

AI-Driven Textual Analysis of Chairperson Traits for Predicting Corporate Debt Policies: Evidence from Taiwanese Listed Firms

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Abstract

This study compares traditional financial indicators with generative AI text analysis in an internet-embedded pipeline to examine how chairperson traits, including extraversion and overconfidence, shape corporate debt policy. Extraversion is quantified by classifying linguistic cues in the annual report's "Letter to Shareholders." A web crawler harvests filings and related public disclosures and normalizes HTML/PDF to text with versioned logs for auditability. Financial data for Taiwanese listed companies from 2004 to 2023 is collected from TEJ. Traditional determinants are controlled in dynamic target-adjustment regressions estimated with GLS cross-sectional weighting to mitigate heteroskedasticity. We find that extraverted or overconfident chairpersons tend to adopt optimistic debt policies by lowering leverage. However, as firms move toward target capital structure, overconfident or extraverted leaders pursue faster adjustments, suggesting that both measurement systems deliver consistent predictions. AI-driven textual analysis, continuously refreshed via the internet pipeline, partially substitutes traditional metrics by capturing subtle psychological and behavioral signals in near real time. Integrating AI-driven personality assessments and internet-based monitoring into governance can help investors, boards, and policymakers anticipate executive decisions, strengthen strategic forecasting, and improve financial stability and risk management.

Keywords: Chairperson traits, Debt policy, Extraversion, Overconfidence, AI text analysis

1 Introduction

Chairperson, as a key decision-maker, significantly shape corporate strategies and financial policies. Their individual psychological characteristics have increasingly been recognized to influence corporate decision-making beyond traditional financial theories. Prominent cases like Elon Musk of Tesla and Tim Cook of Apple highlight distinct financial outcomes influenced by their respective personality traits—aggressive risk-taking versus prudent risk management.

Previous studies have indicated that CEOs with

more proactive or aggressive personalities may exhibit a preference for high-risk investment strategies [1], which in turn can influence a firm's capital structure [2]. According to traditional financial theory, corporate managers are assumed to act rationally when making financing decisions, typically adhering to the Pecking Order Theory. This theory suggests that firms prioritize internal financing first, followed by debt issuance, and only consider equity issuance as a last resort, primarily to mitigate the adverse effects of information asymmetry associated with equity financing. However, recent developments in behavioral finance have shown that managerial decisions are not always fully rational. When managers exhibit traits such as optimism or overconfidence, their financing choices may deviate from the predictions of traditional theories, potentially leading to capital structures that reflect behavioral biases rather than purely rational considerations.

Within the Big Five personality traits framework proposed by Tupes and Christal [3], Extraversion reflects an individual's level of engagement in social interactions, goal pursuit, and risk-taking behavior. Corporate leaders high in extraversion tend to be more outward-facing, embrace challenges, and are more inclined to adopt proactive financial and investment strategies. Prior studies have found that extraverted executives may be more willing to seek flexible strategies and external financing from investors or banks [4-5], and possess greater persuasive ability to convince boards or shareholders to accept higher leverage. This personality trait is also reflected in a stronger drive for profitability; to achieve organizational goals, extraverted CEOs may undertake high-risk investment strategies, thereby influencing the firm's financial structure and investors' risk assessments [6]. Therefore, extraversion is considered a personality trait with significant implications for corporate governance [7].

On the other hand, a psychological cognition similar to extraversion can be manifested in the form of confidence in decision-making. Overconfidence has been identified as another influential factor in corporate decision-making [2]. Unlike extraversion, overconfidence is not considered a stable personality trait but rather a cognitive bias. Overconfident individuals tend to exhibit excessive optimism regarding their own abilities, knowledge, or judgments, which can lead to the underestimation of risks and the adoption of irrational decisions.

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Previous studies have examined the effects of extraversion and overconfidence on investment and mergers and acquisitions decisions. It remains empirically untested whether the personality traits and cognitive biases of the Chairperson impact a firm's capital structure. Additionally, it is uncertain how these traits influence the firm's propensity for leveraging. Moreover, prior research has predominantly relied on either questionnaire surveys or financial data to assess personality traits. Given concerns regarding the objectivity of survey data and the representativeness of financial performance measures, the present study proposes employing generative AI as a training tool for interpreting and analyzing textual content, with the derived characteristics then compared to those inferred from traditional financial data.

