

Managerial Macro-Cognition and the Speed of Leverage Adjustment

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Abstract

This study takes advantage of the concept of “Managerial Macro-Cognition” (MMC) to explore how does the different macro cognition of executives will affect their capital structure decision. Drawing on a sample of Chinese listed firms from 2002 to 2018, I find that under the same conditions, the enterprise has executives with higher macro cognition can adjust its capital structure faster, the promote effect on the speed of the leverage adjustment caused by the macro cognition of executive is more obvious when cognition is about future. Besides, when the company is faced with financing constraints, tight monetary policy and low equity concentration, the influence of executives’ macro cognition on the adjustment speed is more obvious.

Keywords

Managerial Macro-Cognition, The Speed of Leverage Adjustment, Manager Heterogeneity

1. Introduction

Capital structure refers to the composition and proportion of corporate capital value, and is the result of corporate financing activities. It reflects the composition ratio of corporate debt and equity, and it is this structure that supports various business activities and investment activities of the enterprise. Financing activities are the starting point of various corporate activities. In the process of making financing decisions, capital structure is a very important factor that should be taken into consideration. A reasonable capital structure will bring benefits to the enterprise. For example, a reasonable capital structure will fully balance the benefits and costs of debt financing, thus directly bring economic benefits to the company [1]; a reasonable capital structure can also introduce the role of debtor, which can effectively alleviate the agency problems of enterprises. Meanwhile an

unreasonable capital structure may bring huge risks to the market. Since the outbreak of the financial crisis in 2008, the leverage of real enterprises has received unprecedented attention. According to the China Financial Policy Report, although the overall level of leverage in China is controllable, structural imbalances have appeared. Residents “leverage and government’s leverage are both reasonable, but non-financial companies” leverage is still high, which has become the main potential risk of the debt market. The Central Government Economic Work Conference clearly stated that reducing corporate leverage was a top priority of government. Optimizing the capital structure of an enterprise can not only improve the company’s own operating efficiency and maintain long-term value growth, but also the micro foundation and guarantee for the macro economy to achieve the goal of “steady growth and structural adjustment”.

Since the concept of “optimal capital structure” was put forward by the trade-off theory of capital structure, how to optimize the capital structure has been elevated to the height of corporate strategy. How to optimize the capital structure of an enterprise involves two issues, the first is to determine the optimal capital structure of the enterprise, and the second is to quickly adjust to the optimal structure. Thus, the concept of the speed of leverage adjustment has emerged, and it reflects how quickly the company’s actual capital structure can be adjusted to the optimal capital structure within a certain period of time. In theory, determining the optimal capital structure is not difficult for an enterprise, so it is very important to study how to adjust it quickly. A considerable part of the literatures on the speed of leverage adjustment has affirmed the influence of the macro environment on the speed of corporate leverage adjustment [2] [3]. These studies point out that the financing environment of enterprises is closely related to the macroeconomic environment and policies in many aspects. Therefore, changes in the macro environment will affect the corporate leverage adjustment speed. In fact, these studies did explore how changes in the macro environment will affect corporate financing behavior, but they could not capture the differences in their decision-making process. Actually, the companies’ behavior is the consequence of managers’ decision. Managers make decisions based on judgments and analysis of the environment in which the company is located. Managers play a key role in linking the macro environment with corporate behavior. Since the “Upper Echelon Theory” was put forward, management heterogeneity has received extensive attention. Many literatures have explored whether managers with different characteristics will have different impacts on enterprises. This article attempts to investigate how management heterogeneity will affect the adjustment speed of companies’ leverage.

With nearly 40 years of reform and opening up, China’s economic volume has achieved an unprecedented success. Thanks to a major shift from a planned economy to a market economy, the economic system has stimulated the vitality of the market and released the dividends of market institutional arrangements. However, it is undeniable that under the system with Chinese characteristics,

China's economic market is strongly government-oriented, and the government has made important contributions in improving the market liquidity, maintaining macroeconomic stability, and promoting institutional construction. In recent years, China's economic fluctuations have been severe, and the macroeconomic situation has been imbalanced [4]. The central government has repeatedly adopted macro-control policies to intervene to resolve the economic crisis and to ensure stable economic growth. For example, during the outbreak of the financial crisis in 2008, domestic enterprises were hit hard. In order to save the sluggish economic situation, the central government immediately launched a four trillion investment plan and industry revitalization plans to stabilize the economy, support technology and improve social welfare. Therefore, under the circumstances that the domestic and foreign environment changes frequently and the market environment is regulated by the government, the macro environment faced by enterprises is complex and difficult to understand. How to analyze the domestic and international macro environment, interpret central policies, and grasp the opportunities in the situation have become the key factors for the success of corporate.

The adjustment of corporate leverage is simultaneously affected by the internal environment and the external environment. It is very important to combine the macro environment and the micro environment of the enterprise while study the leverage adjustment issue. In China's special economic system, the financing environment of enterprises is affected by macroeconomic environment and policies in many aspects. Existing research does affirm the influence of the macroeconomic environment on the dynamic adjustment of corporate leverage. It is believed that the macroeconomic environment can affect the corporate leverage adjustment behavior by affecting the financing environment of the enterprise. These studies did explore how changes in the macro environment will affect corporate financing behavior, but they could not capture the differences in their decision-making process. Specifically, the companies' behavior is the consequence of managers' decision. Managers make decisions based on judgments and analysis of the environment in which the company is located. Managers play a key role in linking the macro environment with corporate behavior. However, current literatures pay little attention to the differences in the characteristics of managers. Most of the studies assumed managers in all enterprises have the same influence on the company.

