



International Journal of
Business and Economic Sciences
Applied Research

Volume 16, Issue 1

International Journal of Business and Economic Sciences Applied Research

IJ BESAR

The logo features the text 'IJ BESAR' in a gold, serif font. The 'IJ' is written in a large, cursive script, while 'BESAR' is in a smaller, all-caps serif font. A decorative, flowing flourish in a matching gold color extends from the bottom right of the text.

A: Agios Loukas, P.C. 65404, Kavala, Greece
E: <https://ijbesar.ihu.gr>

Contents

Credit Rating and Board Evaluation of Family Firms 7 – 18

Ya-Fang Wang, Yu-Chu Hsieh

Maritime Transportation Accidents: A Bibliometric Analysis 19 – 26

Vicky Zampeta, Gregory Chondrokoukis

Parental Financial Socialisation and Financial Knowledge: A Structural Equation Modelling Analysis 27 – 39

Adam Ndou

Exploring the Impact of Financial and non-Financial Motives on Employee Performance. A Survey of Indonesian Employees. 40 – 53

Maria Argyropoulou, Wynne Aprilia, Rachel Argyropoulou, Dionisia Tzavara

Exploring the Intrinsic Factors Influencing Return on Assets: A Case Study of the Hotel Industry in Selected EU Countries 54 – 61

Goran Karanovic

Earnings Management Ethicality and Application in the Kenyan Public Sector: A Critical Review 62 – 70

Robert Odek, Kalundu Kimanzi

The Effect of the Movement in 52-Week High on Momentum Profit: The Evidence from Taiwan 71 – 86

Li-Chuan Liao, Tzu-Pu Chang, Ping-Huang Wang

Editors in **C**hief:

Assis. Prof. Christos Grose, International Hellenic University

Assoc. Prof. Persefoni Polychronidou, International Hellenic University

IG BESAR



Editorial Board of IJBESAR

- Alexander Phyllis, Bournemouth University, Bournemouth, UK
- Apergis Nikolaos, University of Piraeus, Piraeus, Greece
- Archontakis Fragiskos, International Hellenic University, Greece
- Bartlett Will, London School of Economics and Political Science, London, UK
- Bartuševičienė Ilona, Mykolas Romeris University, Vilnius, Lithuania
- Bašan Lorena, University of Rijeka, Rijeka, Croatia
- Belascu Lucian, Lucian Blaga University of Sibiu, Sibiu, Romania
- Bourlakis Michael, Cranfield School of Management, Bedfordshire, UK
- Butkus Mindaugas, Mykolas Romeris University, Vilnius, Lithuania
- Chytis Evangelos, University of Ioannina, Ioannina, Greece
- Darskuvienė Valdonė, ISM University of Management and Economics, Vilnius, Lithuania
- Fassas Athanasios, University of Thessaly, Volos, Greece
- Gkliatis Ioannis, University of Hertfordshire, Hellenic Observatory of Corporate Governance, Hertfordshire, UK
- Goić Srećko, University of Split, Split, Croatia
- Grima Simon, University of Malta, Msida, Malta
- Hajidimitriou Yiannis, University of Macedonia, Thessaloniki, Greece
- Horobet Alexandra, Bucharest University of Economic Studies, Bucharest, Romania
- Karanović Goran, University of Rijeka, Rijeka, Croatia
- Karasavoglou Anastasios, International Hellenic University, Kavala, Greece
- Koufopoulos Dimitrios N., University of London Worldwide, Hellenic Observatory of Corporate Governance, London, UK
- Kourtidis Dimitrios, International Hellenic University, Kavala, Greece
- Lopez-Rodriguez José, The University of La Coruña, La Coruña, Spain
- Malliaris Anastasios, Loyola University of Chicago, Chicago, USA
- Marinkovic Srdjan, University of Nis, Nis, Serbia
- Marinov Georgi, Varna University of Economics, Varna, Bulgaria
- Maris George, University of the Aegean, Rhodes, Greece
- Mavlutova Inese, Banku Augstskola School of Business and Finance, Riga, Latvia
- Mocanu Mihaela Romania, Bucharest University of Economic Studies, Bucharest, Romania
- Sliwinski Adam, Warsaw School of Economics, Warsaw, Poland
- Stankevičienė Jelena, Vilnius Gediminas Technical University, Vilnius, Lithuania
- Thalassinos Eleftherios, University of Piraeus, Piraeus, Greece
- Utkulu Utku, Dokuz Eylül University, Izmir, Turkey
- Zoumboulakis Michael, University of Thessaly, Volos, Greece

AIM AND SCOPE

The **International Journal of Business and Economic Sciences Applied Research** (IJBESAR) is a blind peer-reviewed, scholarly journal devoted to publishing high-quality papers and sharing original business and economics research worldwide. The Journal considers only manuscripts that have not been published (or submitted simultaneously), at any language, elsewhere. Contributions are in English. The authors retain the copyright of their work without restrictions. The Journal is issued both in electronic form (for free) and in printed form as annual volume (free for the authors). The Journal accepts 9 types of articles defined as follows:

1. **Research Articles:** A research article is a regular article which aims to present new findings.
2. **Letters to the Editor:** A letter to the editor is a short article which aims to present new findings that require fast publication procedures.
3. **Notes:** A note is an article (regular or short) which aims to present rather new findings.
4. **Comments:** A comment is a short article that makes comments on another article already published by this journal or replies to a comment;
5. **Review Articles:** A review article is an article which aims to present comprehensively already existing findings.
6. **Lecture Notes:** A lecture note is a short review article.
7. **Monographs:** A monograph is a thesis of one or more authors on a unique subject; apart from the standard reviewing procedures, a monograph must also be accepted from a committee of specialists appointed by the Editor.
8. **Innovations:** An innovation is an article which aims to present new procedures or devices.
9. **Selected conference articles:** Upon an agreement with a conference committee, selected papers may be published by the Journal in a special section. In this case the editor will appoint in collaboration with the conference committee guest editors.

ETHICAL NOTES

An author is a person who has a substantial contribution to the article; all other contributions should be mentioned as acknowledgements. Authors should cite only the articles which have contributed to their work; unnecessary citations should not be listed. Authors should present their work as objectively as possible. Arguments that discriminate people by race, sex, origin, religion, etc. are not accepted. Bogus results must not be given. Reviewers should not take advantages from the manuscript; instead, they should help the authors to improve their work. Reviewers should not criticize in public the manuscripts. The Editor guarantees the anonymity of the reviewers.

Credit Rating and Board Evaluation of Family Firms

Ya-Fang Wang ^{†1}, Yu-Chu Hsieh ²

¹ Providence University, 200, Sec. 7, Taiwan Boulevard, Shalu Dist., Taichung City 43301, Taiwan <https://orcid.org/0000-0002-8073-1502>

² Providence University, 200, Sec. 7, Taiwan Boulevard, Shalu Dist., Taichung City 43301, Taiwan <https://orcid.org/0009-0001-8068-1445>

ARTICLE INFO	ABSTRACT
Article History	Purpose: The purpose of this paper is to shed the light on board evaluation for following analyses that will explore whether and how does credit rating agencies react to board performance evaluation.
Received 15 April 2023 Accepted 03 July 2023	Design/methodology/approach: To test our research questions, we hand-collect board evaluation information for Taiwan publicly firms from annual reports and firm websites for the years 2019 to 2021. Then, we use the ordered probit model to examine our research questions.
<i>JEL Classifications</i> G18, M41, M48	Finding: First, our results show that there is a relationship between family firms and unfavorable ratings. However, effective board evaluation was shown to strengthen transparency and accountability in internal governance environment, thereby moderating such negative relationships. Second, when family firms are mandated to establish audit committees or change auditors, they are more likely to receive unfavorable ratings. Specifically, effective board evaluation moderates' negative effects on ratings and positively impacts rater perceptions. Third, rating agencies assign a more unfavorable rating to family firms that ignore gender diversity on audit committees, however, effective audit committee's evaluation could moderate the concern whether gender diversity on audit committees affect the effectiveness of corporate governance.
	Research limitations/implications: First, we focus on the context of family governance to examine the effect of board evaluation on credit ratings. Therefore, our findings may not be applicable to non-family firms. Second, we are not able to directly observe the mechanism of board evaluation because our study uses hand-collected data of board evaluation obtained from publicly available MOPS reports and website news. In addition, our sample period is limited from 2019 until 2022 due to the significantly higher hand-collecting cost of using board evaluation data. Third, with respect to our extended analyses on audit changes, we didn't consider the types of auditor changes because it is difficult to distinguish between auditor resignations and dismissals. Finally, although we include control variables consistent with prior studies, our research models may have not fully captured variables associated with credit ratings.
	Originality/value: First, our results contribute to the family firm literature on the relationship between corporate governance and economic consequence by focusing on the importance of board evaluation. Second, our findings can be useful to regulators and policy-makers in making governance policies aiming to mandate the establishment of audit committees' complementary rules by encouraging family firms to fulfill the board evaluation for improving the quality of governance environment. Third, our findings not only contribute to the auditing literature but also imply that the board's performance evaluation plays a positive factor in credit raters' considerations. Fourth, our findings contribute to the audit committee literature examining the effects of gender diversity and performance evaluation.
Keywords: board evaluation, credit rating, family firm	

[†]Corresponding Author: Ya-Fang Wang
Email: yfwang2@pu.edu.tw

1. Introduction

Family firms have a specific ownership structure, and their ownership structure is unique and heterogeneity in the capital market (Galavotti & D'Este, 2022; Daspit et al., 2021; Min, 2021). In Taiwan, family firms are a common organizational form in the capital market, more than 70% of listed companies are family firms (Chen et al., 2022). Compared with non-family firms, family firms are more likely to experience more conflict of interest between family controlling shareholders and minority shareholders (Chen et al., 2020). This highlights the importance of board effectiveness in the family ownership structure because the board is the core of the corporate governance system that directly formulates and supervises internal governance environment and decision-making structure (Lel & Miller, 2019; Balsam et al., 2018; Souther, 2018). Additionally, board effectiveness is particularly relevant to fund-raising activities and future development plans, because market participants view the board performance and governance as a key determinant of firm risk and growth. Board evaluation has an important role in corporate governance, it is the first defense of board effectiveness in improving and maintaining the board performance and governance. In 2020, Taiwan's regulator also amended rules relating to board effectiveness to heighten the importance of board evaluation. Furthermore, the relationship between board effectiveness and credit ratings is particularly relevant because maintaining or obtaining the major capital source is one of board's central tasks and debt financing is a major capital source for publicly firms, and debt financing is dominated by credit ratings (Driss et al., 2021; Badoer et al., 2019; Chava et al., 2019). With the growing importance of board evaluation, investigating the effect of board evaluation in family firms is thus critical to better understand the risk perception of credit raters in making rating decisions.