Beyond traditional disclosures, internet technologies now allow scalable, low-latency collection of corporate narratives and third-party signals (e.g., exchange filings, press releases, and investor communications). Embedding these web-based data streams into chairperson-trait measurement complements our AI text analysis of "Letters to Shareholders," enlarging coverage and temporal granularity. Accordingly, this study targets Taiwanese listed companies from 2004 to 2023 and utilizes AI-driven text analysis techniques to quantitatively assess the extraversion and overconfidence of chairpersons. It further examines whether these traits deviate from traditional rational theories' predictions and influence corporate financing strategies and financial risk preferences.

The findings indicate that, regardless of whether overconfidence is measured using corporate financial data or extraversion is identified through AI, both factors are generally associated with a lower debt level. Although a higher degree of extraversion exhibits an opposite trend, the effect is not statistically significant. These results suggest that personality traits play a role in shaping financial decision directions, potentially leading to a preference for internal sources of financing, which is in line with the pecking order theory.

2 Literature Review

2.1 Text Mining and Sentiment Analysis

With natural language processing and deep learning advances, text mining has become a central tool in research on financial risk and corporate governance [8]. Early studies primarily relied on structured approaches to feature extraction from annual reports and earnings call transcripts. These methods included using domain dictionaries and readability metrics, such as financial sentiment lexicons, tone and uncertainty terms counts, and the Fog Index. The focus was assessing tone, risk disclosure, readability, and litigation-related wording. These studies document systematic associations between textual features and outcome variables such as the cost of capital, earnings persistence, and investment decisions [9-10]. More recently, transformer-based models, such as classifiers built on BERT or FinBERT, have emerged as powerful tools for analyzing long documents. These models can

extract high-dimensional semantic representations directly from the text without manual feature engineering [11]. As a result, they can quantify latent signals in managerial communication, including tone, degree of conviction, risk perception, and personality tendencies such as extraversion and overconfidence.

In addition, sentiment analysis applied to financial texts, including Forms 10 K, annual reports, MD&A, earnings calls, news, and social media, can capture managerial attitudes toward risk. It can also provide insights into their prospects [12-13]. Negative tone and elevated uncertainty are typically associated with a higher cost of debt and more conservative financing choices. In contrast, after controlling for optimism bias, positive tone may influence short-term financing activity and the speed of adjustment. For the present study, chairperson personality traits (extraversion and overconfidence) and linguistic tone (positive or negative, uncertainty) may exert a comparable influence on capital structure. For example, high extraversion combined with elevated uncertainty may dampen the inclination to increase leverage, whereas jointly high extraversion and positive tone may accelerate convergence toward the target capital structure.

2.2 Capital Structure Decision and Personal Traits

The Modigliani and Miller (MM) theorem [14], which laid the foundation for modern corporate capital structure theory, posits that under conditions of no taxes and no information asymmetry, a firm's capital structure does not affect its value. When considering taxes and transaction costs, firms engage in a tradeoff between the tax shield benefits of debt and the potential bankruptcy costs, ultimately aiming for an optimal capital structure [15].

In contrast, Myers and Majluf [16] proposed the Pecking Order Theory, which argues that due to information asymmetry, firms prefer to finance projects first with internal funds, followed by debt, and only as a last resort through equity issuance. Subsequent empirical studies have found that while the financing behavior of some firms is consistent with this theory, others adjust toward a target debt ratio in line with the tradeoff theory. Shyam-Sunder and Myers [17] further noted that firm size, profitability, and growth opportunities all influence capital structure decisions. Large firms tend to pursue a target capital structure that balances tax benefits and financial costs, whereas smaller firms' financing behavior is generally more consistent with the pecking order theory.

Flannery and Rangan [18] challenged traditional capital structure theories, finding that pecking order and market timing effects have limited influence on managers' capital structure decisions. Extending the dynamic tradeoff perspective, they calculated the adjustment speed based on the difference between a firm's actual and target leverage ratios. Their findings indicate that managers systematically narrow this gap over time, bringing the leverage ratio closer to the firm's target.