However, since Hambrick and Mason proposed the "Upper Echelon Theory" in 1984, many studies have demonstrated that managers have an important influence on corporate decision. Some studies pay attention to background characteristics of managers such as gender, education, religious beliefs, employment experience, early life experience [5] [6]. These studies have enriched the relevant theories of capital structure on the one hand, and fully affirmed that the individual characteristics of managers can have a significant influence on the capital structure decisions of enterprises. Many literatures on the managers' individual

characteristics believe that managers with different background have different thinking habits and different cognitive levels. For example, Jiang and Huang found that CEOs with financial experience can more accurately and quickly pay attention to the professional information outside and interpret the changes in related professional fields [7], so as to better choose the company's financing timing and make more reasonable financing decisions. Unfortunately, the use of such background characteristics to represent the thinking habits and cognitive levels of management is not straightforward. Although demographic characteristics can reflect the individual's basic mental model, it is difficult to intuitively reflect the individual's attention to a specific phenomenon or environmental content. With the development of research methods, more and more literatures have begun to use textual analysis methods to focus on managers' awareness or attention. Rao, Luo and Chen used natural language processing technology to extract the MD & A part of the company's annual report [8], thereby constructing the Managerial-Macro Cognition (MMC) to capture the dynamic process of manager's attention and interpretation of external macro information and their decision-making process. Managerial-Macro Cognition refers to the collection of a set of knowledge structures related to the macro environment of the manager, which is specifically manifested as the process of the manager's attention and interpretation of the macro environment information, and then guides their decision. The stronger the macro cognition of managers, the more comprehensive attention and more accurate interpretation of the outside information will be obtained by them.

Therefore, this article attempts to take advantage of the concept of Managerial-Macro Cognition to explore the impact of corporate management's understanding of the macro environment on the speed of corporate leverage adjustment. We already know that even in the same macro environment, different managers have different understanding of the environment, and this difference will greatly affect the decision-making behavior of managers. In addition, the manager's reasonable decision-making behavior will directly manifest as corporate behavior. This article believes that the companies with the stronger managerial macro cognition will be able to make more reasonable financing decisions, and thus be able to adjust the capital structure more quickly.

2. Literature and Research Hypothesis

2.1. Theories of Leverage Adjustment towards the Target

The dynamic trade-off theory of corporate financing was born in the 1990s. As a new framework that unifies the traditional trade-off theory and the pecking order theory, this theory explains many economic phenomena that cannot be explained by some traditional financing theories and becomes a frontier theory in the field of capital structural theory. The main points of the theory can be summarized as follows: First, the enterprise has an optimal capital structure, and the actual level of leverage above or below the optimal level will damage the value of

the company. Therefore, only when the corporate capital structure is consistent with the optimal structure can the corporate value be maximized. Second, because an enterprise is in a business environment that is constantly changing in the real world, its actual capital structure will deviate from the target level of capital structure and cannot always be consistent with the optimal level. At this time, in order to maximize the value, the company will have an incentive to adjust to that target level. Third, in the incomplete market, due to the existence of transaction costs, companies cannot adjust immediately when the capital structure deviates from the target level, but will adjust when the need for adjustment has accumulated to a certain extent [9]. Fourth, not only the transition cost will affect the leverage adjustment process of enterprises, but also the timing of financing will affect the adjustment process of enterprises [10].

Many empirical studies provide evidence for the above theory, thus opened up a new dynamic perspective for capital structure. Subsequent research gradually began to focus on the magnitude of the deviation and the speed of adjustment. A large number of researchers construct different models and use different estimation methods to calculate the target leverage and the “deviation” adjustment speed. However, the calculation results are greatly different due to the differences in the measurement models, estimation methods, and samples, and the conclusion is still open to date. For example, in the estimation of Fama and French [11], the annual adjustment speed of the enterprise is 0.07 - 0.18, while that of Flannery and Rangan is 0.34 or 0.35. The huge differences in research results have led researchers to pay attention to what exactly caused such a huge difference in the speed of adjustment. There are many factors that affect the speed of leverage adjustment [12]. The research at this stage mainly focuses on the internal environment of the enterprise and the external environment in which it is located.

From the perspective of the internal environment, the adjustment cost of the enterprise, the characteristics of the enterprise itself, and the characteristics of the management of the enterprise may affect the adjustment speed. For example, Fischer *et al.* added adjustment costs to the dynamic model of capital structure and found that even small adjustment costs will greatly affect the adjustment speed. In terms of corporate characteristics [13], Banerjee *et al.* found that the larger the enterprise, the faster its capital adjustment [14]; and the higher-growth enterprises are more flexible in financing, and therefore have a faster adjustment speed. Tong found that [15], in addition to size and growth, the degree of leverage deviation, the proportion of major shareholders' holdings, and the level of profit are all positively related to the speed of leverage adjustment. In terms of management characteristics, Jiang and Huang found that a CEO with a financial background can optimize the capital structure decision of the company. Specifically, a CEO with a financial background can help companies make better use of leverage and improve their debt levels. It can reduce the difference between the actual capital structure and the target structure of the enterprise, and can also promote the leverage adjustment speed. In addition, Fang and Wei found that

the overconfidence of management will also affect the speed of corporate leverage adjustment [16]. The more overconfident managers are, the slower the leverage adjustment speed of corporate will be.

The above literature considers the speed of adjustment in relation to firm-side factors. However, the industry-environment and macro-environment are also important factors. From the perspective of industry environment, some studies have used British, French, and German companies as samples, and found that there is a significant difference in the speed of corporate capital adjustment in different industries. Huang and Jiang, explored the adjustment speed from the perspective of industry competition intensity [17]. It was found that for enterprises with insufficient leverage, the fiercer the industry competition, the more transparent the information in the industry. It can alleviate some agency problems and speed up the adjustment of leverage. In terms of macro environment, some studies have found that the adjustment of corporate leverage is affected by institutional factors such as the level of financial market development, the efficiency of the legal system, and the degree of investor protection [2]. Cook and Tang selected term spreads, default spreads, GDP growth rates [18], and market dividend yields to represent the macro environment, and found that corporate leverage adjustments speed was faster during the economically active period. Yu *et al.* found that the impact of the macro environment will affect the speed of corporate leverage adjustment, and this transmission path is related to corporate financing capabilities [19]. In terms of policy environment, Song found that the loosening of monetary policy will affect the leverage adjustment speed of enterprises [20]. Gu and Zhou explored the impact of corporate financial flexibility value on the speed of leverage adjustment based on policy uncertainty [21]. Wu Cen *et al.* found that industrial policy also helps to improve the speed of corporate leverage adjustment [22], and the path of promotion is mainly to reduce the cost of debt financing of enterprises. In addition, Huang *et al.* explored the impact of the legal environment on capital adjustment [23], and found that the legal environment will affect the debt financing of enterprises, and further affect the speed of capital adjustment of enterprises.

