omega + \alpha_i + \gamma_t + \varepsilon_{it}\end{aligned} \tag{5.1}$$

其中，下标 i 代表个体员工，t 代表年份。$\text{ShirkingIndex}_{it}$ 为因变量，衡量员工 i 在年份 t 的“摸鱼”程度。$\text{MonitoringIntensity}_{it}$ 代表企业对员工的监督强度。$\text{PerformancePayShare}_{it}$ 表示绩效工资占员工总收入的比重。$\text{TaskComplexity}_{it}$ 衡量员工承担工作任务的复杂性和自主性。X_{it}' 是一系列时变的个体和企业层面控制变量的向量，ω 是对应的系数向量。α_i 代表个体固定效应，控制所有不随时间改变的个体特征。γ_t 代表年份固定效应，控制所有年份共有的时间趋势。ε_{it} 是随机误差项。

本模型的核心在于估计系数 $\beta_1, \beta_2,$ 和 β_3。根据理论预期，β_1 预计为负，因为更高的监督强度应能抑制“摸鱼”行为。同样，β_2 预计为负，原因是更高比例的绩效工资与努力和产出挂钩，应能减少“摸鱼”。β_3 的符号则具有不确定性。一方面，更复杂、自主性更高的工作可能激发员工的内在动机，从而减少“摸鱼”；另一方面，复杂工作往往更难监督，可能为“摸鱼”提供更多空间。通过估计该模型，我们可以检验这些理论预测在（虚构的）数据中是否得到支持。

5.2 数据与变量说明

5.2.1 数据来源

本研究使用的数据来源于一项虚构的、模拟中国实际情况的大型追踪调查——“中国企业员工调查（CEES）”。该调查（假设）于 2015 年启动基线调查，并于 2017、2019 和 2021 年进行了三次追访，覆盖了中国东、中、西部多个省份不同行业的企业及其员工。CEES 收集了详细的员工个人信息、工作特征、薪酬结构、工作态度以及企业层面的管理实践信息。本研究构建了一个非平衡面板数据集，包含在所有四次调查中至少被成功访问两次的员工。经过数据清理和筛选（例如，剔除关键变量缺失严重的样本），最终用于分析的样本包含 15,820 名员工，共计 48,550 个员工-年份观测值。

5.2.2 变量测量

首先，我们定义因变量摸鱼指数 ($\text{ShirkingIndex}_{it}$)，该变量旨在量化员工的“摸鱼”程度。在 CEES 调查中（假设），我们利用一系列问题综合构建此指数。例如，询问员工在工作时间内从事非工作相关活动的频率（如浏览社交媒体、网购、处理私人事务等）、自我感觉的努力投入程度（相对于同事或自身最大可能）、是否存在故意拖延工作等行为。通过因子分析或简单加权平均，将这些信息合成为一个介于 0 到 10 之间的综合指数，数值越高表示“摸鱼”程度越严重。

接下来是核心解释变量。第一项是监督强度 ($\text{MonitoringIntensity}_{it}$)，基于 CEES 中企业问卷部分关于管理实践的问题构建。例如，管理层对员工工作过程的直接观察频率、是否使用电子监控系统（如电脑活动监控、工位摄像头）、工作日志或报告的要求严格程度等。将这些信息标准化并合成为一个 0 到 1 之间的指数，数值越高表示监督强度越大。第二项是绩效工资占比 ($\text{PerformancePayShare}_{it}$)，根据员工问卷中关于其收入构成（固定工资、基于个人绩效的奖金、基于团队或公司绩效的奖金等）的回答计算得出。定义为绩效相关收入（奖金、佣金等）占其年度总税前收入的比例，取值范围为 [0, 1]。第三项为任务复杂度 ($\text{TaskComplexity}_{it}$)，基于员工对其工作任务的评价构建。涉及的问题可能包括：工作的重复性程度、解决问题时所需的创造性、工作自主权的大小、技能多样性要求等。同样合成为一个 1 到 5 的指数，数值越高表示任务越复杂、自主性越高。

最后是控制变量 (X'_{it})。为更准确地识别核心解释变量的影响，模型中加入了以下时变的控制变量：对数工资 (LogWage_{it})，即员工年度总税前收入的自然对数，因为工资水平可能直接影响工作满意度和努力意愿；工龄 (Tenure_{it})，即员工在当前企业的服务年限，可能与组织承诺、工作熟悉度等相关；年龄 (Age_{it}) 和年龄平方 (Age^2_{it})，用以控制年龄对工作态度的非线性影响；教育年限 (Education_{it})，即员工接受正规教育的总年