The purpose of this study is thus to investigate whether and how does credit rating agencies react to board evaluation of family firms? To test our research questions, we hand-collect board evaluation information for Taiwan publicly firms from annual reports and firm websites for the years 2019 to 2021. Empirical results from our study suggest four major findings and contributes. First, our study provides more significant evidence that board evaluation enhances a family firm's board effectiveness, as reflected by the risk perception of credit raters in making rating decisions. Our results imply that credit raters can understand firms' governance strategies and react accordingly. These results contribute to the family firm literature on the relationship between corporate governance and economic consequence by focusing on the importance of board evaluation. Second, we find that credit raters do perceive family firms being mandatorily required to establish their audit committees to be associated with higher risk and react unfavorably to them. However, credit raters view board evaluation that improves governance effectiveness and thereby react positively to them. Our results imply that credit raters view board evaluation as a governance strategy that improves governance effectiveness and thereby react positively to them. Our findings can be useful to regulators and policymakers in making governance policies aiming to mandate the establishment of audit committees' complementary rules by encouraging family firms to fulfil the board evaluation for improving the quality of governance environment.

Third, our results show that family firms with auditor changes are viewed as a potential red flag of corporate governance particularly when their audit committee members experience turnover. Specifically, our empirical findings highlight the importance of board evaluation in moderating the negative effect of auditor changes on governance performance. These findings not only contribute to the auditing literature but also imply that the board's performance evaluation plays a positive factor in credit raters' considerations. Fourth, we find that credit raters positively react to audit committees' evaluation because they perceive that audit committees' evaluation plays a governance role in audit committees' performance and, therefore, are more likely to moderate the effect of gender inequality of audit committees, leading to a moderate effect on a firm's governance function. Our findings contribute to the audit committee literature by examining the effects of gender diversity and performance evaluation. Overall, our empirical results suggest a positive effect of board evaluation on credit ratings.

This paper proceeds as follows. Section 2 provides related literature review. We describe our sample selection and research design in Section 3. In Section 4, we present the empirical results. In Section 5, we list our conclusions and limitations.

2. Related Literature

2.1 The importance of board evaluation

Corporate governance mechanism plays a crucial role in improving and maintaining the quality of governance environments. The structure of corporate governance mechanism¹ mainly includes (1) board of directors that their duties related to financial reporting, strategy evaluation and corporate governance, (2) audit committees that their duties related to internal control and financial accountability, and (3) auditors that their duties related to reasonable assurance of the financial statements. These three central elements contribute to ensure efficient corporate governance and quality financial reporting as they can efficiently perform and promote the governance function (Cimini et al., 2022; Haman et al., 2020). Specifically, the board of directors plays a bidirectional role in the structure of corporate governance mechanism, it is also responsible for protecting shareholders' interests and moderating agency problems between managers and shareholders (Hettler et al., 2021; Hope et al., 2019). In an internal mechanism of corporate governance, the board of directors plays a pivotal role in communicating governance issues to audit committees and auditors, and its' main responsibility is focused on identifying strategy effectiveness in decision-making and monitoring governance quality in performance management (Lel & Miller, 2019; Balsam et al., 2018; Souther, 2018). In general, the board of directors not only plays a monitoring role in the governance field, but also

¹ See Cohen et al. (2004) for related literature reviews and discussions.

plays an advisory role in providing valuable advice to improve governance environment (Baldeuius et al., 2021; Chen et al., 2020; Golden & Kohlbeck, 2019). Thus, there is no doubt that the board of directors is one of the most important factors affecting governance environment through connecting various governance roles.

The board of directors plays a pivotal role as a governance intermediary in a communicating network of corporate governance, and it is obviously a core role of corporate governance in improving transparency and accountability of governance performance. Thus, board evaluation is particularly important in the board's operation because questionable board performance had adversely affected board's effectiveness and firm's risk management. In 2020, the issue of board evaluation has received much public attention, and Taiwan's regulator has amended the Sample Template of "Rules for Performance Evaluation of Board of Directors"² for evaluating the board performance and improving the board effectiveness. Despite board evaluation having practical importance, the board effectiveness literature provides little insight into the board evaluation and its effects. Instead, much of the board literature (Al-Hadi et al., 2022; García Lara et al., 2022; Hoitash and Mkrtchyan, 2022; Adams & Jiang, 2020; Chen et al., 2020; Peteghem et al., 2018) focuses on the board structure (e.g., independence, diversity, expertise, etc.), and emphasizes the importance of the composition effect of boards in a governance system. In contrast, this study focuses not only on the board structure but also on the board effectiveness by examining the importance of board evaluation and its effects on the economic consequences.

2.2 Economic consequence analysis

Prior studies in corporate governance research focus primarily on the economic consequences of corporate governance.³ For example, there is a large empirical literature documenting corporate governance and its impacts on financial reporting quality (Fuller et al., 2021; Ge et al., 2021; Maroun, 2019; Ng et al., 2019; Cheng et al., 2018; Rinaldi et al., 2018). Some studies further find that quality corporate governance contributes to the efficiency of debt contracts (Gallimberti, 2021; Christensen et al., 2019; Balsam et al., 2018; Guttman & Marinovic, 2018), moderates the effect of analyst coverage and related party transaction (Christensen et al., 2021; Hope et al., 2019; Lehmann, 2019), affects the determinants of audit pricing and cybersecurity audits (Hansen et al., 2021; Abernathy et al., 2019; Islam et al., 2018; Steinbart et al., 2018), increases the usefulness of accounting information (Cascino et al., 2021), has a low risk of litigation (Al-Hadi et al., 2022). Furthermore, several studies extend the corporate governance research by focusing on the topics of CSR/ESG as alternative economic activities to examine the association between corporate governance and CSR/ESG performance (Bartov et al., 2021; Christensen et al., 2021; Brooks & Oikonomou, 2018).

Different from prior studies which discussed the relationship between corporate governance and its impacts from the economic consequence perspective, this study extends and complements the existing literature by investigating the importance of board evaluation and its effects from the effectiveness perspective. We highlighted that board evaluation plays a vital role as one of the governance performance mechanisms in improving board governance and increasing board effectiveness. Strong board governance represents an essential element for fulfilling directors' responsibilities and thereby enhancing board efficacy. Furthermore, board governance is closely associated with credit ratings because maintaining or obtaining the major capital source is one of board's central tasks and debt financing is a major capital source for publicly firms, and debt financing is dominated by credit ratings (Driss et al., 2021; Badoer et al., 2019; Chava et al., 2019). Credit ratings represent the prudent economic response that not only presents the quality of board governance but even generates substantial economic consequences in terms of affected the costs of debt and capital source (Driss et al., 2020; Badoer et al., 2019; Chava et al., 2019).⁴ Therefore, this paper sheds the lights on board evaluation for following analyses that will explore whether and how does credit rating agencies react to board performance evaluation.

3. Sample distribution and research design

3.1 Sample and data

Our initial sample consists of all firms listed on the Taiwan Stock Exchange (TWSE). The credit rating data, company-level financial data, and corporate governance information were obtained from the Taiwan Economic Journal (TEJ) annual file. Board evaluation information was hand-collected from annual reports of the Market Observation Post System (MOPS) and information disclosure of firm websites. After merging these data sources, we exclude the financial services industry (banking, securities, insurance, etc.) and observations with insufficient data required for regression analysis. The sample period is from 2019 to 2021, and our final sample consists of 3,825 firm-year observations.⁵

Panel A of Table 1 illustrates the distribution of ownership structure and board evaluation among firm-year observations, showing that approximately 61.33% of the final sample (in which approximately 83.16% of family firms

² According to the Sample Template of "Rules for Performance Evaluation of Board of Directors", evaluating methods of board performance include the internal board evaluation, self-evaluation by individual board members, peer evaluation, and evaluation by appointed external professional institutions, experts, or other appropriate methods.

³ See Cohen et al. (2002, 2004) for related literature that reviews research on corporate governance and its impacts on financial reporting quality.

⁴ See Balsam et al. (2018) and Ashbaugh-Skaife et al. (2006) for related literature that reviews research on governance features and rating methodologies.

⁵ To implement corporate governance and enhance the company's board functions, the Government of Taiwan has amended the Sample Template of "Rules for Performance Evaluation of Board of Directors" in 2020; moreover, TWSE listed companies shall comply with this law to improve the operation efficiency of the board of directors. Our sample period employed in this study is from 2019 to 2021 to cover one year before and after the Amendment of the Sample Template of "Rules for Performance Evaluation of Board of Directors". Accordingly, our sample period starts from 2019 and ends in 2021.

performed evaluations of board performance) were family firms. Notably, the numbers of performing board evaluations increase monotonically from 2019 to 2021. This indicates that firms are willing to comply with regulatory requirements in promoting evaluations of board performance. As shown in Panel B, approximately 19.27% of the final sample (in which approximately 53.32% of family firms were low risk ratings) were low risk firms. Most notably, approximately 53.32% of family firms (in which approximately 85.75% of family firms with low-risk ratings performed evaluations of board performance) were low risk ratings. This result implies when family firms perform evaluations of board performance to enhance the board functions, they are more likely to receive favorable ratings.

Table 1 Sample distribution

Panel A: Distribution of ownership structure and board evaluation by YEAR							
YEAR	Ownership ^a BE ^b		Family obs. (n = 2,346)		Non-family obs. (n = 1,479)		Total
			BE	Non-BE	BE	Non-BE	
2019			378	371	258	218	1,225(32.03%)
2020			773	19	487	12	1,291(33.75%)
2021			800	5	501	3	1,309(34.22%)
Total			1,951(51.00%)	395(10.33%)	1,246(32.58%)	233(6.09%)	3,825(100%)

Panel B: Distribution of ownership structure and board evaluation by TCRI							
TCRI ^c	Ownership ^a BE ^b		Family obs. (n = 2,346)		Non-family obs. (n = 1,479)		Total
			BE	Non-BE	BE	Non-BE	
low	1		3	0	7	2	12(0.31%)
	2		17	4	14	0	35(0.92%)
	3		73	16	74	12	175(4.58%)
	4		244	36	204	31	515(13.46%)
moderate	5		406	85	226	35	752(19.66%)
	6		531	98	365	74	1,068(27.92%)
high	7		369	79	195	37	680(17.78%)
	8		182	51	106	29	368(9.62%)
	9		112	21	53	11	197(5.15%)
	10		14	5	2	2	23(0.60%)
Total			1,951(51.00%)	395(10.33%)	1,246(32.58%)	233(6.09%)	3,825

^a Family denotes the firm belongs to family firm, but not versa. The information of family firm is as defined in TEJ.

^b BE denotes the firm performs evaluations of board performance, but not versa.

^c TCRI denotes the credit rating is divided into ten degrees, with the highest degree representing the highest credit risk.