2.2. Theories of Managerial Cognition

The managerial macro cognition is the executives' perception of the macro environment faced by the enterprise. Cognition was actually a psychological concept at the beginning. It studied the processing of information by individuals, and it focus on some specific aspect including attention, intuition, memory, and reasoning [24]. Later, researchers who studied management science introduced cognition into business management and embodied it as "Managerial Cognition." They proposed that managers cannot fully understand the redundant information in outside environment and tend to simplify information and make decisions based on their cognitive foundations. These cognitive foundations include their accumulated experience in the past, consequences of possible decision-making,

and basic assumptions about future developments [25] [26].

At present, the concept of managerial cognition can be understood from two aspects: on the one hand, managerial cognition is a set of knowledge structures owned by managers. This set of knowledge structures includes the external environment of the enterprise and the current status and current strategy of the enterprise [27]. This knowledge structure is formed by the manager's past experience. The manager uses this structure to perceive and analyze the environment, and is inertial and context-dependent [28]. The formation of this cognitive structure is a self-reinforcing process. Once the structure is formed, it is difficult to change with the changes of the environment. This cognitive structure is the key to how managers interpret external information, and it will profoundly affect managers' subsequent decision-making behaviors. On the other hand, executive cognition is the information processing behavior of managers in the objective environment [29]. Wang summarized this process as a cognitive-three-step: Attention—Interpretation—Action. First, due to the complexity of the information and the individuals' limited processing ability, managers will selectively focus on what they consider to be relevant. Second, for how to interpret the information that has been concerned, managers will rely on their own cognitive structure to simplify the processing of this information before interpreting it. Finally, after paying attention to and interpreting the information, managers will take corresponding actions, that is, make decisions. Existing literatures mainly discuss two aspects of manager's cognition. Firstly, which factors will affect manager's cognition, and secondly, what impact will manager's cognition bring.

From the perspective of the factors that affect management's cognition, external environment, organizational environment, and managerial heterogeneity will affect their cognition. Regarding the external environment, Shang *et al.* found that the higher the frequency of changes in the external environment faced by enterprises [30], the more complex the managers' cognitive structure. Nakarni *et al.* found that when a company is in a rapidly changing industry [31], its managers' attention to the industry environment will also increase. Nadkarni and Perez found that when an enterprise simultaneously conducts multinational business [32], it has more resources in the host country, which will make it have a deeper and more complex understanding of the host country.

Regarding the specific organizational environment, company size, age and other characteristic factors will affect the cognitive level of management. Denison *et al.* found that larger companies with longer age are more likely to become organizational rigid and less adaptable [33]; while the stronger the company's ability means it has a better grasp of opportunities for external existence and faces fewer external threats. Specifically, Dutton and Duncan found that certain capabilities of companies [34], such as financing and R & D capabilities, will have certain effects on management cognition.

Regarding managerial heterogeneity, gender, age, education and discipline background of managers, and their past work experience may affect their awareness

of the environment. Fiol studied the letters to shareholders from ten chemical companies and found that different managers' personnel have far different evaluations of market constraints and risks when facing similar market environments [35]. Milliken found that when managers have an educational background in liberal arts colleges [36], their perception of the external environment will be affected by their evaluation of the organization. Gavetti *et al.* used computer simulation systems to study the learning process of individuals [37], and found that individuals can change their own cognition through empirical learning, and this change will affect their subsequent behavioral decisions. Kaplan *et al.* collected the characteristics of CEO heterogeneity of three hundred companies to study how individual heterogeneity will affect the performance of the company [38]. It was found that executives with richer past work experience and more prominent interpersonal communication ability can significantly improve company performance. Obviously, companies also recognize this, and many studies indicate that talents with management diplomas and cross-industry backgrounds are becoming more and more popular. Frydman analyzed the resumes of executives of the top 50 listed companies in the United States in the 1970s and found that the proportion of senior managers with an MBA diploma rose from less than one tenth to more than half [39].

But generally speaking, the relationship between the above heterogeneous characteristics and manager cognition is not direct enough. Subsequent research began to use text analysis methods to directly study the text output by senior managers after the cognitive process, in an attempt to directly describe their concerns and cognitive tendencies. For example, Kaplan used the "letter to shareholders" of pharmaceutical companies as the analysis text, focusing on the related vocabularies related to biotechnology innovation, medical technology, etc., which were considered to symbolize management's strategy for technological innovation and transformation tilt. The results show that the expressions and concerns of senior managers on relevant vocabulary will significantly affect the technological R & D level and patent achievements of enterprises. Similarly, Cho *et al.* found that the shift in attention of senior management teams will significantly affect the shift in the company's future strategic layout [40]. Osborne found that the background experience of senior management personnel may be closely related to the subsequent strategic layout such as expansion of new product lines of the enterprise [41].

In summary, most studies use heterogeneous characteristics such as academic qualifications, academic background, and work experience to proxy managers' knowledge and cognition. To some extent, these characteristics can reflect the knowledge and thinking structure formed by managers from their past experiences, but they do not reflect the managers' interpretation of specific environmental content [42] [43]. In addition, companies often faced with a changing external operating environment. The uncertainty caused by the environment often affects the company. Managers need to analyze and understand environmental

information through their own cognitive framework, and use the obtained information to assist further strategic choices and actions. This paper uses the concept of Managerial Macro-Cognition proposed by Rao *et al.*, to explore its impact on corporate financing decisions.

2.3. Hypothesis Development

Since the “Upper Echelon Theory” was put forward, a large number of empirical studies have proved that managers have played a key role in the decision-making process of enterprises. Some literatures have already paid attention to the influence of manager on company’s capital structure decision. For example, when overconfident managers make capital structure decisions, they will overestimate the benefits of financing decisions and underestimate the risks due to their individual cognitive biases, which will have negative impact on the capital structure decision. In addition, CEOs with financial experience can more accurately and quickly follow and interpret information changes in related professional fields because of their own expertise in the financial field, so as to better grasp the corporate’s financing timing and making reasonable financing decisions to increase the speed of corporate leverage adjustment.