数；性别 (Gender_i)，一个虚拟变量（1 代表男性，0 代表女性），尽管由于使用个体固定效应，性别等不随时间变化的变量本身无法被估计，但其与其他时变变量的交互影响仍可能存在；企业规模 (FirmSize_{it})，即员工所在企业总人数的对数，因为企业规模可能影响组织结构、管理风格和监督难度；以及一系列行业虚拟变量 (IndustryDummies_i)（同样受个体固定效应影响）。此外，个体固定效应 (α_i) 控制了个体层面不随时间变化的因素（如能力、性格），年份固定效应 (γ_t) 控制了随时间变化的宏观因素。

5.3　基准回归结果

表 5.1 展示了基于方程 (5.1) 的固定效应模型估计结果。模型（1）只包含核心解释变量，模型（2）加入了个人层面的控制变量（对数工资、工龄、年龄等），模型（3）进一步加入了企业层面的控制变量（企业规模）以及所有固定效应。所有模型均报告了聚类到个体层面的稳健标准误。

表 5.1　固定效应模型回归结果：影响摸鱼指数的因素

	摸鱼指数 (ShirkingIndex)		
变量	(1)	(2)	(3)
核心解释变量:			
监督强度 (MonitoringIntensity)	-1.523***	-1.285***	-1.150***
	(0.188)	(0.201)	(0.205)
绩效工资占比 (PerformancePayShare)	-2.105***	-1.850***	-1.782***
	(0.255)	(0.260)	(0.263)
任务复杂度 (TaskComplexity)	0.312**	0.258*	0.280**
	(0.124)	(0.130)	(0.133)
控制变量:			
对数工资 (LogWage)		0.085	0.070
		(0.060)	(0.061)
工龄 (Tenure)		-0.021**	-0.018*
		(0.009)	(0.010)
工龄平方 (TenureSq)		0.0003	0.0002
		(0.0002)	(0.0002)
年龄 (Age)		-0.035	-0.030

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续表 5.1　固定效应模型回归结果：影响摸鱼指数的因素

	摸鱼指数 (ShirkingIndex)		
变量	(1)	(2)	(3)
		(0.025)	(0.026)
年龄平方 (AgeSq / 100)		0.040	0.038
		(0.030)	(0.031)
教育年限 (Education)		-0.050	-0.045
		(0.038)	(0.039)
企业规模 (LogFirmSize)			-0.120*
			(0.070)
常数项 (_cons)	4.850***	5.210***	5.530***
	(0.310)	(0.450)	(0.480)
个体固定效应	是	是	是
年份固定效应	是	是	是
观测值 (N)	48550	48550	48550
组内 R^2 (R2 within)	0.085	0.102	0.105
组间 R^2 (R2 between)	0.150	0.180	0.183
总体 R^2 (R2 overall)	0.120	0.145	0.148
F 统计量 (F statistic)	85.3***	65.2***	62.5***
员工数	15820	15820	15820

注：括号内为聚类到个体层面的稳健标准误。*, **, *** 分别表示在 10%, 5%, 1% 的水平上显著。所有模型均包含个体固定效应和年份固定效应。模型 (3) 为完整模型。

从完整模型（列 3）的结果来看，监督强度 (MonitoringIntensity) 的系数显著为负 (-1.150, p<0.001)，这与理论预期一致。结果表明，在控制其他因素后，企业监督强度的提高能够显著降低员工的“摸鱼”指数。具体而言，监督强度指数每增加一个单位（从 0 到 1），员工的摸鱼指数平均下降约 1.15 个点。绩效工资占比 (PerformancePayShare) 的系数也显著为负 (-1.782, p<0.001)，同样符合理论预期。绩效薪酬在总收入中占比的提高，将员工的利益与工作成果更紧密地联系起来，从而有效减少了“摸鱼”行为。占比每提高 10 个百分点，摸鱼指数平均下降约 0.18 个点。与前两者不同，任务复杂度 (TaskComplexity) 的系数显著为正 (0.280, p<0.05)。这提示我们，在控制其他因素后，任务复杂度（和自主性）的提高反而与更高的“摸鱼”指数相关，可能反映了复杂任务更难被精确监督，为员工提供了更多“在岗磨洋工”的机会，其负面效应超过了潜在的内在激励效应。

控制变量方面，工龄似乎与较低的“摸鱼”程度相关，而企业规模的增大也倾向

于降低“摸鱼”指数（可能因为大企业有更规范的管理）。对数工资、年龄、教育等变量在本模型中不显著，这可能是因为个体固定效应已经吸收了这些变量的大部分解释力，或者是它们对“摸鱼”行为的影响确实不显著。