3.2 Research design

We examine our research questions by investigating whether and how does credit rating agencies react to board evaluation of family firms? We specify the following ordered probit model:

$$TCRI_{it} = \beta_1 FAMIL Y_{it} + \beta_2 BE_{it} + \beta_3 FAMIL Y \times BE_{it} + \sum Control Variables_{it} + \varepsilon_{it} \quad (1)$$

where, for firm i and year t :

- $TCRI$ = Taiwan Corporate Credit Rating Index, where the credit rating is divided into ten degrees, with the highest degree representing the highest credit risk;
- $FAMILY$ = 1 if the firm belongs to family firms, else 0;⁶
- BE = 1 if the firm performs evaluations of board performance, else 0;
- $FAMILY \times BE$ = the interaction is the $FAMILY$ and BE ;
- ROA = net income divided by total assets;
- OCF = cash flow from operations divided by total assets;
- DE = total debt divided by total assets;
- $ZSCORE$ = bankruptcy risk from Altman's (1968) Z-Score model;⁷
- $INDBOD$ = number of independent directors divided by total board size;
- $SIZE$ = dummy variables controlling for size based on total assets;
- $YEAR$ = dummy variables controlling for years;
- IND = dummy variables controlling for industries;
- ε = error term.

⁶ $FAMILY$ follows the definition of the TEJ database: (1) both the board chair and the CEO are members of same family group; or (2) family members occupy over 50% of the board seats while affiliated firms and outside directors occupy less than 33% of the board seats; or (3) family members occupy over 33% of the board seats and at least three family members are board directors, supervisors, and managers; or (4) the family holds control rights exceeding critical control rights.

⁷ Altman's Z-score is equal to $1.2 \times (\text{net working capital} / \text{total assets}) + 1.4 \times (\text{retained earnings} / \text{total assets}) + 3.3 \times (\text{earnings before interest and taxes} / \text{total assets}) + 0.6 \times (\text{market value of equity} / \text{book value of liabilities}) + 0.99 \times (\text{sales} / \text{total assets})$. A lower Z-score represents greater risk of bankruptcy.

Our dependent variable, *TCRI*, represents the corporate credit risk as determined by the Taiwan Corporate Credit Rating Index (TCRI ratings). As defined by TCRI, TEJ indicates that TCRI employs semi-expert procedure, a quantitative model, and manual determination to assess the corporate credit risk based on the theory of financial analysis, domestic situation, and public information. The methodology is public, transparent, and with discriminatory power, which provides reference for financial institutions in investment and lending. TCRI ratings range from 1 (highest rating) to 10 (lowest rating-debt in payment default).

Our main test variables, *FAMILY*, is a dummy variable that takes the value of 1 if the firm belongs to family firms and zero otherwise. Its coefficient, β_1 , captures the difference in TCRI ratings between the family and non-family samples after controlling for all other variables that may affect credit risks included in Equation (1). *BE*, is a dummy variable that takes the value of 1 if the firm performs evaluations of board performance and zero otherwise. If board evaluations contribute to moderate the credit risks, then β_2 should be negative, but not vice-verse. In addition, we further include *BE* and its interaction with *FAMILY* into Equation (1). By examining the significance of the coefficient of *FAMILY*×*BE*, we can shed light on the association between board evaluations of family firm and evaluations of credit risk.

Our control variables include factors considered major determinants affecting firms' credit risks. Previous research (Hung et al., 2022; Yue et al., 2022; Bao and Tanyi, 2020; Hepfer et al., 2020; Hinkel et al., 2020; Hong et al., 2019; Ames et al., 2018; Akins, 2018; Bonsall IV et al., 2018) provides evidence indicating that a firm's financial conditions can potentially explain significant variation in credit risks. Firms with poor financial performance might face greater credit risks and thereby receive unfavorable ratings. We thus include proxies for the firm's financial conditions (*ROA*, *OCF*, *DE*, and *ZSCORE*) to control the effect of firm performance on TCRI ratings. We include *INDBOD* to control the effect of corporate governance differentiation and expect that a more effective governance environment is more likely to manage credit risks and hence receive a favorable rating. Finally, we also controlled size (*SIZE*), year (*YEAR*), and industry (*IND*) effects (Reynolds & Francis, 2000).

4. Descriptive statistics and empirical results

4.1 Descriptive statistics

Table 2 presents descriptive statistics for variables in our research models partitioned based on whether the firm performs evaluations of board performance. As shown in Table 2, the 3,197 observations (approximately 83.58 percent of the sample) that do perform evaluations of board performance have an average *TCRI* of 5.8611 with a median of 6, while the 628 observations that do not perform evaluations of board performance (approximately 16.42 percent of the sample) have an average *TCRI* of 6.0573 with a median of 6. The mean and median differences are statistically significant at the 1 percent level. These descriptive statistics suggest that firms that evaluate their directors exhibit lower credit risks and more favorable TCRI ratings, suggesting that board evaluation plays a complementary role in corporate governance. In addition, firms that do perform evaluations of board performance perform better (*ROA*), have more payable (*DE*), and have stronger corporate governance (*INDBOD*) compared to firms that do not perform evaluations of board performance.

Table 2 Descriptive statistics

Variable ^b	BE obs. ^a (n = 3,197)			Non-BE obs. (n = 628)			Test of Differences ^c	
	Mean	Med.	S.D.	Mean	Med.	S.D.	t-test	Wilcoxon
<i>TCRI</i>	5.8611	6.0000	1.5710	6.0573	6.0000	1.5914	2.86***	2.88***
<i>ROA</i>	0.0565	0.0554	0.1019	0.0444	0.0444	0.0953	-2.74***	-3.57***
<i>OCF</i>	0.0613	0.0604	0.1456	0.0675	0.0649	0.1341	0.98	1.68*
<i>DE</i>	0.4327	0.4340	0.1867	0.4090	0.4196	0.1869	-2.90***	-2.75***
<i>ZSCORE</i>	2.7332	2.4391	1.7913	2.8389	2.4396	1.9058	1.34	0.83
<i>INDBOD</i>	0.3709	0.3750	0.0829	0.3510	0.3333	0.0858	-5.46***	-6.31***

^a BE denotes the firm performs evaluations of board performance, but not versa.

^b The definition of the variables reported in this table are: *TCRI* = Taiwan Corporate Credit Rating Index, where the credit rating is divided into ten degrees, with the highest degree representing the highest credit risk; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size.

^c Asterisks *, **, *** indicate significance at the 0.10, 0.05, 0.01 levels, respectively.

Table 3 presents Pearson correlation coefficients for all variables considered. The correlation shows that *TCRI* is significantly and positively associated with *FAMILY* ($p < 0.01$), showing that family firms are more likely to receive unfavorable ratings compared to non-family firms. As well, *TCRI* is significantly and negatively associated with *BE* ($p < 0.01$), indicating that evaluations of board performance decrease raters' risk perception and then lead to receive favorable ratings. Although the correlations between several control variables are above 0.35, the highest variance inflation factor (VIF) observed is 2.78 for all models. Both are below the suggested multicollinearity problem threshold of 10 (Hair et al., 2006; Kennedy, 1998; Gujarati, 1995; Marquandt, 1980), suggesting that multicollinearity is not likely to be a problem in our study.

Table 3 Pearson correlation matrix

Variable ^a	<i>TCRI</i>	<i>FAMILY</i>	<i>BE</i>	<i>ROA</i>	<i>OCF</i>	<i>DE</i>	<i>ZSCORE</i>
<i>FAMILY</i>	0.0757						
<i>BE</i>	-0.0461	-0.0142					
<i>ROA</i>	-0.5027	-0.0364	0.0443				
<i>OCF</i>	-0.3839	-0.0754	-0.0159	0.5355			
<i>DE</i>	0.1528	0.0455	0.0469	-0.1625	-0.1358		
<i>ZSCORE</i>	-0.2805	-0.0985	-0.0216	0.3934	0.2156	-0.7455	
<i>INDBOD</i>	0.0831	-0.0337	0.0880	0.0104	-0.0177	-0.0449	0.0701

^a The definition of the variables reported in this table are: *FAMILY* = 1 if the firm belongs to family firms, else 0; *BE* = 1 if the firm performs evaluations of board performance, else 0; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size.

4.2 How credit ratings react to board evaluation of family firms

Board evaluation

Table 4 presents the results of the ordered probit regression model used to investigate whether and how credit ratings react to the family ownership structure with consideration of board performance. As shown in Column (1), the coefficient on *FAMILY* is positively significant ($p < 0.01$), indicating that family firms are more likely to receive unfavorable ratings. This result also implies that the family ownership structure seems more likely to increase credit raters' perceived risk of corporate governance and, therefore, are associated with more unfavorable ratings. Further, we examine whether there is a relationship between board evaluation and credit rating. In Column (2), the coefficient on *FAMILY* is still positively significant ($p < 0.01$). Notably, the estimated coefficient on *BE* is negative and significant ($p < 0.01$), indicating that firms that evaluate their board performance are more likely to receive more favorable TCRI ratings. This result also implies that credit raters view board performance evaluation as a corporate governance improving mechanism and, therefore, react favorably to firms that perform board evaluation. Next, our primary variables of interest in Column (3), *FAMILY* and *FAMILY*×*BE*, are insignificant positive that indicate that family firms are more likely to receive a positive rating reaction when they perform an evaluation of board performance. Given the above-mentioned findings, these results imply that board evaluation plays an important role in improving the board effectiveness of family ownership structure and positively influences the risk perception of credit raters in making rating decisions. With respect to the coefficients on control variables, most control variables, such as *ROA*, *OCF*, *DE*, and *ZSCORE*, are significantly associated with credit ratings in the expected directions and consistent with prior studies (e.g., Hung et al., 2022; Yue et al., 2022; Bao & Tanyi, 2020; Hepfer et al., 2020; Hinkel et al., 2020).

Table 4 Family firm, board evaluation and credit rating

Variable ^a	Pred. Sign	(1)		(2)		(3)	
		Coef.	z-value ^b	Coef.	z-value	Coef.	z-value
<i>FAMILY</i>	+/-	0.1135	3.10***	0.1121	3.06***	0.0390	0.45
<i>BE</i>	-			-0.1430	-2.56***	-0.1973	-2.36***
<i>FAMILY</i> × <i>BE</i>	+/-					0.0873	0.93
<i>ROA</i>	-	-4.2895	-11.20***	-4.2961	-11.22***	-4.2974	-11.22***
<i>OCF</i>	-	-1.2628	-5.33***	-1.2672	-5.34***	-1.2660	-5.33***
<i>DE</i>	+	1.6329	9.18***	1.6422	9.24***	1.6414	9.24***
<i>ZSCORE</i>	-	-0.0542	-2.65***	-0.0541	-2.65***	-0.0542	-2.65***
<i>INDBOD</i>	-	0.3391	1.52*	0.3580	1.61*	0.3569	1.60*
<i>SIZE</i>			Included		Included		Included
<i>YEAR</i>			Included		Included		Included
<i>IND</i>			Included		Included		Included
Pseudo R ²			22.32%		22.36%		22.37%
n			3,825		3,825		3,825

^a The definition of the variables reported in this table are: *FAMILY* = 1 if the firm belongs to family firms, else 0; *BE* = 1 if the firm performs evaluations of board performance, else 0; *FAMILY*×*BE* = the interaction between *FAMILY* and *BE*; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size; *SIZE* = dummy variables controlling for size based on total assets; *YEAR* = dummy variables controlling for years; *IND* = dummy variables controlling for industries.