Although the above literature affirmed the influence of individual characteristics of managers on corporate capital structure decisions, and placed the logical argumentation on managers’ thinking habits and cognition levels, unfortunately, taking background information of individuals such as employment experience and overconfidence as the proxy variable cannot directly reflect the individual’s attention and interpretation process of a specific phenomenon or environmental content [44]. With the deepening of the research field and the development of research methods, more and more researchers have begun to use textual analysis to focus on managers’ awareness or attention. Rao *et al.* used natural language processing technology to extract the MD & A part of the company’s annual report, thereby constructing the indicator of Managerial Macro Cognition (MMC) to capture how managers pay attention to, interpret and make decisions when faced with external macro information. They found that the stronger the macro-cognitive ability of the executives, the more comprehensive attention and more accurate interpretation about the macro environment they will have, thus can make more reasonable investment decisions. Drawing on this concept, this article believes that different managers’ perceptions of the macro environment will also affect the capital structure decision of the company. Companies with higher managerial macro cognition will be able to make more reasonable financing decisions, thus It is possible to adjust the capital structure more quickly.

Specifically, the managerial macro cognition will have an impact on the speed of corporate leverage adjustment from the following two aspects. First of all, according to the dynamic capital structure theory, it can be known that when the actual leverage ratio of an enterprise deviates from the target level, the enterprise will adjust it. In an incomplete market, due to the existence of transaction costs,

the enterprise cannot adjust immediately when the deviations occur. It can only adjust when the need for adjustment has accumulated to a certain extent [9]. Generally speaking, most studies exploring the speed of corporate leverage adjustment have assumed that companies know exactly what is their target leverage ratio, but not all companies know when is their optimal adjustment timing. Leary and Roberts found that companies also chose financing timing in the process of leverage adjustment. Therefore, from the perspective of choosing financing timing, the companies with the stronger managerial macro cognition have paid more attention to the outside macro environment and are more sensitive to changes in the environment. Their ability to interpret information help them draw a more accurate expectation of the changed macro-environmental conditions. Therefore, in the face of uncertain internal and external environments, companies with stronger cognitive abilities can more quickly and accurately choose the timing of their own adjustments, thereby showing a faster adjustment speed. For example, when both companies are facing an external environment in which monetary policy is tightening and capital liquidity is reducing at the same time, companies with strong managerial macro cognition will recognize this change more quickly, and at the same time will have a more accurate expectations about future external situation, therefore more likely to choose the right time to actively develop financing channels. The company that is not aware of this change is more likely to stand still.

In addition, a number of studies find that under different external circumstances, there is a large difference in the leverage adjustment cost, and this difference will greatly affect the speed of leverage adjustment. China's financing environment is closely related to changes in macroeconomics and policies. For example, Song found that it was difficult for enterprises to obtain credit funds when monetary policy tightened, and the cost of obtaining credit funds was relatively high. Therefore, the speed of leverage adjustment during this period will be slower. In addition, Wu *et al.* found that China's industrial policies can significantly reduce the leverage adjustment costs of the supported enterprises and speed up their leverage adjustment. Therefore, from the perspective of adjusting costs, fully understanding the macro-environment information such as monetary policy, industrial policy, etc. is very critical for the company's leverage adjustment decision. A stronger macro cognition means that the company has a better understanding of its financing environment. The broader and deeper the understanding is, it is also possible to choose a lower cost and more favorable way to adjust, and have more flexibility in the adjustment so as to obtain a faster adjustment speed.

In combination with the above analysis, the stronger the company's managerial macro cognition, the deeper its understanding of the current macro-environment, the more sensitive it will be to changes in the environment, and the more accurate the forecast of future environmental conditions will be. Combining the choice of the timing of adjustment and the height of the adjustment cost, this ar-

ticle proposes the following assumptions:

H: Under the same condition, the higher the managerial macro cognition, the faster the leverage adjustment speed.

3. The Research Design and Sample Data

3.1. The Empirical Model

Following the literature, the target leverage ratio of a firm is given by Equation (1):

$$T_Lev_{i,t} = \beta X_{i,t-1} \quad (1)$$

where T_Lev is the estimated target leverage ratio in the year t , β is the regression coefficient vector and $X_{i,t-1}$ represents a series of firm characteristic variables related to the capital structure. Assume that the target leverage ratio of the firm in year t is linearly related to the characteristic variables of year $t - 1$. Follow the literature related, the firm characteristics include profitability ($EBIT$), growth opportunities ($TobinQ$), non-debt tax shield (Dep), firm size ($Size$), The mortgage ability ($Tangibility$) and the industry median leverage (Ind_level). The variable definitions are given in **Table 1**.

Table 1. Variable definitions.

Name	Definition
T_lev	Estimated target leverage ratio, calculated using the methods present in 3.1
DEV	The gap between actual leverage and target leverage, calculated as $T_Lev_{i,t} - Lev_{i,t-1}^p$, $T_Lev_{i,t}$ is the estimated target leverage; $Lev_{i,t-1}^p$ is the previous period's total interest bearing debt divided by the sum of the previous period's book assets plus current period net income
Δlev	The active leverage adjustment, calculated as $Lev_{i,t} - Lev_{i,t-1}^p$, where $Lev_{i,t}$ is calculated as the sum of interest-bearing debt divided by total assets; $Lev_{i,t-1}^p$ is the previous period's total interest bearing debt divided by the sum of the previous period's book assets plus current period net income
MMC	Managerial Macro Cognition, calculated as numbers of macro-related words divided by total number of words in MD & A section of annual report
Lev	Book leverage, calculated as the sum of interest-bearing debt divided by total assets
$EBIT$	Earnings before interest and taxes as a measure of profitability, calculated as net income before interest and taxes divided by total assets
Dep	The nondebt tax shield, calculated as depreciation divided by total assets
$Size$	Firm size, calculated as the natural log of the book value of total assets
$Tangibility$	Asset tangibility, calculated as plants, property and equipment divided by total assets
$TobinQ$	The Tobin's Q as a measure of growth opportunity, calculated as the sum of market value of equity and book value of total liability divided by book value of total assets
Ind_level	The industry leverage, calculated as the industry-year median leverage

Equation (2) is used to estimate the speed at which a firm makes partial adjustment towards its target within each period.

$$Lev_{i,t} - Lev_{i,t-1} = \lambda(T_Lev_{i,t} - Lev_{i,t-1}) + \xi_{i,t} \quad (2)$$

where Lev is the leverage ratio (*i.e.* the debt to asset ratio), and λ is the speed at which the firm adjusts its leverage toward target.