Most of the above research assumes that managers act as rational decision-makers. However, recent developments in behavioral finance suggest that decision-makers, when facing uncertainty and risk, may exhibit cognitive biases

influenced by their personality traits—overestimating their abilities and judgment, underestimating potential risks, and making irrational decisions. This is a common behavioral pattern among overconfident managers. Malmendier and Tate [19] similarly argued that overconfident CEOs tend to delay exercising stock options or continue purchasing company shares due to excessive optimism about the firm's future performance. The study analyzed behavioral persistence to ascertain whether such behavior stems from psychological traits or insider information. It found that long-term behavioral patterns are typically attributed to overconfidence, whereas short-term behavior may suggest using insider information. Empirical evidence shows that overconfident CEOs are more sensitive to changes in cash flow and, particularly in firms favoring equity financing, prefer to retain internal resources for investment rather than rely on external financing.

The concept of personality traits was first proposed by Tupes and Christal [3], and later, Costa and McCrae [20] developed the Revised NEO Personality Inventory (NEO-PI-R) to measure five broad dimensions of personality. A distinguishing feature of this instrument is its subdivision of each personality dimension into multiple facets, thereby revealing the complexity of personality. For example, Extraversion is broken down into sociability, energy, and positive emotions, enabling researchers and clinical psychologists to understand an individual's extraverted tendencies better.

Prior literature has shown that CEOs, even when internal funds are sufficient, may underestimate financing risks due to overconfidence, leading to suboptimal investment decisions [19]. This may cause firms to deviate from their optimal capital structure or result in excessively high leverage ratios [21]. Table 1 presents the key distinctions between extraversion and overconfidence.

Table 1. Key differences between extraversion and overconfidence

Dimension	Extraversion	Overconfidence
Nature	Personality trait	Cognitive bias / behavioral deviation
Focus	Social tendency, emotional expressiveness	Overestimation of abilities and outcomes
Stability	Relatively stable and long-term personality trait	Context-dependent (e.g., influenced by market conditions)
Decision style	Active engagement, risk-taking tendency	Overconfidence, risk underestimation
Measurement	Surveys, self-assessment, text analysis	Behavioral data, financial performance, event responses

Given that chairpersons with high extraversion possess stronger social skills and excel at building and maintaining extensive social networks [4], they are more likely to access valuable financial information and enjoy a broader

range of financing options. Such networks facilitate easier access to capital. Therefore, highly extraverted chairpersons are expected to have more opportunities to secure funding to sustain profitability and increase market share [22]. Such extraverted chairpersons tend to favor risk-taking and profit-seeking investments, which also makes profitability and business risk endogenously influence their decisions on leverage. This pattern is consistent with Myers [23], who argues that firms under the pecking order financing policy with stronger profitability or higher business risk generally maintain lower leverage at the industry level. Likewise, overconfident executives may place excessive trust in their decision-making ability, potentially leading to overinvestment [19]. By overestimating a firm's future incoming cash flows, executives tend to use their internal funds excessively to finance investment [24]. Conversely, executives believe external markets undervalue their firm and thus reducing reliance on debt under asymmetric information. Based on the above reasoning, the first hypothesis of this study is proposed as follows:

H1a: Chairpersons exhibiting extraversion have a significant impact on their firms' leverage ratios.

H1b: Chairpersons exhibiting overconfidence have a significant impact on their firms' leverage ratios.

On the other hand, Malmendier and Tate [19] suggested that overconfident executives tend to be more sensitive to a firm's free cash flow. When firms have substantial free cash flow, overconfident executives may invest in projects with negative net present value. Nicholson, Soane, Fenton-O'Creevy and Willman [25] further found that overconfident chairpersons believe they can make better decisions than others and interpret market information more accurately, leading them to make decisions they perceive as more beneficial to the firm. Such traits may substantially impact the adjustment of a firm's capital structure.

In addition, when free cash flow is insufficient, executives may reduce investment, thereby forgoing potentially beneficial projects. This behavior may result in more frequent capital structure adjustments. By contrast, chairpersons with high levels of extraversion tend to possess greater strategic flexibility, enabling them to respond rapidly to market changes while driving firm growth [4].