^b Asterisks *, **, *** indicate significance at the 0.10, 0.05, 0.01 levels, respectively. One-tailed for directional expectations, and two-tailed for others.

Mandatory establishment of audit committee

Audit committees play an important and essential role in reinforcing corporate governance pillars and improving board effectiveness, and their importance has received particular attention from the public (García Lara et al., 2022; Das et al., 2022; Aobdia et al., 2021; Carr et al., 2021; Free et al., 2021; Fuller et al., 2021; Hansen et al., 2021; Park et al., 2021). The Financial Supervisory Commission (FSC) of Taiwan mandates all listed firms to establish an audit

committee composed of independent directors after 2021.⁸ This gives us a good opportunity to examine how board evaluation of family firms affects the relationship between mandatory establishment of audit committees and credit ratings by using the sample before the enforcement date of audit committee establishment. To investigate our research issues, we include an indicator variable *MANAC* and its interaction with board evaluation to capture the interactive effect of mandatory establishment and board evaluation on rating reactions. We specify the following ordered probit model:

$$TCRI_{it} = \beta_1 MANAC_{it} + \beta_2 BE_{it} + \beta_3 MANAC \times BE_{it} + \sum Control\ Variables_{it} + \varepsilon_{it} \quad (2)$$

Where *MANAC* equals one if the firm is mandatorily required to establish an audit committee, and zero otherwise. *MANAC*×*BE* equals the interaction between *MANAC* and *BE*. Control variables are the same as previously mentioned in Equation (1).

As shown in Column (1) of Table 5, the coefficient on *MANAC* is positively significant ($p < 0.01$), indicating that family firms are more likely to receive unfavorable ratings when they are mandatorily required to establish their audit committees. This result implies that it is viewed as a potential red flag of warned governance quality when family firms are mandatorily required to improve governance environment. In Column (2), the coefficient on *MANAC* is still positively significant ($p < 0.01$) whereas the coefficients on *MANAC* and *MANAC*×*BE* are insignificant positive in Column (3). These findings suggest that credit raters do perceive family firms being mandatorily required to establish their audit committees to be associated with higher risk and react unfavorably to them. However, credit raters view board evaluation that improves governance effectiveness and thereby react moderately to them.

Table 5 Mandatory establishment of audit committee, board evaluation and credit rating

Variable ^a	Pred. Sign	(1)		(2)		(3)	
		Coef.	z-value ^b	Coef.	z-value	Coef.	z-value
<i>MANAC</i>	+/-	0.1710	3.37***	0.1716	3.39***	0.1160	0.96
<i>BE</i>	-			-0.1245	-1.79**	-0.1446	-1.91**
<i>MANAC</i> × <i>BE</i>	+/-					0.0647	0.51
<i>ROA</i>	-	-4.2892	-9.10***	-4.2961	-9.13***	-4.2993	-9.14***
<i>OCF</i>	-	-1.1556	-3.86***	-1.1602	-3.87***	-1.1581	-3.87***
<i>DE</i>	+	1.7066	7.55***	1.7212	7.60***	1.7229	7.61***
<i>ZSCORE</i>	-	-0.0812	-3.09***	-0.0805	-3.07***	-0.0804	-3.07***
<i>INDBOD</i>	-	0.1467	0.48	0.1706	0.56	0.1688	0.55
<i>SIZE</i>		Included		Included		Included	
<i>YEAR</i>		Included		Included		Included	
<i>IND</i>		Included		Included		Included	
Pseudo R ²		22.62%		22.65%		22.65%	
n		2,346		2,346		2,346	

^a The definition of the variables reported in this table are: *MANAC* = 1 if the firm is mandatorily required to establish an audit committee, else 0; *BE* = 1 if the firm performs evaluations of board performance, else 0; *MANAC*×*BE* = the interaction between *MANAC* and *BE*; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size; *SIZE* = dummy variables controlling for size based on total assets; *YEAR* = dummy variables controlling for years; *IND* = dummy variables controlling for industries.

^b Asterisks *, **, *** indicate significance at the 0.10, 0.05, 0.01 levels, respectively. One-tailed for directional expectations, and two-tailed for others.

The effect of auditor change

The external auditor plays a pivotal role in the corporate governance system by constraining firm's opportunistic accounting choices through providing reasonable assurance for the reliability of financial reporting (Hallman et al., 2022; Lee, 2022; Adams et al., 2021; Frankel et al., 2021; Cassell et al., 2020). Auditor's governance functions are more likely to face more challenges when auditees are family firms because family firms are typically high control and detection risks. When family firms change their auditors, capital market participants may perceive such auditor changes to be a signal of risk information regarding financial reporting failures. To investigate how credit raters react auditor changes of family firms and their board efficiency, we include an indicator variable *CHANGE* and its interaction with board evaluation to capture the interactive effect of auditor changes and board evaluation on rating reactions. We specify the following ordered probit model:

$$TCRI_{it} = \beta_1 CHANGE_{it} + \beta_2 BE_{it} + \beta_3 CHANGE \times BE_{it} + \sum Control\ Variables_{it} + \varepsilon_{it} \quad (3)$$

Where *CHANGE* equals one if the firm changes their auditor, and zero otherwise. *CHANGE*×*BE* equals the interaction between *CHANGE* and *BE*. Control variables are the same as previously mentioned in Equation (1).

As shown in Column (1) of Table 6, the coefficient on *CHANGE* is positively significant ($p < 0.05$), indicating that family firms are more likely to receive unfavorable ratings when they change their auditors. This result also implies that credit raters perceive an increase in the family firms' risk exposures due to auditor changes, which in turn

⁸ Please refer to the Financial-Supervisory-Securities-Corporate-10703452331 for detailed regulations about the mandatory establishment of audit committee.

increases perceived risks in their rating decisions. In Column (2), the coefficient on *CHANGE* is still positively significant ($p < 0.05$) whereas the coefficients on *CHANGE* and *CHANGE*×*BE* are insignificant positive in Column (3). These results indicate that board evaluation strengthens the corporate governance effectiveness and moderates the negative relation between auditor changes and credit ratings.

Table 6 Auditor change, board evaluation and credit rating

Variable ^a	Pred. Sign	(1)		(2)		(3)	
		Coef.	z-value ^b	Coef.	z-value	Coef.	z-value
<i>CHANGE</i>	+/-	0.3009	2.58***	0.3019	2.59***	0.1931	0.90
<i>BE</i>	-			-0.1237	-1.78**	-0.1308	-1.84**
<i>CHANGE</i> × <i>BE</i>	+/-					0.1350	0.53
<i>ROA</i>	-	-4.2412	-8.96***	-4.2480	-8.99***	-4.2485	-8.99***
<i>OCF</i>	-	-1.1648	-3.87***	-1.1695	-3.88***	-1.1679	-3.88***
<i>DE</i>	+	1.6687	7.41***	1.6831	7.47***	1.6809	7.47***
<i>ZSCORE</i>	-	-0.0833	-3.17***	-0.0827	-3.15***	-0.0826	-3.15***
<i>INDBOD</i>	-	0.2307	0.76	0.2547	0.83	0.2509	0.82
<i>SIZE</i>			Included		Included		Included
<i>YEAR</i>			Included		Included		Included
<i>IND</i>			Included		Included		Included
Pseudo R ²			22.58%		22.61%		22.62%
n			2,346		2,346		2,346

^a The definition of the variables reported in this table are: *CHANGE* = 1 if the firm changes their auditor, else 0; *BE* = 1 if the firm performs evaluations of board performance, else 0; *CHANGE*×*BE* = the interaction between *CHANGE* and *BE*; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size; *SIZE* = dummy variables controlling for size based on total assets; *YEAR* = dummy variables controlling for years; *IND* = dummy variables controlling for industries.

^b Asterisks *, **, *** indicate significance at the 0.10, 0.05, 0.01 levels, respectively. One-tailed for directional expectations, and two-tailed for others.

Audit committee turnover and auditor change

The relationship between the audit committees and external auditors is highly related to the effects of corporate governance on the firm's prospect and performance. Audit committees are not only responsible for the auditor's selection (hiring and retention) and supervision, but also support the auditor's work to enhance the performance of corporate governance and the quality of financial reporting (Hurley et al., 2019; Kowaleski et al., 2018). This raises an interesting question on whether the auditor-client relationship becomes more uncertain when their audit committee members experience turnover. Therefore, we further extend our analysis considering the effect of audit committee turnover on the relationship among auditor change, board efficiency, and rater reaction.

In this section, we partition the sample into two sub-samples based on whether audit committee members experience turnover and compare the above results. As such, comparing Panels A and B of Table 7 provides evidence as to whether credit raters regard the audit committee turnover as an important factor for auditor change and board evaluation. In Panel A, the result of coefficients on *CHANGE*, *BE* and *CHANGE*×*BE* is like those reported in Table 6 whereas the coefficients on *CHANGE*, *BE* and *CHANGE*×*BE* are all insignificant in Panel B. These results seem to imply that family firms with auditor changes are viewed as a potential red flag of corporate governance particularly when their audit committee members experience turnover. Again, our findings highlight the importance of board evaluation in moderating the negative effect of auditor changes on governance performance.