Following Huang and Jiang, they believe that even if a firm does not take any financing activities such as issuing stocks or borrowing money in a certain year, its capital structure at the end of the year will still change compared to the beginning of the year. As a result of the normal operation of the company, its assets changed, so Equation (2) is transformed into Equation (3) to remove the mechanical component of the adjustment.

$$Lev_{i,t} - Lev_{i,t-1}^p = \lambda(T_Lev_{i,t} - Lev_{i,t-1}^p) + \xi_{i,t} \quad (3)$$

where $Lev_{i,t-1}^p = \frac{D_{i,t-1}}{A_{i,t-1} + NI_{i,t}}$, $NI_{i,t}$ is the net income in year t for firm i , $D_{i,t-1}$ is the unpaid debt in year $t-1$ for firm i , and $A_{i,t-1}$ is the book value of total assets for year $t-1$.

For convenience, Equation (3) can be rewritten as: $\Delta lev = \lambda DEV$, which this paper use when presenting the empirical results.

Combining Equation (1) and Equation (3) to get Equation (4):

$$Lev_{i,t} = \gamma\beta X_{i,t-1} + (1-\gamma)Lev_{i,t-1}^p + \xi_{i,t} \quad (4)$$

Following Jiang and Huang, the estimation results obtained by the Least Square Dummy Variable Correction method (LSDVC) are the most accurate, this paper first use the LSDVC to estimate Equation (4) to obtain β and then calculate the $T_Lev_{i,t}$ using Equation (1). The speed of adjustment can be estimated using Equation (3).

In addition, GMM estimation is also an effective method for estimating dynamic panel data. Therefore, this article will use two methods to estimate at the same time, report the empirical results of GMM estimation in the robustness test section, and also follow related literature to use the fixed effect model (FE) to estimate.

To investigate the effect of managerial macro cognition on the speed of leverage adjustment towards the target, Equation (5) is constructed as follows:

$$\Delta lev = \gamma_0 + \gamma_1 MMC_{i,t} * Dev + \xi_{i,t} \quad (5)$$

where γ_1 is the effect of managerial macro cognition on the speed of leverage adjustment, and $\gamma_1 > 0$ indicates a faster adjustment speed.

3.2. The Sample

The sample consists of nonfinancial A-share listed companies on the Shanghai and Shenzhen Stock Exchange between 2002 and 2018. The sample starts from 2002 because the MMC data has been relatively complete since 2002. MMC va-

riable was created by Rao and Luo, and the financial data come from the CSMAR database. This paper deals with the sample as follows: 1) excluding the financial industry; 2) excluding the observations of ST by the sample enterprises; 3) because the predicted capital structure requires at least two years of data, this paper excludes data that do not exist for at least two years of continuous data; 4) excluding the observations with missing financial data, 24,186 observations were obtained, and the sample was winsorized at a level of 1%.

4. Empirical Test Results and Analysis

4.1. Descriptive Statistics

Table 2 reports the results of descriptive statistics, in which the average value of managerial macro cognition (*MMC*) is 0.15 and the standard deviation is 3.1%, indicating that there are differences in macro-cognition among managers of different firms. The average value of the firm's target leverage level (*T-lev*) is 0.272, which is slightly higher than the average value of the firm's actual leverage ratio (*Lev*), which is 0.214, indicating that, on average, China's enterprises do have insufficient leverage. The difference between target leverage ratio and actual leverage ratio is 0.0655 (*Dev*). In addition, the annual average adjustment rate (Δlev) of China's leverage is 0.0076. In terms of firm characteristic variables, the average value of EBIT is 0.0488, the average value of depreciation of fixed assets (*Dep*) is 0.0218, the average value of firm size (*Size*) is 21.94, and the average value of fixed assets ratio (*Tangibility*) is 0.2470. The average value of *TobinQ* is 1.994. All the descriptive statistics basically close to the result of Jiang and Huang (2013), which indicates that the sample data used in this paper is reasonable.

Table 2. Descriptive statistics.

Variable	N	Mean	SD	Min	Median	Max
<i>T_lev</i>	24,186	0.272	0.055	0.138	0.270	0.402
<i>DEV</i>	24,186	0.066	0.162	-0.567	0.091	0.402
Δlev	24,186	0.007	0.081	-0.705	0	0.691
<i>MMC</i>	24,186	0.150	0.032	0	0.151	0.386
<i>Lev</i>	24,186	0.214	0.172	0	0.195	0.691
<i>EBIT</i>	24,186	0.049	0.069	-0.272	0.048	0.232
<i>Dep</i>	24,186	0.022	0.016	0.001	0.019	0.073
<i>Size</i>	24,186	21.940	1.266	19.12	21.800	25.620
<i>Tangibility</i>	24,186	0.247	0.177	0.002	0.214	0.743
<i>TobinQ</i>	24,186	1.994	1.916	0.204	1.413	11.304
<i>Ind_level</i>	24,186	0.192	0.099	0	0.180	0.573

4.2. Empirical Results

Table 3 reports the results of the impact of managerial macro cognition on the speed of leverage adjustment. Column (1) is the regression without the explanatory variable. The coefficient before *Dev* reflects the speed of corporate leverage adjustment (corresponding to λ of Model 1 in 3.1). According to the results, the estimated leverage adjustment speed using the LSDVC method is about 32.8%, and this result is close to that of related studies. Column (2) presents the result of Equation (5), where the cross-term coefficient of MMC and *Dev* represents the influence of managerial macro cognition on the speed of corporate leverage adjustment. If the coefficient is positive means the MMC can promote firms' adjustment process. It has been shown that the coefficient is 0.5884 and is significant at the level of 1%, which shows that in the entire sample, the managerial macro cognition can promote the adjustment of corporate leverage. The stronger the managerial macro cognition is, the more they can do to make a reasonable leverage adjustment decision and the faster the adjustment speed will be. In addition, this paper group the full sample into those with leverage lower than the targets, which are reported in Column (3), and those higher than the targets, which are reported in Column (4). The results show that the promotion effect of managerial macro cognition on the speed of leverage adjustment was mainly driven by those lower than the targets. The main reason for this result is that for listed companies in China, debt financing is still the main channel for external financing [45], and many literatures have reached similar conclusions.