Accordingly, this study anticipates that chairpersons exhibiting extraversion or overconfidence will accelerate the speed of capital structure adjustment. The second set of hypotheses is as follows:

H2a: Firms led by chairpersons exhibiting extraversion adjust their capital structures faster.

H2b: Firms led by chairpersons exhibiting overconfidence adjust their capital structures faster.

In summary, AI-driven text analysis and sentiment analysis have shown the ability to extract semantically meaningful signals from corporate narratives, which can explain variations in the cost of capital and financing choices. Compared with traditional financial indicators, textual features can be updated in real time within internet-embedded data flows, capturing shifts in managerial tone and risk attitudes across market conditions. For this study,

jointly incorporating chairperson traits and financial measures into the dynamic capital structure adjustment equation is expected to enhance explanatory power for leverage levels, adjustment speed, and short-term predictive performance.

3 Methodology

Given that prior literature lacks financial quantitative indicators for measuring extraversion, and that most studies rely on surveys or observational methods, which may lack uniformity or objective validation, this study adopts a measurement approach designed to ensure external objectivity while saving time and maintaining consistency. In particular, generative AI is employed to train, interpret, and identify extraversion.

We implement an internet-based ingestion layer that fetches structured filings and narrative sections from public portals (e.g., exchange repositories), harmonizes HTML/PDF into text, and time-stamps each document for version control. This layer runs on a scheduled crawler plus event-driven webhooks to capture newly posted reports in near real time. All web acquisitions follow robots and portal terms; we implement de-duplication, language normalization, and redaction for personal data to minimize bias and privacy risks.

The analysis utilizes the “Letter to Shareholders” section from annual reports authored by the chairperson as the primary data source. Given the standardized format of paragraphs in Chinese annual reports, this study uses Python to extract the section titled “Letter to Shareholders” by identifying its specific starting and ending phrases. The extracted content is then converted into Unicode-encoded CSV files in Chinese, organized by company and year. This procedure ensures consistency in data formatting, allowing for smooth and accurate input into the AI platform for subsequent analysis. Referring to the methodology of Pyun [26], the AI is provided with a definition of extraversion and its relevance to corporate governance before the analysis, and it then performs textual analysis.

We arranged and translated the definitions of the Big Five personality traits framework proposed by Tupes and Christal [3] into Chinese, using them as the primary basis for AI evaluation. Additionally, we uploaded a collection of Chinese and English academic papers from the past decade related to corporate governance and finance, which are grounded in the Big Five traits as supplementary reference materials.

We then submitted “Letter to Shareholders” categorized by firm size and industry type for the AI platform to identify vocabulary related to extraversion. We expected the AI to extract and summarize industry- and size-specific linguistic patterns associated with extraversion.

After the AI extracts four sets of words that indicate extraversion, these extracted words are subsequently used to assess whether firms of the same size and industry group display extraversion characteristics.

Finally, to minimize the risk of classification errors from a single AI tool, we employed a cross-validation

approach using two generative AI platforms, ChatGPT and Claude¹. If both platforms classified a company’s “Letter to Shareholders” for a given year as exhibiting extraverted language, we assigned the firm a dummy equal to 1 for extraversion; otherwise, 0.

In addition, while traditional supervised learning methods require labeled training data, our prompt-based approach enables zero-shot or few-shot inference based on conceptual definitions. Thus, the AI can perform classification tasks without requiring a labeled dataset. Figure 1 presents the instruction-guided classification process.