Table 7 Auditor change, board evaluation and credit rating (consider audit committee turnover)

Panel A: Audit committee turnover ^a							
Variables ^b	Pred. Sign	(1)		(2)		(3)	
		Coef.	z-value ^c	Coef.	z-value	Coef.	z-value
<i>CHANGE</i>	+/-	0.3029	1.72*	0.2977	1.70*	0.3551	1.09
<i>BE</i>	-			-0.3032	-2.28**	-0.2988	-2.16**
<i>CHANGE</i> × <i>BE</i>	+/-					-0.0665	-0.18
<i>ROA</i>	-	-2.7091	-3.97***	-2.7489	-4.01***	-2.7500	-4.02***
<i>OCF</i>	-	-2.0123	-3.54***	-2.0354	-3.56***	-2.0336	-3.55***
<i>DE</i>	+	1.4062	3.84***	1.4562	3.96***	1.4582	3.96***
<i>ZSCORE</i>	-	-0.1575	-3.54***	-0.1524	-3.43***	-0.1522	-3.43***
<i>INDBOD</i>	-	-0.3274	-0.61	-0.2555	-0.47	-0.2539	-0.47
<i>SIZE</i>			Included		Included		Included
<i>YEAR</i>			Included		Included		Included
<i>IND</i>			Included		Included		Included
Pseudo R ²			23.69%		23.86%		23.87%
n			686		686		686

Panel B: Non-audit committee turnover							
Variables	Pred. Sign	(1)		(2)		(3)	
		Coef.	z-value	Coef.	z-value	Coef.	z-value
<i>CHANGE</i>	+/-	0.2234	1.41	0.2239	1.41	0.0250	0.09
<i>BE</i>	-			-0.0581	-0.68	-0.0702	-0.81
<i>CHANGE</i> × <i>BE</i>	+/-					0.2582	0.75
<i>ROA</i>	-	-5.0179	-8.31***	-5.0170	-8.31***	-5.0193	-8.33***
<i>OCF</i>	-	-0.8677	-2.84***	-0.8690	-2.85***	-0.8654	-2.85***
<i>DE</i>	+	1.9117	6.77***	1.9168	6.78***	1.9143	6.78***
<i>ZSCORE</i>	-	-0.0510	-1.58*	-0.0510	-1.58*	-0.0506	-1.57*
<i>INDBOD</i>	-	0.4089	1.09	0.4179	1.11	0.4136	1.10
<i>SIZE</i>			Included		Included		Included
<i>YEAR</i>			Included		Included		Included
<i>IND</i>			Included		Included		Included
Pseudo R ²			23%		23.01%		23.02%
n			1,660		1,660		1,660

^a Audit committee turnover denotes that firm's audit committee experiences members turnover.

^b The definition of the variables reported in this table are: *CHANGE* = 1 if the firm changes their auditor, else 0; *BE* = 1 if the firm performs evaluations of board performance, else 0; *CHANGE*×*BE* = the interaction between *CHANGE* and *BE*; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size; *SIZE* = dummy variables controlling for size based on total assets; *YEAR* = dummy variables controlling for years; *IND* = dummy variables controlling for industries.

^c Asterisks *, **, *** indicate significance at the 0.10, 0.05, 0.01 levels, respectively. One-tailed for directional expectations, and two-tailed for others.

Audit committee's evaluation and gender diversity

Gender diversity in firm performance has been an important issue in the corporate governance areas, and as a result, there has been growth in the number of this research stream (Wang et al., 2022; Doan & Iskandar-Datta, 2021; Lee et al., 2019). Prior empirical findings suggest that female directors play an effective role in improving board efficacy and decision-making quality (Friedman, 2020; Nekhili et al., 2020; Oradi & Izadi, 2019). Prior studies focus attention on the impact of gender diversity and ignore the moderating effect of governance mechanism in corporate governance studies. In this section, we consider audit committees' evaluation as a determinant in our analyses to extend prior literature by examining whether gender diversity is associated with credit ratings and how audit committees' evaluation moderates the effect of gender diversity on credit ratings. To investigate our research issues, we include a variable *GENDER* to capture the effect of gender diversity on rating reactions. We specify the following ordered probit model:

$$TCRI_{it} = \beta_1 GENDER_{it} + \sum Control Variables_{it} + \varepsilon_{it} \quad (4)$$

Where *GENDER* equals the difference between female and male audit committee members, divided by the size of audit committee. Control variables are the same as previously mentioned in Equation (1).

As shown in Table 8, we partition the sample into two sub-samples based on whether the firm performs performance evaluation of audit committees. Table 8 shows that the coefficient of *GENDER* is only significant and positive in the non-ACE group, whereas it is insignificant in the ACE group. These results indicate that the lack of gender diversity in the audit committees is viewed as a risk factor to be more likely to receive unfavorable ratings if such family firms didn't perform performance evaluation of audit committees. Our findings imply that credit raters positively react to audit committees' evaluation because they perceive that audit committees' evaluation plays a governance role in board performance and, therefore, are more likely to moderate the effect of gender inequality of audit committees, leading to a moderate effect on a firm's governance function.

Table 8 Gender diversity of audit committee, board evaluation and credit rating

Variables ^b	Pred. Sign	ACE obs. ^a (n = 1,211)		Non-ACE obs. (n = 1,135)	
		Coef.	z-value ^c	Coef.	z-value
<i>GENDER</i>	+/-	0.1384	1.37	0.1904	2.24**
<i>ROA</i>	-	-3.9177	-6.67***	-4.7701	-6.60***
<i>OCF</i>	-	-1.5321	-4.23***	-1.0564	-2.43***
<i>DE</i>	+	0.5976	1.93**	2.8341	8.58***
<i>ZSCORE</i>	-	-0.1440	-4.02***	-0.0351	-0.89
<i>INDBOD</i>	-	0.9296	1.96**	-0.5501	-1.23
<i>SIZE</i>			Included		Included
<i>YEAR</i>			Included		Included
<i>IND</i>			Included		Included
Pseudo R ²			21.46%		26.09%
n			1,211		1,135

^a ACE denotes the firm performs evaluations of audit committee performance, but not versa.

^b The definition of the variables reported in this table are: *GENDER* = the difference between female and male audit committee members, divided by the size of audit committee; *ROA* = net income divided by total assets; *OCF* = cash flow from operations divided by total assets; *DE* = total debt

divided by total assets; *ZSCORE* = bankruptcy risk from Altman's (1968) Z-Score model; *INDBOD* = number of independent directors divided by total board size; *SIZE* = dummy variables controlling for size based on total assets; *YEAR* = dummy variables controlling for years; *IND* = dummy variables controlling for industries.

° Asterisks *, **, *** indicate significance at the 0.10, 0.05, 0.01 levels, respectively. One-tailed for directional expectations, and two-tailed for others.

5. Conclusion

Remarking on the prominence of “Rules for Performance Evaluation of Board of Directors”, we focus on family structure to examine whether board evaluation affects raters' risk evaluation. Effective board evaluation leads to improved corporate governance efficiency, and thereby increasing the transparency of corporate performance and reducing the credit risk of financial condition. Further, effective board evaluation strengthens the moderating role of board function. We predict and find that board evaluation plays an important role in improving the board effectiveness of family ownership structure and positively influences the risk perception of credit raters in making rating decisions.

To further shed light on the efficacy of board evaluation about the credit rating reaction, we conducted a series of extended analyses. First, our results suggest that credit raters do perceive family firms being mandatorily required to establish their audit committees to be associated with higher risk and react unfavorably to them. However, credit raters view board evaluation that improves governance effectiveness and thereby react moderately to them. Second, we find that family firms with auditor changes are viewed as a potential red flag of corporate governance particularly when their audit committee members experience turnover. Specifically, our findings highlight the importance of board evaluation in moderating the negative effect of auditor changes on governance performance. Third, we also find that credit raters positively react to audit committees' evaluation because they perceive that audit committees' evaluation plays a governance role in audit committees' performance and, therefore, are more likely to moderate the effect of gender inequality of audit committees, leading to a moderate effect on a firm's governance function.

This study is subject to various limitations. First, we focus on the context of family governance to examine the effect of board evaluation on credit ratings. Therefore, our findings may not be applicable to non-family firms. Second, we are not able to directly observe the mechanism of board evaluation because our study uses hand-collected data of board evaluation obtained from publicly available MOPS reports and website news. In addition, our sample period is limited from 2019 until 2022 due to the significantly higher hand-collecting cost of using board evaluation data. Third, with respect to our extended analyses on audit changes, we didn't consider the types of auditor changes because it is difficult to distinguish between auditor resignations and dismissals. Finally, although we include control variables consistent with prior studies, our research models may have not fully captured variables associated with credit ratings.

References

- Abernathy, J. L., Kubick, T. R. and Masli, A. N. S., 2019, “The effect of general counsel prominence on the pricing of audit services”, *J. Account. Public Policy*, 38, 1, pp. 1 – 14.
- Adams, M. and Jiang, W., 2020, “Do financial experts on the board matter? An empirical test from the United Kingdom's non-life insurance industry”, *Journal of Accounting, Auditing and Finance*, 35, 1, pp. 168 – 195.
- Adams, T., Krishnan, J. and Krishnan, J., 2021, “Client influence and auditor independence revisited: Evidence from auditor resignations”, *J. Account. Public Policy*, 40, 5, pp. 1 – 20.
- Akins, B., 2018, “Financial reporting quality and uncertainty about credit risk among ratings agencies”, *The Accounting Review*, 93, 4, pp. 1 – 22.
- Al-Hadi, A., Taylor, G. and Richardson, G., 2022, “Are corruption and corporate tax avoidance in the United States related?”, *Review of Accounting Studies*, 27, pp. 344 – 389.
- Ames, D. A., Hines, C. S. and Sankara, J., 2018, “Board risk committees: Insurer financial strength ratings and performance”, *Journal of Accounting and Public Policy*, 37, 2, pp. 130 – 145.
- Aobdia, D., Siddiqui, S. and Vinelli, A., 2021, “Heterogeneity in expertise in a credence goods setting: Evidence from audit partners”, *Review of Accounting Studies*, 26, 2, pp. 693 – 729.
- Ashbaugh-Skaife, H., Collins, D. W. and LaFond, R., 2006, “The effects of corporate governance on firms' credit ratings”, *Journal of Accounting Economics*, 42, 1 – 2, pp. 203 – 243.
- Badoer, D. C., Demiroglu, C. and James, C. M., 2019, “Ratings quality and borrowing choice”, *The Journal of Finance*, 74, 5, pp. 2619 – 2665.
- Baldenius, T., Meng, X. and Qiu L., 2021, “The value of board commitment”, *Review of Accounting Studies*, 26, 4, pp. 1587 – 1622.
- Balsam, S., Gu, Y. and Mao, C. X., 2018, “Credit influence and CEO compensation: Evidence from debt covenant violations”, *The Accounting Review*, 93, 5, pp. 23 – 50.
- Bao, M. X. and Tanyi P., 2020, “Does auditor ratification matter to bondholders? Evidence from new bond issues”, *J. Account. Public Policy*, 39, 4, 106765.
- Bartov, E., Marra, A. and Momenté, 2021, “corporate social responsibility and the market reaction to negative events: Evidence from inadvertent and fraudulent restatement announcements”, *The Accounting Review*, 96, 2, pp. 82 – 106.
- Bonsall IV, S. B., Green, J. R. and Muller III, K. A., 2018, “Are credit ratings more rigorous for widely covered firms?”, *The Accounting Review*, 93, 6, pp. 61 – 94.
- Brooks, C. and Oikonomou, I., 2018, “The effects of environmental, social and governance disclosures and performance on firm value: A review of the literature in accounting and finance”, *The British Accounting Review*, 50, 1, pp. 1 – 15.
- Carr, K. M., Aier, J. K. and Cao, J., 2021, “Did PCAOB rules on ethics, independence, and tax services influence financial reporting for income taxes?”, *J. Account. Public Policy*, 40, 5, pp. 1 – 23