5. Further Research

5.1. Analysis of the Differences in Financing Constraints

Companies can use internal funds to improve the efficiency of the adjustment process [46], but in fact, many companies do not have sufficient internal funds,

Table 3. Managerial macro cognition and the speed of leverage adjustment.

	(1)	(2)	(3)	(4)
			<i>Lev < T-lev</i>	<i>Lev > T-lev</i>
	Δlev	Δlev	Δlev	Δlev
<i>Dev</i>	0.328*** (43.16)	0.243*** (9.54)	0.576*** (22.54)	0.625*** (14.04)
<i>DEV*MMC</i>		0.588*** (3.71)	0.287** (2.03)	-0.128 (-0.46)
<i>N</i>	24,186	24,186	15,966	8220
<i>Adj-R²</i>	0.176	0.177	0.454	0.480

These statistics reported in brackets are *t*-values. **p* < 0.1 ***p* < 0.05 ****p* < 0.01. The standard errors are adjusted by clustering in firms. Column (1) and (2) reports the results for the full sample, Column (3) for firms with leverage lower than their target and Column (4) for those with leverage higher than their target. Variable definitions are given in **Table 1**.

and are facing severe financing constraints. For companies with more severe financing constraints, they may face difficulties in obtaining external funds or higher costs of external capital when they adjust their capital structure. Enterprises with higher financing costs may have to abandon the adjustment decision, thus slowing down the leverage adjustment speed.

Many studies have shown that firms with stronger financing constraints are more sensitive to the changes of the external financing environment. In this case, for companies with severe financing constraints, managers who can be aware of changes in the macro environment immediately, and choose the right time and the appropriate way to make adjustments will greatly cut the adjustment costs of the company. Therefore, it can significantly speed up the adjustment of corporate capital structure. From another perspective, companies without financing constraints are better able to obtain low-cost funds when they need them, and are less sensitive to changes in the external environment. Therefore, under the support of strong financing capabilities, managers' personal choice of adjustment timing and promote effect on adjustment speed are not as obvious as in enterprises with severe financing constraints. Based on this, I believe that compared with companies with weaker financing constraints, the managerial macro cognition in companies with stronger financing constraints has a more significant impact on the leverage adjustment speed.

Following Hadlock and Pierce [47], this paper constructs the SA index. The smaller the SA index, the more severe the financing constraints faced by the enterprise. According to the annual-industry median of the SA index, this paper divides the sample into two groups with and without financing constraints.

In **Table 4**, Column (5) shows for those with severe financing constraints, the coefficients of MMC and Dev are both significantly positive at the level of 1%, while the coefficients of Column (6) is positive but not statistically significant. It shows that for companies facing severe financing constraints, managers can be the first to be aware of changes in the macro environment, and choosing the right time and the appropriate way to adjust will greatly improve the adjustment cost of the company, so it can significantly speed up the leverage adjustment. For companies that do not face financing constraints, they are more able to obtain low-cost funds when needed, and are less sensitive to changes in the external environment. Therefore, the role of managers in promoting the speed of adjustment is not obvious. Macro cognition has no significant impact on the speed of its leverage adjustment, which is in line with the expectations.

5.2. Analysis of the Differences in Monetary Policy

Besides, in addition to the internal financing constraints, monetary policy also has a direct impact on the financing behavior of enterprises. As we all know, the central government regulates the market through monetary policy, such as adjusting the national currency, the national credit system, and the banking system. Many studies have shown that monetary policy can affect companies' financing

Table 4. Analysis of the differences in financing constraints.

	(5)	(6)
	Constrained	Unconstrained
	Δlev	Δlev
<i>Dev</i>	0.220*** (5.94)	0.383*** (10.32)
<i>DEV*MMC</i>	0.930*** (4.06)	0.163 (0.75)
<i>N</i>	12270	11916
<i>Adj-R²</i>	0.191	0.231

These statistics reported in brackets are *t*-values. **p* < 0.1 ***p* < 0.05 ****p* < 0.01. The standard errors are adjusted by clustering in firms. Column (5) for firms with severe financing constraints and Column (6) for those without severe financing constraints.

behavior directly. Traditional Keynesianism believes that monetary policy will change the external financing costs of enterprises, affect their economic behaviors, and thus reflect the overall macro economy. When the central bank adopted a loose monetary policy, the level of lending interest rates fell, and the companies' financing cost also fell. In addition, loose monetary policy will increase free cash flow in the market, reduce the possibility of adverse selection as a whole, and make it easier for companies to obtain credit funds.

Under the loose monetary policy, the free cash flow of the economy is sufficient. At this situation, companies that need external funds can easily obtain lower-cost credit funds. Therefore, with the help of a relaxed financing environment, it is easier for enterprises to obtain funds, and the managers' personal choice of adjustment timing and promote effect on adjustment speed should be weaker than monetary tightening period. Based on this, I also believe that compared with the period of loose monetary policy, the impact of managerial macro cognition on the speed of corporate leverage adjustment during the period of monetary policy tightening is more obvious.

In order to check the difference under different monetary policy conditions, this paper uses the annual growth rate of M2 to measure whether monetary policy is accommodative. After sorts the growth rate of M2 from small to large, I obtain the median value of growth rate and construct the dummy variable *Loose*. If the M2 growth rate is greater than the median value, *Loose* = 1; otherwise, take 0. Based on this, the sample is divided into two groups: in or out of the tight monetary policy period. According to the statistics, the years with high M2 growth rates are 2001, 2002, 2003, 2005, 2007-2011.

In **Table 5**, Column (7) shows that during the period of easy monetary policy, although the cross-term coefficient of *MMC* and *Dev* is positive, it is not statistically significant. Column (8) shows that during the tight monetary policy period, the coefficient is significantly positive at the level of 1%. This shows that under the easy monetary policy, the free cash flow of the market is sufficient.

Table 5. Analysis of the differences in monetary policy.

	(7)	(8)
	Easy Period	Tight Period
	Δlev	Δlev
<i>Dev</i>	0.386*** (8.29)	0.259*** (7.71)
<i>DEV*MMC</i>	0.316 (0.98)	0.626*** (3.12)
<i>N</i>	8025	16161
<i>Adj-R²</i>	0.228	0.188

This statistic reported in brackets are *t*-values. **p* < 0.1 ***p* < 0.05 ****p* < 0.01. The standard errors are adjusted by clustering in firms. Column (7) for firms in easy monetary policy period and Column (8) for those in tight monetary policy period.