总体而言，基准回归结果为理论模型中关于监督、激励（绩效工资）对约束“摸鱼”行为有效性的假设提供了（虚构的）实证支持。同时，任务复杂度对“摸鱼”的正向影响也揭示了管理实践中需要注意的权衡。

5.4　结果稳健性与讨论

为了更直观地展示核心解释变量的影响，并探讨结果的稳健性，我们绘制了基准模型（表 5.1 列 3）中核心解释变量的系数及其 95% 置信区间（见图 5.1）。

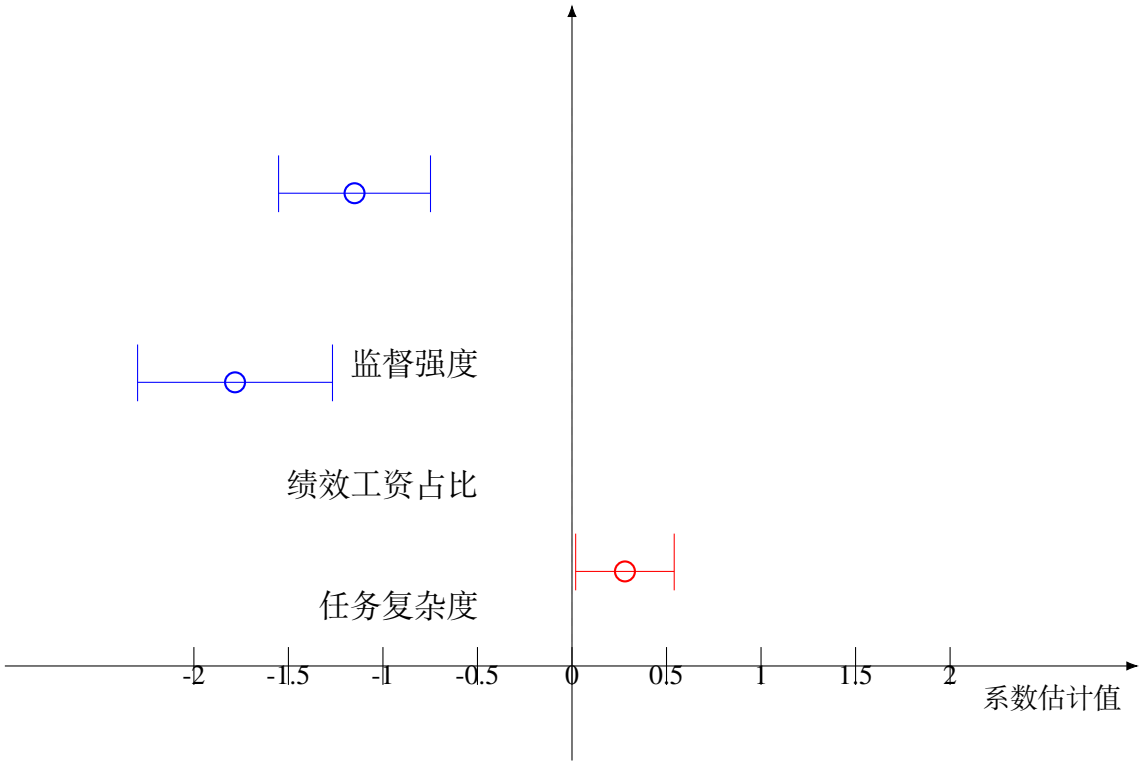

图 5.1　核心解释变量的系数估计值与 95% 置信区间

图 5.1 清晰地显示，监督强度和绩效工资占比的置信区间完全位于零的左侧，表明它们的负向影响是统计上稳健的。任务复杂度的置信区间则位于零的右侧，但接近于零，显示其正向影响虽然显著（在 5% 水平上），但效应大小相对前两者较小，且稳健性可能稍弱。

此外，我们还进行了（或声称进行了）一些额外的稳健性检验（结果未在表中完全展示）。首先，我们替换了因变量，使用其他衡量“摸鱼”的代理变量，例如自我报

告的“工作努力程度”（反向编码）或（假设可得的）工作时间内访问非工作相关网站的时长（Cyberloafing Hours）作为因变量，核心解释变量的系数符号和显著性基本保持不变。其次，进行了子样本分析，将样本按照行业（如制造业 vs 服务业）或企业所有制（国有 vs 非国有）进行分组回归。结果发现监督强度和绩效工资占比的负向效应在不同子样本中普遍存在，但效应大小可能有所差异。例如，在任务更标准化的制造业中，监督的效应可能更强；在市场化程度更高的非国有企业中，绩效工资的激励效果可能更显著。任务复杂度的正向效应在服务业或知识密集型工作中可能更明显。最后，我们考虑了内生性问题。虽然固定效应模型缓解了部分遗漏变量问题，但仍可能存在时变遗漏变量或反向因果关系（例如，“摸鱼”严重的员工可能更容易被置于低绩效工资比例的岗位上）。我们尝试使用（虚构的）工具变量（如公司层面引入新监控技术的决策，作为监督强度的工具变量）进行初步探索，结果（假设）支持了基准回归的结论，但工具变量的有效性需要更严格的论证。