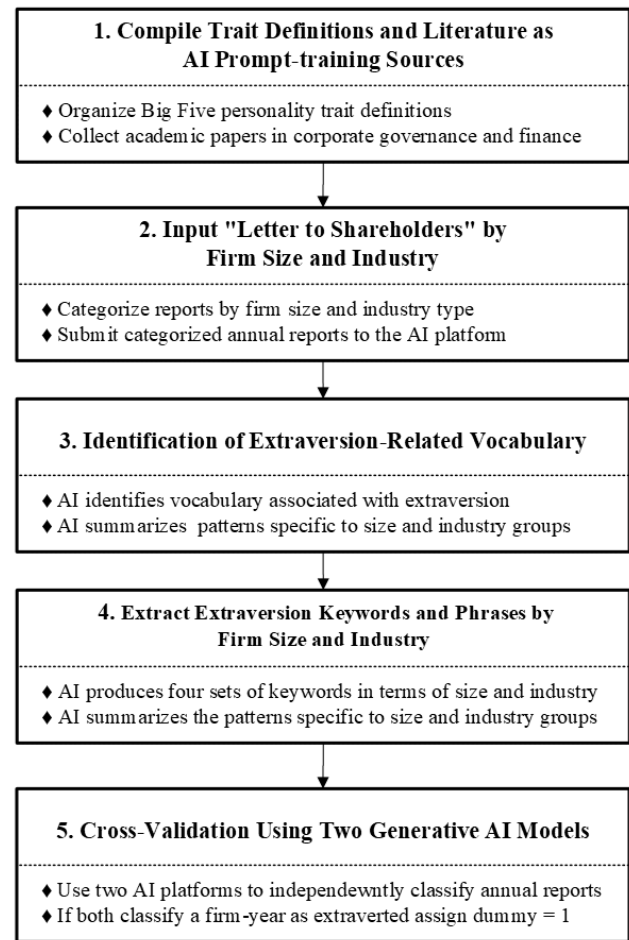


Figure 1. Instruction-guided classification process for AI to determine extraversion

We then examine the impact of extraversion and overconfidence on corporate leverage as proposed in H1a. This study adopts the model of Lartey, Kesse and Danso [27]:

$$\begin{aligned}
 MDR_{it} = & a_0 + a_1 ExtraVersion_{it} + a_2 SIZE_{it} \\
 & + a_3 TANG_{it} + a_4 NDTs_{it} + a_5 ROA_{it} \\
 & + a_6 MB_{it} + a_7 SGR_{it} + \phi_i + \tau_t + \varepsilon_{it}
 \end{aligned} \quad (1)$$

where MDR_{it} denotes the market value–based leverage ratio of firm i in year t . The primary reason for measuring

¹ The exact versions we used in this study were ChatGPT (GPT-4.1) and Claude 3.5 Sonnet, as we engaged in prompt-based inference at the beginning of 2025.

leverage using market value is that market value reflects the market's expectations of the firm's prospects, investor confidence, and risk assessments, providing a timelier representation of the firm's financial status. $ExtraVersion_{it}$ denotes the dummy of the chairperson's trait identified by AI. Other control variables are defined in Table 2.

Table 2. Operational definitions of control variables

Variables	Operational definition
Firm Size ($SIZE$)	$SIZE = \ln(\text{Total Assets})$
Tangible Assets Ratio ($TANG$)	$TANG = \frac{PPE}{\text{Total Assets}}$
Non-debt Tax Shields ($NDTS$)	$NDTS = \frac{\text{Depreciation expense}}{\text{Net Sales}}$
Profitability (ROA)	$ROA = \frac{EBIT}{\text{Total Assets}}$
Future Growth (MB)	$MB = \frac{\text{Firm's Market Value}}{\text{Firm's Book Value}}$
Sales Growth (SGR)	$SGR = \frac{\text{Sales}_t - \text{Sales}_{t-1}}{\text{Sales}_{t-1}}$

This study also determines overconfidence as a binary indicator. We assess whether the chairperson exhibits overconfidence using three proxies: (i) changes in the chairperson's shareholding, (ii) evidence of overinvestment, and (iii) dividend policy. If at least two of these proxies are satisfied, the dummy equals 1; otherwise, it equals 0. To avoid confounding the results, we exclude the proxy directly related to leverage to mitigate concerns about causal error between the measurement and the firm's leverage ratio. We then examine the impact of overconfidence on corporate leverage as proposed in H1b with Equation (2).

$$MDR_{it} = b_0 + b_1 OverConfidence_{it} + b_2 SIZE_{it} + b_3 TANG_{it} + b_4 NDTS_{it} + b_5 ROA_{it} + b_6 MB_{it} + b_7 SGR_{it} + \phi_i + \tau_t + \gamma_{it} \quad (2)$$