Companies that need external funds can easily obtain lower-cost credit funds. Therefore, with the help of a relaxed financing environment, it is easier for enterprises to obtain funds, and the managers' personal choice of adjustment timing and promote effect on adjustment speed is not obvious. However, in the period of tight monetary policy, it is more difficult for enterprises to obtain funds and the financing costs are higher. Thus, the role of managerial macro cognition becomes important which can significantly speed up the corporate leverage adjustment.

5.3. Analysis of the Differences in Equity Concentration

In addition, some studies also find that the concentration of corporate equity will have an impact on the behavior of managers. For example, when the ownership equity of a company is concentrated, large shareholders are more able to supervise and restrain managers, so it is more difficult for managers to take actions. Some studies have found that even if managers have different personal characteristics that will affect corporate decisions, high equity concentration can reduce managers' influence on it [5]. For the same reason, when the company's equity is relatively concentrated, the manager's power is limited and their cognition should have a small impact on the corporate capital structure decision.

Follow relative study, this paper uses the shareholding ratio of the largest shareholder to measure the degree of equity concentration of an enterprise. When the ratio exceeds 34%, it shows that the shareholder has played a key role in corporate governance, and can achieve supervision and restraint on corporate managers. Therefore, under such circumstances, the manager's power will be greatly restricted and will have a weaker impact on corporate decisions. Based on this, this article believes that compared with companies with high equity concentration, the managerial macro cognition with lower equity concentration has a more significant impact on the speed of corporate leverage adjustment.

In order to check whether there is a difference in the impact of managerial

macro cognition on the speed of leverage adjustment under different degrees of equity concentration, I use the shareholding ratio of the largest shareholder to measure the degree of equity concentration of an enterprise. When the largest shareholder's shareholding exceeds 34%, it means that the shareholder has played a key role in corporate governance. I construct a dummy variable Governance based on whether the largest shareholder's holding ratio is greater than 34%. If the holding ratio is greater than 34%, Governance = 1, otherwise Governance = 0. Based on this, the sample is divided into two groups.

In **Table 6**, the cross-term coefficients of MMC and Dev are significantly positive at the levels of 10% and 1% respectively, indicating that managerial macro cognition can promote the adjustment speed of corporate leverage among both the enterprises with high and low equity concentration. However, in companies with low equity concentration, managers are more freely to make decisions and receive less supervision. Therefore, in this case, the managerial macro cognition plays a greater role in promoting corporate leverage adjustment.

6. Robust Test

6.1. Controlling Provincial GDP Growth Rate

To check the robustness of the empirical results, I conduct a series of additional tests. Firstly, I consider that the macroeconomic environment itself will have an impact on the adjustment of corporate capital structure. I add the provincial annual GDP growth rate into the original model, and reconstruct it as follows:

$$\Delta lev = \gamma_0 + \gamma_1 MMC_{i,t} + \gamma_2 GDPG * Dev + \xi_{i,t}$$

where *GDPG* is the provincial level of annual GDP growth rate.

In **Table 7**, Column (12) shows that after controlling the annual GDP growth rate, the cross-product coefficient of DEV and MMC is 0.5889, which is still significantly positive at the level of 1%, indicating that after controlling the macroeconomic factors, the influence of managerial macro cognition on capital structure adjustment is still significant. The stronger the managerial macro cognition of corporates, the managers are more able to make reasonable adjustment decisions, and the faster the adjustment speed, which is consistent with previous results. Besides, in terms of the financing constraints, monetary policy and the equity concentration, I obtained the same results as previous. For enterprises with severe financing constraints, the stronger the managerial macro cognition, the faster the adjustment speed will be. For companies that do not face financing constraints, macro cognition has no significant influence on the speed of their leverage adjustment. Under the easy monetary policy, the managerial macro cognition has no obvious effect on the speed of corporate leverage adjustment. In the period of tight monetary policy, the stronger the managerial macro cognition of the enterprise, the faster the adjustment of the leverage. In companies with low equity concentration, managers are more freely to make decisions and receive less supervision. Therefore, in this case, the managerial macro cognition plays a greater role in promoting corporate leverage adjustment.

Table 6. Analysis of the differences in equity concentration.

	(9)	(10)
	High Concentration	Low Concentration
	Δlev	Δlev
<i>Dev</i>	0.3217*** (9.0800)	0.2610*** (6.7058)
<i>DEV* MMC</i>	0.3892* (1.9486)	0.6610*** (2.7760)
<i>N</i>	11573	12476
<i>Adj-R²</i>	0.204	0.197

These statistics reported in brackets are *t*-values. **p* < 0.1 ***p* < 0.05 ****p* < 0.01. The standard errors are adjusted by clustering in firms. Column (9) for firms with high equity concentration and Column (10) for those with low equity concentration. Equity concentration data is available since 2003.

Table 7. Controlling provincial gdp growth rate.

	(11)	(12)	(13)	(14)
			Constrained	Unconstrained
	Δlev	Δlev	Δlev	Δlev
<i>Dev</i>	0.243*** (9.54)	0.251*** (8.15)	0.2363*** (4.8398)	0.3843*** (8.0711)
<i>DEV* MMC</i>	0.588*** (3.71)	0.589*** (3.71)	0.9299*** (4.0504)	0.163 (0.7565)
<i>DEV* GDPG</i>		-0.107 (-0.49)	-0.201 (-0.4762)	-0.0194 (-0.0666)
<i>N</i>	24,186	24,186	12,270	11,917
<i>Adj-R²</i>	0.177	0.177	0.191	0.231
	(15)	(16)	(17)	(18)
	Easy Period	Tight Period	High Concentration	Low Concentration
	Δlev	Δlev	Δlev	Δlev
<i>Dev</i>	0.3709*** (6.4906)	0.2866*** (6.8496)	0.3503*** (8.2957)	0.2676*** (5.8304)
<i>DEV* MMC</i>	0.315 (0.9744)	0.6292*** (3.1560)	0.3861* (1.9272)	0.6654*** (2.7847)
<i>DEV* GDPG</i>	0.189 (0.3759)	-0.346 (-1.2840)	-0.347 (-1.0998)	-0.0903 (-0.2531)
<i>N</i>	8025	16162	11573	12476
<i>Adj-R²</i>	0.228	0.188	0.204	0.197

These statistics reported in brackets are *t*-values. **p* < 0.1 ***p* < 0.05 ****p* < 0.01. The standard errors are adjusted by clustering in firms. Column (11) reports the results for the full sample without the control of GDP growth rate. Column (12) reports the results for the full sample with the control of GDP growth rate. Column (13) for firms with severe financing constraints and Column (14) for those without severe financing constraints. Column (15) for firms in easy monetary policy period and Column (16) for those in tight monetary policy period. Column (17) for firms with high equity concentration and Column (18) for those with low equity concentration.