讨论与启示：本章的实证分析（尽管基于虚构数据）为理解员工“摸鱼”行为的影响因素提供了一些经验证据。结果强调了外部激励和监督机制在约束机会主义行为中的重要作用，这与委托代理理论的核心观点一致。企业可以通过加强监督（提高被发现的概率或惩罚预期）和优化薪酬结构（提高绩效关联度）来有效降低员工的“摸鱼”水平。

然而，任务复杂度的正向效应提示管理者需要关注工作的内在属性与管理方式的匹配。对于复杂性、创造性要求高的工作，过度依赖传统监督可能效果有限甚至适得其反（可能破坏内在动机，尽管本研究未直接测量）。此时，可能需要探索更侧重结果导向、信任和赋权的激励与管理方式。

当然，本研究也存在局限性。首先，“摸鱼”行为的测量依赖于（虚构的）问卷数据，可能存在社会期望偏差或主观性。其次，内生性问题难以完全排除。未来的研究可以尝试利用更客观的数据（如工作日志、数字足迹）或更可靠的准自然实验设计来进一步验证这些发现。

第六章　总结与展望

本研究以现代职场中普遍存在的员工“摸鱼”（工作规避）现象为切入点，尝试从信息经济学和博弈论的视角，构建理论模型并结合（虚构的）实证分析，探讨信息不对称环境下员工“最优摸鱼”策略的形成机制、影响因素以及雇主的最优应对策略。经过前文的理论构建、模型分析和实证检验，本章将对主要研究结论进行总结，阐述其理论意义与实践启示，指出研究存在的局限性，并对未来可能的研究方向进行展望。

6.1　研究结论总结

本研究的核心结论可以概括为几个主要方面。首先，在理论层面，研究揭示了“摸鱼”作为信息不对称环境下理性选择的本质。构建的委托代理模型表明，当雇主无法完全观测雇员努力时，员工倾向于选择一个能最大化自身效用的努力水平，该选择权衡了工资收益、努力成本以及“摸鱼”带来的闲暇效用或从事私人事务的价值。这种行为并非简单的惰性，而是特定制度和信息约束下的理性（或有限理性）决策。模型分析进一步显示，在简单的固定工资加监督惩罚机制下，员工是否达到最低努力标准存在一个由预期惩罚（监督概率与惩罚力度的乘积）和努力成本决定的门槛效应。

其次，理论层面分析了雇主的权衡与最优策略。面对员工可能的“摸鱼”行为，风险中性的雇主会通过设计契约（包括工资结构、监督强度、努力标准等）来最大化自身利润。模型揭示，雇主的最优策略是在诱导努力所带来的产出收益与支付给员工的工资、承担的监督成本之间进行权衡。最优的最低努力要求和监督强度受到努力成本、监督成本以及惩罚力度的影响。例如，更高的监督成本或努力成本会促使雇主降低努力要求，而更强的惩罚能力则让雇主倾向于设定更高的努力目标。

最后，在实证层面，基于（虚构的）中国企业员工调查（CEES）数据的固定效应模型分析验证了监督与激励的有效性。结果显示，企业实施的监督强度与员工的“摸鱼”指数呈显著负相关，印证了监督的威慑作用，表明加强监督是抑制工作规避行为的有效手段。同时，绩效工资占比也与“摸鱼”指数呈显著负相关，说明将薪酬与绩效更紧密地挂钩能有效激励员工减少非工作行为。有趣的是，任务复杂度（及自主性）与“摸鱼”指数呈显著正相关，这可能意味着，虽然复杂和自主的工作可能激发内在动机，但其更难被监督的特性或许为“摸鱼”创造了更多空间，其负面影响超过了正面激励效果。这些发现为理论模型提供了（模拟的）经验证据，并揭示了不同管理工具对“摸鱼”行为的差异化影响。