To further test the effect of extraversion and overconfidence on the speed of capital structure adjustment as stated in H2, this study follows the model of Flannery and Rangan [18]. We first specify the partial adjustment process in Equation (3), where λ denotes the speed of adjustment toward the target capital structure (MDR^*_{it}), capturing the extent to which firms close the gap between actual and target leverage.

$$MDR_{it} - MDR_{it-1} = \lambda (MDR^*_{it} - MDR_{it-1}) \quad (3)$$

After rearranging and expanding the above specification, we incorporate extraversion, overconfidence, and control variables into the leverage equation and

conduct regression analyses using Equations (4.1) and (4.2).

$$MDR_{it} = (1 - \lambda) MDR_{it-1} + c_1 ExtraVersion_{it} + c_2 (1 - \lambda) MDR_{it-1} \times ExtraVersion_{it} + c_3 SIZE_{it} + c_4 TANG_{it} + c_5 NDTS_{it} + c_6 ROA_{it} + c_7 MB_{it} + c_8 SGR_{it} + \phi_i + \tau_t + \eta_{it} \quad (4.1)$$

$$MDR_{it} = (1 - \lambda) MDR_{it-1} + d_1 OverConfidence_{it} + d_2 (1 - \lambda) MDR_{it-1} \times OverConfidence_{it} + d_3 SIZE_{it} + d_4 TANG_{it} + d_5 NDTS_{it} + d_6 ROA_{it} + d_7 MB_{it} + d_8 SGR_{it} + \phi_i + \tau_t + \mu_{it} \quad (4.2)$$

To assess whether the effects of extraversion and overconfidence on the speed of capital structure adjustment are consistent, we first compute the coefficient $1 - \lambda$ and then apply the half-life formula to derive the implied adjustment speeds under each condition for comparison.

4 Empirical Results

This study adopts information sources from the Taiwan Economic Journal (TEJ) and the Market Observation Post System (MOPS) to assemble data on Taiwanese listed firms from 2004 to 2023. We exclude firms in the financial and insurance industries and those with primary listings overseas. We remove firms with fewer than three fiscal-year observations and drop observations with missing values. All variables are winsorized at the 0.5% level in each tail, and the final sample comprises 631 firms and 9,480 firm-year observations. Descriptive statistics of all variables are shown in Table 3.

4.1 Effects of Extraversion and Overconfidence on Leverage

The empirical results in Table 4 indicate that chairperson extraversion ($ExtraVersion$) and overconfidence ($OverConfidence$) are both significantly negatively associated with the market value leverage ratio (MDR). The empirical findings align with prior research [22], suggesting that firms led by extraverted or overconfident chairpersons exhibit lower leverage ratios. A potential mechanism is that rational managers use higher leverage as a commitment device to avoid value-decreasing investments, whereas overconfident managers perceive new projects as value-enhancing and therefore reduce debt to fund them [28]. Moreover, in firms with dispersed ownership structures, extraverted executives may adopt high-risk-high-return investment approaches to appeal to shareholders, which in turn diminishes the firm's dependence on constrained debt financing channels [29].

Table 3. Descriptive statistics

Variables	Mean	Median	Max	Min	S.D.
<i>MDR</i>	0.2541	0.2170	0.9651	0.0000	0.1917
<i>ExtraVersion</i>	0.3935	0.0000	1.0000	0.0000	0.4885
<i>OverConfidence</i>	1.1324	1.0000	3.0000	0.0000	0.7752
<i>TA</i>	38,719	9,169	683,000	653	97,736
<i>SIZE</i>	16.2326	16.0314	20.3418	13.3896	1.3927
<i>TANG</i>	0.4193	0.4118	0.8752	0.0129	0.1981
<i>NDTS</i>	0.0509	0.0335	0.3792	0.0004	0.0575
<i>ROA</i>	0.0503	0.0501	0.2758	-0.2413	0.0707
<i>MB</i>	1.2652	1.0861	5.1707	0.5820	0.6324
<i>SGR</i>	0.0796	0.0286	3.9035	-0.7590	0.4287

Note: *MDR* is market value based leverage ratio; *ExtraVersion* is a dummy for chairperson extraversion; *OverConfidence* is a dummy for chairperson overconfidence; *TA* denotes total assets (in million NT\$); *SIZE* is the natural logarithm of total assets; *TANG* is tangible asset ratio; *NDTS* is non-debt tax shield; *ROA* is firm's profitability; *MB* is firm's future growth ability; *SGR* is the sales growth rate.