- Cascino, S., Clatworthy, M. A., Osma, B. G., Gassen, J. and Imam, S., 2021, "The usefulness of financial accounting information: Evidence from the field", *The Accounting Review*, 96, 6, pp. 73 – 102.
- Cassell, C. A., Hansen, J. C., Myers, L. A. and Seidel, T. A., 2020, "Does the timing of auditor changes affect audit quality? Evidence from the initial year of the audit engagement", *Journal of Accounting, Auditing and Finance*, 35, 2, pp. 263 – 289.
- Chava, S., Ganduri, R. and Ornthanalai, C., 2019, "Do credit default swaps mitigate the impact of credit rating downgrades?", *Review of Finance*, 23, 3, pp. 471 – 511.
- Chen, J. Z., Cussatt, M. and Gunny, K. A., 2020, "When are outside directors more effective monitors? Evidence from real activities manipulation", *Journal of Accounting, Auditing and Finance*, 35, 1, pp. 26 – 52.
- Chen, S. Z., Cao, Q. W., Xu, W. L. and Lin, F. Q., 2020, Global Views, Taipei, Taiwan.
- Chen, X., Feng, M. and Li, C., 2020, "Family entrenchment and internal control: Evidence from S&P 1500 firms", *Review of Accounting Studies*, 25, 1, pp. 246 – 278.
- Cheng, Q., Cho, Y. J. and Yang, H., 2018, "Financial reporting changes and the internal information environment: Evidence from SFAS 142", *Rev Account Stud*, 23, 1, pp. 347 – 383.
- Christensen H. B., Hail, L. and Leuz, C., 2021, "Mandatory CSR and sustainability reporting: Economic analysis and literature review", *Review of Accounting Studies*, 26, 3, pp. 1176 – 1248.
- Christensen, T. E., Gomez, E., Ma, M. and Pan, J., 2021, "Analysts' role in shaping non-GAAP reporting: Evidence from a natural experiment", *Review of Accounting Studies*, 26, 1, pp. 172 – 217.
- Christensen, T. E., Pei, H., Pierce, S. R. and Tan, L., 2019, "Non-GAAP reporting following debt covenant violations", *Review of Accounting Studies*, 24, 2, pp. 629 – 664.
- Cimini, R., Mechelli, A. and Sforza, V., 2022, "Auditor independence and value relevance in the European Banking Sector: Do investor and corporate governance matter?", *Journal of Accounting, Auditing and Finance*, 37, 3, pp. 654 – 677.
- Cohen, J., Krishnamoorthy, G. and Wright, A. M., 2002, "Corporate governance and the audit process", *Contemporary Accounting Research (Winter)*, pp. 573 – 594.
- Cohen, J., Krishnamoorthy, G. and Wright, A., 2004, "The corporate governance mosaic and financial reporting quality", *Journal of Accounting Literature*, 23, pp. 87 – 152.
- Das, S., Gong, J. J. and Li, S., 2022, "The effect of accounting expertise of board committees on the short- and long-term consequences of financial restatements", *Journal of Accounting, Auditing and Finance*, 37, 3, pp. 603 – 632.
- Daspit, J., Chrisman, J. J., Evangelopoulos, N., 2021, "Family firm heterogeneity: A definition, common themes, scholarly progress, and directions forward", *Family Business Review*, 34, 3, pp. 296 – 322.
- Doan, T. and Iskandar-Datta, M., 2021, "Does gender in the C-Suite really matter?", *Journal of Accounting, Auditing and Finance*, 36, 1, pp. 81 – 107.
- Driss, H., Drobetz, W., Ghoul, S. E. and Guehami, O., 2021, "Institutional investment horizons, corporate governance, and credit ratings: International evidence", *Journal of Corporate Finance*, 67, 101874.
- Frankel, R. M., Kalay, A., Sadka, G. and Zou, Y., 2021, "Complementarity between audited financial reporting and voluntary disclosure: the case of former Andersen clients", *The Accounting Review*, 96, 6, pp. 215 – 238.
- Free, C., Trotman, A. J. and Trotman, K. T., 2021, "How audit committee chairs address information-processing barriers", *The Accounting Review*, 96, 1, pp. 147 – 169.
- Friedman, H. L., 2020, "Investor preference for director characteristics: portfolio choice with gender bias", *The Accounting Review*, 95, 5, pp. 117 – 147.
- Fuller, S. H., Joe, J. R. and Luippold B. L., 2021, "The effect of auditor reporting choice and audit committee oversight on management financial disclosures", *The Accounting Review*, 96, 6, pp. 239 – 274.
- Galavotti, I. and D'Este, C., 2022, "The corporate governance-diversification link: Exploring the heterogeneity of family firms", *Corporate Governance*, 23, 3, pp. 441 – 457.
- Gallimberti, C. M., 2021, "Borrowers' financial reporting and the quality of banks' loan portfolios", *The Accounting Review*, 96, 2, pp. 261 – 301.
- García Lara, J. M. G., Penalva, J. and Scapin, M., 2022, "Financial reporting quality effects of imposing (gender) quotas on boards of directors", *J. Account. Public Policy*, 41, 2, 106921.
- Ge, R., Ji, Y. and Louis, H., 2021, "Accounting quality and alliance contract provisions", *The Accounting Review*, 96, 4, pp. 261 – 287.
- Golden, J. and Kohlbeck, M., 2019, "The unintended effects of financial accounting standard 123R on stock repurchase and dividend activity", *Journal of Accounting, Auditing and Finance*, 34, 3, pp. 411 – 433.
- Guttman, I. and Marinovic, I., 2018, "Debt contracts in the presence of performance manipulation", *Rev Account Stud*, 23, 3, pp. 1005 – 1041.
- Hallman, N. J., Kartapanis, A. and Schmidt, J. J., 2022, "How do auditors respond to competition? Evidence from the bidding process", *Journal of Accounting and Economics*, 73, 2 – 3, 101475.
- Haman, J., Chalmers, K. and Fang, V., 2020, "The effects of IPO mandatory lockups and corporate governance on underpricing: Evidence from the Australian Securities Exchange", *Journal of Accounting, Auditing and Finance*, 35, 4, pp. 854 – 869.
- Hansen, J. C., Lisic, L. L., Seidel, T. A. and Wilkins, M. S., 2021, "Audit committee accounting expertise and the mitigation of strategic auditor behavior", *The Accounting Review*, 96, 4, pp. 289 – 314.
- Hepfer, B. F., Wilde, J. H. and Wilson, R. J., 2020, "Tax and nontax incentives in income shifting: Evidence from shadow insurers", *The Accounting Review*, 95, 4, pp. 219 – 262.
- Hettler, B., Forst, A., Cordeiro, J. and Chavez, S., 2021, "Excess insider control and corporate social responsibility: Evidence from dual-class firms", *J. Account. Public Policy*, 40, 6, 106877.
- Hinkel, T. P. and Hoffman, B. W., 2020, "Meeting earnings benchmarks via real activities manipulation: Debt market effects", *Journal of Accounting, Auditing and Finance*, 35, 2, pp. 349 – 378.
- Hoitash, U. and Mkrtchyan, A., 2022, "Internal governance and outside directors' connections to non-director executives", *Journal of Accounting and Economics*, 73, 1, 101436.
- Hong, H. A., Kim, Y. and Lobo, G. J., 2019, "Does financial reporting conservatism mitigate underinvestment?", *Journal of Accounting, Auditing and Finance*, 34, 2, pp. 258 – 283.
- Hope, O., Lu, H. and Saiy, S., 2019, "Director compensation and related party transactions", *Review of Accounting Studies*, 24, 4, pp. 1392 – 1426.

- Hung, M., Kraft, P., Wang, S. and Yu, G., 2022, "Market power and credit rating standards: Global evidence", *Journal of Accounting and Economics*, 73, 2 – 3, 101474.
- Hurley, P. J., Mayhew, B. W. and Obermire, K. M., 2019, "Realigning auditors' accountability: Experimental evidence", *The Accounting Review*, 94, 3, pp. 233 – 250.
- Islam, M. S., Farah, N., Stafford and T. F., 2018, "Factors associated with security/cybersecurity audit by internal audit function: An international study", *Managerial Auditing Journal*, 33, 4, pp. 377 – 409.
- Kowaleski, Z., Mayhew, B. W. and Tegeler, A. C., 2018, "The impact of consulting services on audit quality: An experimental approach", *Journal of Accounting Research*, 56, 2, pp. 673 – 711.
- Lee, G. H. S., Nagy, A. L. and Zimmermam A. B., 2019, "Audit partner assignments and audit quality in the United States", *The Accounting Review*, 94, 2, pp. 297 – 323.
- Lee, K. K. Y., 2022, "Stock price crashes and auditors' client-retention decisions", *Journal of Accounting, Auditing and Finance*, 37, 2, pp. 493 – 517.
- Lehmann, N., 2019, "Do corporate governance analysts matters? Evidence from the expansion of governance analyst coverage", *Journal of Accounting Research*, 57, 3, pp. 721 – 761.
- Lel, U. and Miller, D., 2019, "The labor market for directors and externalities in corporate governance: evidence from the international labor market", *Journal of Accounting and Economics*, 68, 1, 101222.
- Maroun, W., 2019, "Does external assurance contribute to higher quality integrated reports?", *J. Account. Public Policy*, 38, 4, 106670.
- Min, B., 2021, "Heterogeneity of R&D in family firm", *Journal of Business Research*, 129, pp. 88 – 95.
- Nekhili, M., Gull, A. A., Chtioui, T. and Radhouane, I., 2020, "Gender-diverse boards and audit fees: What difference does gender quota legislation make?", *Journal of Business Finance and Accounting*, 47, 1-2, pp. 52 – 99.
- Ng, J., Ranasinghe, T., Shi, G. and Yang, H., 2019, "Unemployment insurance benefits and income smoothing", *J. Account. Public Policy*, 38, 1, pp. 15 – 30.
- Oradi, J. and Izadi, J., 2019, "Audit committee gender diversity and financial reporting: Evidence from restatements", *Managerial Auditing Journal*, 35, 1, pp. 67 – 92.
- Park, S., Qin, J., Seidel, T. and Zhou, J., 2021, "Determinants and consequences of noncompliance with the 2013 COSO framework", *J. Account. Public Policy*, 40, 6, 106899.
- Peteghem, M. V., Bruynseels, L. and Gaeremynck, A., 2018, "Beyond diversity: A tale of faultlines and frictions in the board of directors", *The Accounting Review*, 93, 2, pp. 339 – 367.
- Rinaldi, L., Unerman, J., Villiers, C. D., 2018, "Evaluating the Integrated Reporting journey: insights, gaps and agendas for future research", *Accounting Auditing and Accountability Journal*, 31, 5, pp. 1294 – 1318.
- Souther, M. E., 2018, "The effects of internal board networks: Evidence from closed-end funds", *Journal of Accounting and Economics*, 66, 1, pp. 266 – 290.
- Steinbart, P. J., Raschke, R. L., Gal, G. and Dilla, W. N., 2018, "The influence of a good relationship between the internal audit and information security functions on information security outcomes", *Accounting, Organizations and Society*, 71, pp. 15 – 29.
- Wang, Y., Yu, M. and Gao, S., 2022, "Gender diversity and financial statement fraud", *J. Account. Public Policy*, 41, 2, 106903.
- Yue, H., Zhang, L. and Zhong, Q., 2022, "The politics of bank opacity", *Journal of Accounting and Economic*, 73, 2 – 3, 101452.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence



Maritime Transportation Accidents: A Bibliometric Analysis

Vicky Zampeta[†] and Gregory Chondrokoukis

University of Piraeus, Faculty of Industrial Management and Technology, Piraeus Greece

ARTICLE INFO

Article History

Received 5 April 2023
Accepted 28 April 2023

JEL Classifications
M40, D81, G32

ABSTRACT

Purpose:

The article aims to highlight the concept of risk management in maritime transportation accidents in the specialized literature on the Web of Sciences database through existing materials.