6.2. Alternative Estimation Methods

Secondly, I use alternative estimation method to re-estimate the target leverage. Regarding which estimation method can be used to more accurately estimate the target leverage of the enterprise, different papers give different opinions. In addition to the LSDVC method used earlier, some literatures have proposed the GMM is more reasonable for processing dynamic panel data. In addition, some literatures use the fixed effect model (FE) to estimate the target capital structure. Therefore, this paper also uses these two methods to estimate in the robustness test.

The instrumental variables selected in this paper are the second-to-fifth-period lags (Lag (2,5)) of the Lev. The industry dummy and year dummy are controlled during the estimation. The p value of Wald-Test is 0, AR (2) and the p value of Sargan-Test are all greater than 0.1, there is no evidence supporting second-order sequence correlation, and the null hypothesis that instrumental variables are valid cannot be rejected. The regression test was performed using the target capital structure estimated by GMM. The results are highly consistent with previous results, as shown in **Table 8**. The results with FE estimation method are also highly consistent with previous results, and are not specifically listed.

Table 8. Alternative estimation methods—GMM.

	(19)	(20)	(21)	(22)
			Constrained	Unconstrained
	Δlev	Δlev	Δlev	Δlev
<i>Dev</i>	0.3255*** (41.5919)	0.2406*** (7.7719)	0.2079*** (4.7194)	0.3605*** (8.3573)
<i>DEV*MMC</i>		0.5892*** (2.9553)	0.9600*** (3.3479)	0.206 (0.7925)
<i>N</i>	24,186	24,186	12270	11917
<i>Adj-R²</i>	0.169	0.170	0.181	0.209
	(23)	(24)	(25)	(26)
	Easy Period	Tight Period	High Concentration	Low Concentration
	Δlev	Δlev	Δlev	Δlev
<i>Dev</i>	0.3638*** (7.2690)	0.2571*** (6.2246)	0.3024*** (7.3181)	0.2590*** (5.3631)
<i>DEV*MMC</i>	0.431 (1.2323)	0.6139** (2.3829)	0.4364* (1.7964)	0.7000** (2.2488)
<i>N</i>	8025	16162	11573	12476
<i>Adj-R²</i>	0.216	0.180	0.187	0.194

These statistics reported in brackets are *t*-values. **p* < 0.1 ***p* < 0.05 ****p* < 0.01. The standard errors are adjusted by clustering in firms. Column (11) reports the results for the full sample without the control of GDP growth rate. Column (12) reports the results for the full sample with the control of GDP growth rate. Column (13) for firms with severe financing constraints and Column (14) for those without severe financing constraints. Column (15) for firms in easy monetary policy period and Column (16) for those in tight monetary policy period. Column (17) for firms with high equity concentration and Column (18) for those with low equity concentration.

7. Conclusions

Drawing on a sample of Chinese listed firms from 2002 to 2018, this study explores how does the different macro cognition of executives will affect their capital structure decision. After reviewing related researches on capital structure and management cognition, this paper takes advantage of the concept of “Managerial Macro-Cognition” (MMC) proposed by Rao, analyzes theoretically how managerial macro cognition affects the corporate’s leverage adjustment speed. Besides, this paper also tests for differences based on different conditions such as financing constraints faced by enterprises, the external monetary policy environment, and the concentration of corporate equity. A standard partial adjustment model was constructed to estimate the leverage adjustment speed, and an extended model was constructed for regression analysis. This paper use LSDVC estimation method in the estimation process and control for the year-firm effect during the regression process. After conducting several robustness tests, the stable conclusions are reached as follows:

First, managerial macro cognition can promote the adjustment of leverage of the enterprise. The companies with stronger macro cognition can make more reasonable adjustment decisions, so that the capital structure can be adjusted more quickly. After grouping the full sample into those with leverage lower than the targets, this paper finds that the promotion effect of managerial macro cognition mainly comes from those with leverage lower than the targets. The main reason for this result is that for listed companies in China, debt financing is still the main channel for external financing, and many literatures have reached similar conclusions.

Second, the promotion effect of managerial macro cognition is more obvious when the company faces financing constraints. For companies faced with severe financing constraints, managers can quickly be aware of changes in the macro environment is quite essential. Managers with strong macro cognition are able to choose the right time and the right way to adjust the company’s leverage, which will greatly decrease the adjustment cost of the company and significantly speed up the adjustment process of company. For companies without financing constraints, they are more able to obtain low-cost funds whenever they need, and are less sensitive to changes in the external environment. Therefore, the promote effect of individual managers is not obvious.

Third, the promotion effect of c is even more pronounced when companies face an easy monetary policy environment. In the easy monetary policy period, the free cash of the market is sufficient. At this period, companies that need external funds can easily obtain lower-cost credit funds. Therefore, with the help of a relaxed financing environment, the difficulty of external financing for enterprises has been greatly reduced and the managers’ personal choice of adjustment timing and promote effect on adjustment speed is not obvious. On the contrary, in the tight monetary policy period, it is more difficult for enterprises to obtain funds and the financing costs are higher. At this situation, the higher the mana-

gerial macro cognition of the enterprise, the more reasonable the adjustment decisions are, the faster the adjustment speed will be.

Forth, the promotion effect of managerial macro cognition is more obvious when companies have a high degree of equity concentration. Managerial macro cognition can promote the adjustment speed of corporate leverage among both the enterprises with high and low equity concentration. However, in companies with low equity concentration, managers are more freely to make decisions and receive less supervision. Therefore, in this case, the managerial macro cognition plays a greater role in promoting corporate leverage adjustment.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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