Table 4. Regression estimates of the effects of extraversion and overconfidence on leverage

	Model (I)	Model (II)
<i>ExtraVersion</i>	-0.0055** (0.0023)	
<i>OverConfidence</i>		-0.0095*** (0.0012)
<i>SIZE</i>	0.0523*** (0.0041)	0.0560*** (0.0041)
<i>TANG</i>	0.1169*** (0.0188)	0.1216*** (0.0194)
<i>NDTS</i>	0.0275 (0.0577)	0.0261 (0.0549)
<i>ROA</i>	-0.376*** (0.0321)	-0.3775*** (0.0325)
<i>MB</i>	-0.0844*** (0.0039)	-0.0844*** (0.0039)
<i>SGR</i>	0.0025 (0.0032)	-0.0038** (0.0015)
Constant	-0.5175*** (0.0671)	-0.5701*** (0.0676)
Fixed Effect	Yes	Yes
Observations	9,480	9,480
Within Pseudo R ²	0.8539	0.8746
Overall Pseudo R ²	0.7240	0.7263

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Standard errors are reported in parentheses.

The evidence indicates that both the identification of extraversion from “Letter to Shareholders” narratives and the inference of overconfidence from traditional financial indicators are associated with lower corporate leverage. These findings align with explanations rooted in managerial optimism bias and the pecking order theory, as previously mentioned [22–23]. Notably, the statistical significance and coefficient magnitude for extraversion are smaller than those for overconfidence, and the Pseudo R² is also lower. This pattern may indicate that the AI measure of chairperson extraversion does not fully capture its influence on debt policy. Moreover, while financial indicators are typically audited and therefore more reliable,

the AI classification relies solely on narrative disclosures in “Letter to Shareholders”; limitations in the volume or richness of training text may attenuate the estimated effect of extraversion on *MDR*.

4.2 Effects of Extraversion and Overconfidence on the Speed of Adjustments of Capital Structure

We augment the specification with interaction terms between extraversion, overconfidence, and lagged leverage to examine whether chairperson traits affect the adjustment speed. The empirical results in Table 5, Panel A, show that both interactions (*ExtraVersion* × *MDR*_{*t*-1} and *OverConfidence* × *MDR*_{*t*-1}) are significantly negative. After substituting the estimated coefficients into the half-life formula, Panel B indicates that firms led by extraverted or overconfident chairpersons exhibit faster adjustment. This pattern suggests that chairpersons employ more proactive strategies to close the gap between actual and target leverage when pursuing an optimal capital structure under the tradeoff view. Across all specifications, firms exhibit a stable and relatively fast convergence toward their target leverage within one year. This finding is partially aligned with earlier research indicating that firms under the leadership of extraverted CEOs tend to adjust toward their target leverage at a faster pace, typically within a one-year horizon [27]. Notably, the magnitude and significance of extraversion remain lower than overconfidence, implying that the AI-driven extraversion measure is informative but has more limited explanatory power.

Incidentally, the Pseudo R² values presented in the tables are higher than those typically found in traditional regression analyses. This increase is attributed to the inclusion of firm fixed effects, which capture a significant amount of cross-firm variation, as well as the application of GLS cross-sectional weighting and the use of lagged variables, both of which enhance the model's fit. Nonetheless, we believe that financing policies inherently demonstrate considerable cross-firm heterogeneity and persistence, making it unlikely that the results suffer from overfitting.