Design/methodology/ approach:

The keyword study identifies several keywords as they have been set in this study and as they appear in the Web of Science database. Using VOSviewer our main concern is to identify and highlight the most essential and questioned words associated with the “maritime accidents” and “other issues related with maritime accidents” concept. We extracted 456 articles, underlined 259 keywords with the similar meaning to the keywords we have selected in the previous stage.

Findings:

We found that the maritime transportation accidents (MTA) topic has limited expansion in the literature. The gaps are considerably big leaving space for further research. The analysis of the keywords proves an interconnection between the MTA, the risk models, safety, management organization and more.

Research limitations/ implementations:

Although there has been an increased interest in this field especially among countries with the shipping sector highly developed (maritime universities in China, London Poland, etc.), we have noticed that the related studies are still at the beginning, especially if we consider the accounting side of this subject.

Originality value:

The present article can only be the beginning of a set of studies in MTA, given that the issue has an increasing interest in academia. For future research, we can consider using a larger sample, more keywords, and additional databases.

Keywords:

Shipping risk management,
bibliometric mapping,
VOSviewer, maritime
transportation accidents.

1. Introduction

The examination of scientific publications can be approached from various perspectives such as subject matter, time, and scientific metrics. Bibliometric analysis is the primary technique used to evaluate research outcomes in the scientific community. It involves quantifying data related to scientific publications and their authors as a means of measuring scientific accomplishments (Norton, 2001). These publications can be collected from databases, for example Scopus and/or Web of Sciences (WoS).

The main objective of this research is to analyze the factors behind a maritime transportation accident (MTA). A bibliometric analysis of the scientific literature on this issue has been used to identify the evolution and future research trend in this topic which is extremely important in shipping as an indicator for wage packages and risk premiums. The term bibliometric analysis introduced by Pritchard (1969) was quickly used to assess the number of publications on several publications by researchers every time they were searching on existing literature for certain topics. Since then, many authors have undertaken the task of defining and analysing bibliometric techniques (Norton, 2001; Polanco, 1995; Stefaniak, 2008; Nowak, 2006).

Bibliometric analysis uses quantitative statistical data analysis based on published literature, from the sources selected by the author (usually Scopus and Web of Sciences) to study publication patterns within a scientific field (De Bellis, 2009), in our case the maritime transport accidents (MTA). The bibliometric analysis involves a set of quantitative measures, techniques, indices, metrics, and tools to analyze references in the scientific literature (Donthu et al., 2021).

The rationale for selecting Scopus and/or WoS databases is that they are reputable, globally recognized databases of academic publications, which compile a vast array of bibliometric indicators and cover a diverse range of fields

[†]Corresponding Author: Vicky Zampeta
Email: Vicky.zampeta@gmail.com

spanning the sciences, technology, social sciences, humanities, medicine, and arts. The databases collectively index content from over 45,000 scientific journals and conference proceedings and are highly ranked in terms of citation counts. Using additional databases could lead to redundant data and integration issues.

From a bibliometric perspective, there is currently a knowledge gap regarding maritime transport accidents (MTA), which prompts several general questions such as: What is the conceptual and thematic structure of MTA? What are the main internal factors and sub-factors that underpin this topic? How has research in this field developed over time? And what are the emerging research areas and challenges for the future?

Using bibliometric analysis, the researcher identifies the key elements of the research such as the author(s), the affiliation, links and citations, the country of publication, the year of publication, JEL codes, and keywords.

2. Review of Literature

It is widely accepted that human error is responsible for approximately 80% of sea accidents. Despite numerous studies on the human factor and maritime safety, certain issues require further investigation. Crew fatigue caused by strict schedules, understaffing, poor management, low wages, inadequate equipment or technology, and the safety culture and recruitment policies of shipping companies are factors that adversely affect crew safety.

However, these organizational factors are often acknowledged but seldom researched. Additionally, it is essential to examine how multiculturalism in ship operations can lead to problems caused by multinational crews and how such problems can be prevented in the future.

The growing concern for maritime safety has led to an increased demand for research on the competencies of crews operating at sea, particularly in high-risk areas. Chen et al. (2013) have explored the human and organizational factors contributing to marine casualties.

They illustrated an accident in a multiple-levels why-because graph and identified how the human factors are involved in an accident amongst factors. A drawback of this method is that the analyser should have substantial knowledge on the maritime accidents and operational environments.

Chauvin et al. (2013) evaluated the relationship between human factors and maritime safety in the Human Factor Analysis and Classification System (HFACS). They examined the human factors in 5 causal categories and further divided human failures into perception and decision. They suggested to use psychological experiments to train people for a higher level of safety in the maritime field. Although the cause-and-effect relationship between human factors and maritime accidents is yet to be defined, she provided that the human factors is a critical factor of maritime accidents.

Analysing maritime accidents can be a dope way to find out what caused the mess and how different factors are linked. Pristrom et al. (2015; 2016) peeped the Global Integrated Shipping Information System (GISIS) database to figure out how likely a ship might get hijacked. Zhang et al. (2016b) checked out past accidents from 2008 to 2013 in Tianjin port to predict what might happen in the future.

Zampeta & Chondrokoukis (2022) have conducted a thorough analysis of maritime transportation accidents, focusing on internal factors that contribute to such accidents. Their study sheds light on the essential elements and activities that lead to maritime accidents, which can be addressed to enhance workers' occupational health, especially during the challenging pandemic and post-pandemic times. The study employs various advanced econometric techniques, yielding robust estimates that strengthen the existing findings in this field.

In a related study, Zampeta & Chondrokoukis (2023) have demonstrated that different work activities can result in injuries to different body parts. The location of work-related injuries varies across different groups of body parts. The study also reveals strong connections between work activities, work location, rank, nationality, and body injuries, utilizing robust econometric methodology and Gaussian and Mixed-Markov graphical models.

This research has analysed the existing literature in maritime transportation accidents (MTA) to determine the importance of MTA and how it is distributed among authors, countries and citation complexity using bibliometric analysis.

According to Liu et al. (2019), bibliometric studies involve a quantitative analysis of publications that focus on a particular phenomenon. This method is widely used to examine scientific discourse and understand the emergence and development of a research field (Ellegaard & Wallin, 2015) and is an effective procedure for understanding how a field of research emerges and develops (van Raan, 2005; Zhang et al., 2016a).

Norton (2001) argues that bibliometric analysis measures the literature used by researchers to study a topic, while Stefaniak (2008) defines it as the use of quantitative methods to analyze the state and development of a research topic in the literature. Polanco (1995) describes bibliometric analysis as a way to track the evolution of research in a topic using quantitative criteria, and Nowak (2006) presents it as a tool to describe and explain scientific phenomena. The use of bibliometric analysis allows researchers to understand the interest of other users in a particular research topic.

Bocken et al. (2014), Czakon (2011), Cook et al. (1997), Hart (1998), Mulrow (1994), and Tranfield et al. (2003) have identified three stages of bibliometric analysis: research planning, research implementation, and reporting.

In the present study, the research area focused on maritime transport accidents (MTA), and the data source selected was the Web of Science (WoS) scientific database. The analysis was limited to the period between 2010 and 2022, and key bibliographic criteria, such as the number, type, country, language, and research areas of the publications, were used for the analysis. Excel and VOSviewer were used to analyze the resulting data sets, and the findings of the bibliometric analysis were reported in the publication.

Table 1: Clusters of keywords

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
(Red)	(Green)	(Blue)	(Yellow)	(Purple)	(Skyblue)
Risk-Assessment	Model	Bayesian Network	Maritime Risk	Maritime Safety	Port
Probability	Safety	Sea	System	Transportation	Casualties
Accidents	Maritime Accidents	Formal Safety Assessment	Decision-Making	Reliability	Determinants
Framework	Management	Safety Assessment	Systems	Ship	Seaport
Risk Analysis	Organizational-Factors	Oil-Spill	Uncertainty	Accident	Statistics
Maritime Accident	Risk	Bayesian Networks	Marine	Resilience	Time
Navigation	Hfacs	Collisions	Methodology	Information	Police
Risk Assessment	Human Error	Port State Control	Quantification	Validity	Institutional Theory
Ais Data	Classification	Prediction	Maritime Transport	Search	Accidente Severuty
Simulation	Collision	Gulf	Fuzzy	Search And Rescue	Vessel Accidents

Source: (Author's construct, 2023)

3.2 Overlay Map Review

Regarding the overlay map, the words are shown according to the average year of publication. The terms in yellow are found in documents that were from the year 2020 which are model, maritime accidents, maritime safety, risk-assessment, Bayesian network, organizational facts. Among the most current terms are e-navigation, optimization, domain, machine learning, safety climate, risk, among others (Figure 2).