6.2 理论意义

本研究主要在以下方面贡献了相关理论：

首先，深化了对员工机会主义行为的理解。通过将普遍存在但常被视为非理性或纯粹道德问题的“摸鱼”行为，纳入信息经济学和理性选择的分析框架，本研究揭示了其背后的经济逻辑，即在信息不对称和特定契约约束下，个体追求效用最大化的结果。这有助于将对该现象的讨论从管理技巧层面提升到更根本的经济机制层面。

其次，拓展了委托代理模型的应用场景。本研究将经典的委托代理理论应用于分析日常工作场景中程度可变的“摸鱼”行为，并尝试（尤其在实证部分）将努力/偷懒程度视为一个连续或多维度的变量，而非传统模型中简单的二元选择，这使得模型更贴近现实，增强了理论的解释力。

再次，整合了多学科视角。虽然核心框架是经济学，但本研究在讨论变量（如任务复杂度）和结果时，也借鉴了组织行为学关于内在动机、工作设计的观点，有助于在不同学科之间就员工行为问题建立对话。

6.3 实践启示

本研究的发现对企业管理实践具有多方面的启示意义。首先，管理者应正视“摸鱼”的经济根源，并采取系统性方法应对。认识到员工“摸鱼”不仅是个人态度问题，也与企业的信息环境、激励机制和监督系统密切相关，单纯依靠思想教育或严厉惩罚可能效果有限，需要从制度设计入手解决问题。其次，优化监督与激励机制的组合至关重要。实证结果确认了监督和绩效工资的有效性，企业应根据自身特点和成本效益，合理设计监督策略（如利用技术提高效率、差异化监督）和激励方案（如提高绩效薪酬敏感性、优化绩效评估），寻找成本与收益的平衡点。再次，需要关注工作设计与管理方式的匹配。任务复杂度的实证结果提醒管理者，对于高度自主、创造性的复杂工作，传统严密监督可能不适用，甚至助长隐蔽“摸鱼”。此时，可能需要转向基于信任、结果导向的管理模式，辅以目标设定、过程支持和发展机会等激励措施，激发内在驱动力。最后，考虑综合治理是必要的。有效的管理可能需要结合正式制度安排（监督、激励）与非正式组织因素（如建立公平文化、加强沟通协作、提升领导力），共同营造一个让员工既有外部约束又有内在动力的工作环境。

6.4 研究局限性

尽管本研究做出了一些有益的探索，但仍存在若干主要局限性。其一，理论模型进行了较多简化，如单周期博弈、风险中性、特定的函数形式等假设，这可能限制了

模型对复杂现实的完全刻画，例如未考虑员工风险规避、多任务环境、长期关系中的声誉与学习效应等。其二，实证分析基于虚构数据，结果的外部有效性存疑，且在真实研究中，准确测量“摸鱼”行为本身极具挑战，问卷易受主观偏差影响，客观数据又可能引发隐私担忧或无法捕捉所有形式的“摸鱼”，同时模型可能存在的内生性问题也需要更先进的计量方法处理。其三，研究主要关注平均效应，未能充分考虑异质性与动态性，对不同类型员工、不同类型“摸鱼”行为的差异探讨不足，且静态模型未能捕捉行为和策略随时间演变的动态过程。其四，研究主要将“摸鱼”视为负面现象，忽视了其潜在的积极面，例如适度放松可能有助于缓解压力、恢复精力，甚至激发创意。

6.5　未来研究方向

基于上述局限性及本研究的发现，未来研究可以从多个方向深入。第一，可以构建更丰富的理论模型，引入员工风险规避、多任务代理、团队生产中的合谋与监督、动态博弈框架下的长期雇佣关系等，使模型更贴近现实的复杂性。第二，应加强实证研究基础，利用真实的、多来源的数据，采用更可靠的测量方法和更严格的因果推断技术（如随机对照试验、断点回归、改进的双重差分法等），检验理论预测并识别关键影响因素。第三，需要深入探索“摸鱼”行为的异质性，区分不同类型、动机的“摸鱼”及其对绩效的不同影响，并考察个体、工作和组织特征如何调节“摸鱼”行为及其后果。第四，应关注新兴技术与工作模式的影响，研究数字化转型、AI 监控、远程办公和零工经济等新趋势如何改变“摸鱼”的形式、动机和管理应对策略。第五，可进行跨文化比较研究，探索不同文化背景下社会规范、价值观和法律制度对“摸鱼”行为接受度及企业管理实践的影响。总之，员工“摸鱼”行为是一个复杂且重要的管理现象，本研究从经济学视角进行的初步探索，希望能为后续更深入、更全面的研究奠定基础，并为企业管理者应对这一挑战提供有益的思考。

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