Table 5. Interactive effects of extraversion and overconfidence for the speed of adjustments

Panel A: Estimations for Regression Models		
	Model (III)	Model (IV)
MDR_{t-1}	0.4266*** (0.0116)	0.4322*** (0.013)
<i>ExtraVersion</i>	0.0008 (0.0022)	
<i>ExtraVersion</i> * MDR_{t-1}	-0.0203* (0.0116)	
<i>OverConfidence</i>		-0.0026** (0.0012)
<i>OverConfidence</i> * MDR_{t-1}		-0.0191*** (0.0056)
<i>SIZE</i>	0.0308*** (0.0037)	0.0324*** (0.0031)
<i>TANG</i>	0.0657*** (0.0146)	0.0623*** (0.0144)
<i>NDTS</i>	-0.1219*** (0.0434)	-0.1171*** (0.0439)
<i>ROA</i>	-0.2692*** (0.0256)	-0.2659*** (0.0226)
<i>MB</i>	-0.0809*** (0.0037)	-0.0809*** (0.0027)
<i>SGR</i>	-0.007** (0.0028)	-0.0161*** (0.0017)
Constant	-0.2591*** (0.0602)	-0.2781*** (0.0497)
Fixed Effects	Yes	Yes
Observations	8,849	8,849
Within Pseudo R ²	0.9124	0.9382
Overall Pseudo R ²	0.8016	0.8022
Panel B: Half-life year for Capital Structure Speed of Adjustments		
SoA Half-Life without EV	0.81	
SoA Half-Life with EV	0.77	
SoA Half-Life without OC		0.83
SoA Half-Life with OC		0.78

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Standard errors are reported in parentheses. EV denotes *ExtraVersion*; OC denotes *OverConfidence*.

5 Conclusions

This study centers on the personality traits of chairpersons at Taiwanese listed firms and examines how extraversion and overconfidence affect capital structure and adjustment behavior. The results show that chairpersons with higher extraversion or overconfidence tend to be associated with lower leverage, indicating that optimistic or overconfident managers influence the direction of financial policy. The fact that both traits are generally linked to lower leverage suggests a managerial preference for internal financing, consistent with the pecking

order theory. These findings also imply that personality classifications generated through AI possess nontrivial discriminative validity and broadly align with inferences based on traditional financial indicators.

Concerning adjustment speed and magnitude, both extraversion and overconfidence significantly affect adjustment behavior, accelerating or amplifying the pace at which firms move toward their target capital structures. In practice, firms led by optimistic or overconfident managers appear more inclined to reach targets earlier to meet market expectations or mitigate the constraints imposed by transaction costs.

We transform our approach from a static academic study into a living monitoring tool in practice by utilizing and embedding internet technologies. Boards, creditors, and regulators can subscribe to API endpoints that flag trait-consistent shifts in debt preferences as new online disclosures arrive, enabling earlier covenant calibration and risk communication. This internet-native layer enables low-latency updates to chairperson-trait measures derived from Letters to Shareholders. It facilitates out-of-sample testing of whether web-scale narratives improve the prediction of leverage adjustments beyond traditional ratios.

From a practical standpoint, LLM-based identification of managerial traits offers several advantages. Investors can leverage these assessments to anticipate financing decisions and evaluate credit risk in real time. Financial institutions may also utilize AI-driven analysis of textual disclosures to incorporate leadership personality characteristics into early-stage lending risk evaluations. Moreover, for shareholders and boards of directors, insights into executive personality traits can inform appointment decisions and enhance the design of governance and risk-management mechanisms. By operationalizing our approach as an online service and dashboard, we translate behavioral measurement into actionable monitoring for boards and creditors, while preserving auditability through versioned models and logged requests.

While using AI to analyze the narratives in the “Letter to Shareholders” of annual reports to assess the personality of chairpersons is an innovative approach, it may be limited by the nature of the algorithms used. Additionally, since annual reports are edited documents, this could affect the accuracy of personality assessments. The sample is restricted to Taiwanese listed firms, which limits external validity; extending the analysis to other countries would strengthen generalizability.

Finally, while this study focuses on extraversion and overconfidence, corporate decisions are shaped by multiple forces, including internal resource constraints, external financing conditions, and other managerial traits such as conscientiousness and openness. Future research that employs a broader set of techniques and research designs, incorporates additional personality dimensions, and models more complex interaction mechanisms would help develop a more comprehensive theoretical framework and yield more actionable implications for practice.

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