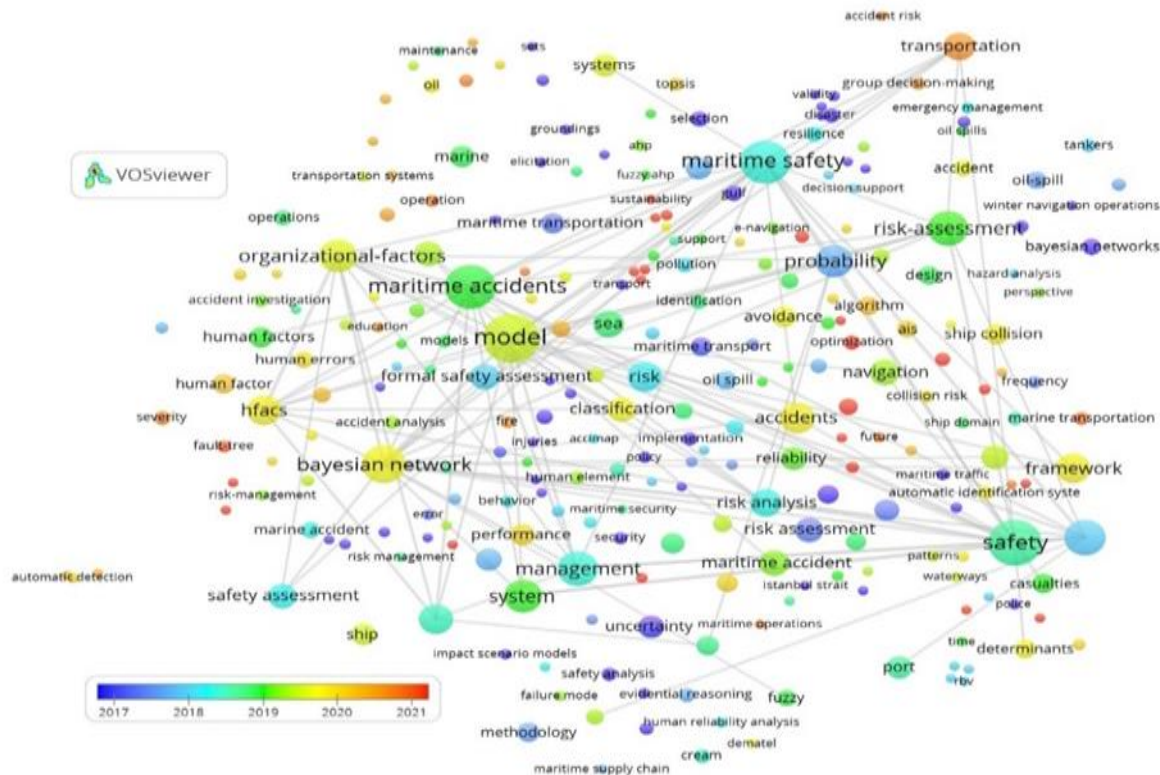


Figure 2: Overlay map according to the average year of publication.

Source: (Author's construct, 2023)

3.3 Overlay Map According to the Country of Publication

During the second part of this study, we imposed a minimum of one published document per country. The program selected from the database (499 articles) 44 countries that met the requirements. The research teams from different countries have built a stable collaboration network, creating the foundation for future research on the "maritime accidents" topic.

Figure 3 presents the overlay of countries in different links (marked with different color) and dots (different in size). Some dots are more significant than others because some countries have published more papers on this subject, showing a greater interest in it. The density of each line is a sign of qualitative cooperation among researchers. Table 2 shows the cluster of references per country.

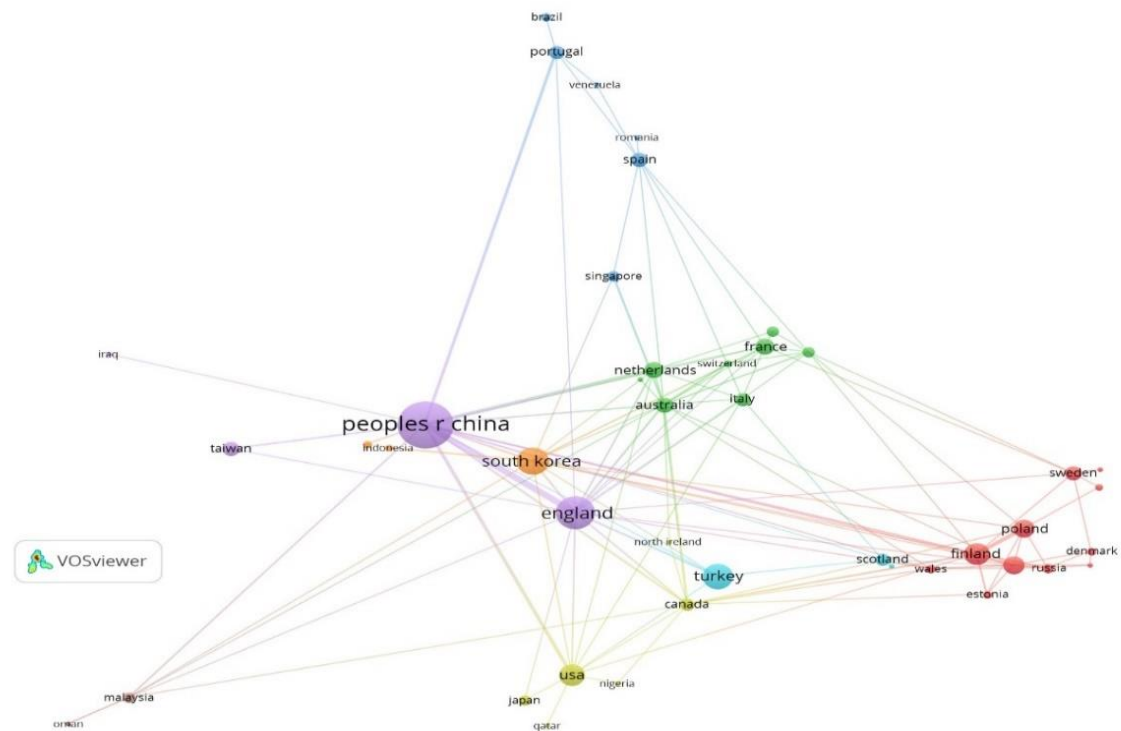


Figure 3: Overlay map according to the country of publication.

Source: (Author’s construct, 2023)

Table 2: Clusters of references per country

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
(Red)	(Green)	(Blue)	(Yellow)	(Purple)	(Skyblue)
France	Turkey	USA	Peoples R	South Korea	Malaysia
Netherlands	Finland	Taiwan	China	New Zealand	Oman
Australia	Poland	Canada	England	Indonesia	United Arab Emirates
Croatia	Norway	Japan	Taiwan		
Spain	Sweden	North Ireland	Iraq		
Italy	Scotland	Nigeria			
Portugal	Russia	Qatar			
Germany	Denmark				
Greece	Estonia				
Singapore	Slovenia				

Source: (Author’s construct, 2023)

Following Table 2 we established the top 6 countries with the greatest interest on the topic of “maritime transportation accidents and related issues” where the study subject has been highly disputed, France, Turkey, USA, Peoples Republic of China, South Korea and Malaysia, following by The Netherlands, Finland, Taiwan, England, New Zealand and Oman. Greece is in the lowest position with Estonia, Singapore, and Slovenia. The subject of this study “maritime transportation accidents” has not been examined extensively, although Greece has one of the biggest fleets in the world and this is the reason behind our decision to work on this.

3.4 Author Co-Citation Network Review

Figure 4 shows the organization of co-authorship where we can distinguish nine clusters as shown in Table 3. Each one is represented by a different color. Table 3 is represented by the top ten most quoted universities, where researchers have shown interest in the trends of maritime transportation risk management topics.

Among the top 10 universities with the greatest number of citations in MTA are the Wuhan Technical University of the Peoples Republic of China, followed by the Liverpool John Moores University, Dalian Maritime University, Shanghai Maritime University, Aalto University, Gdynia Maritime University, Delft Technical University, Hong Kong Polytechnic University, Istanbul Technical University, and National Taiwan Ocean University.

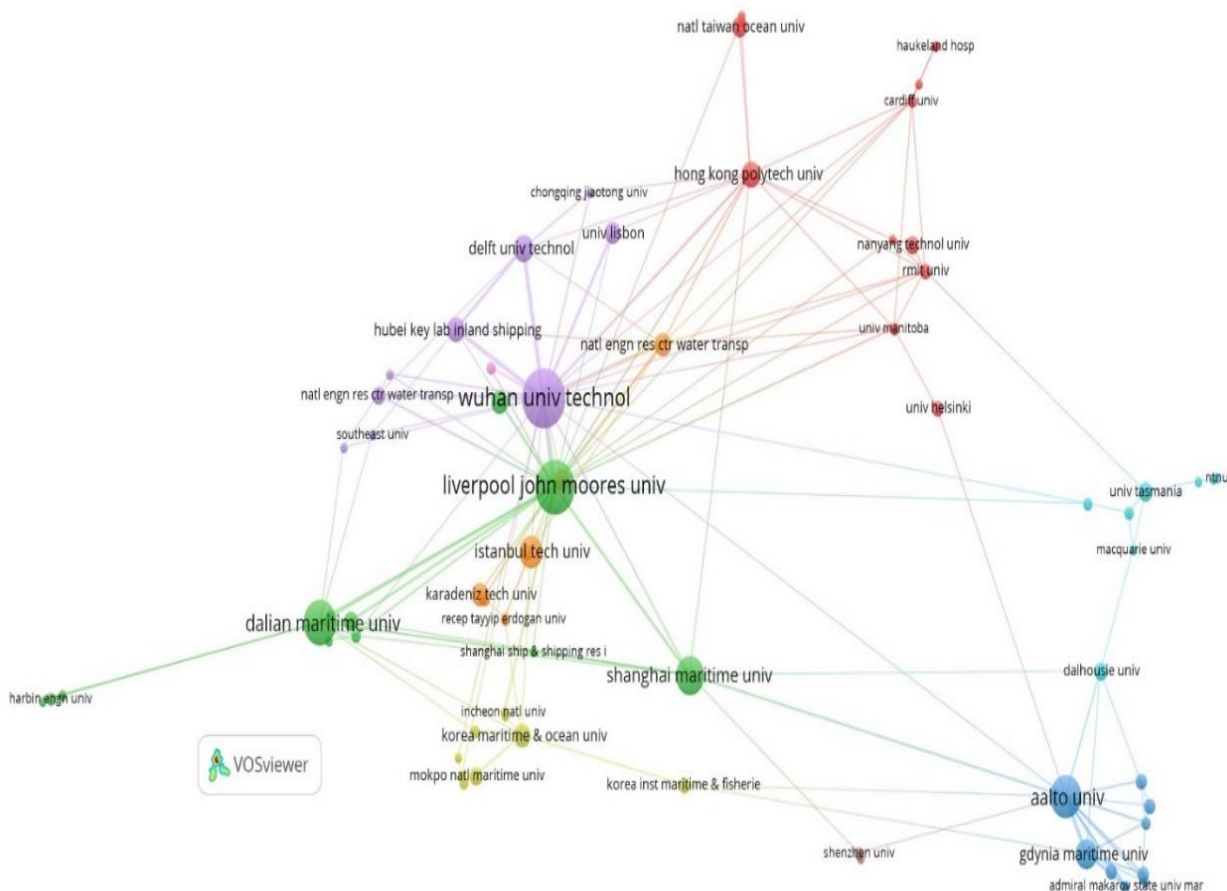


Figure 4: Organization of co-authorship

Source: (Author's construct, 2023)

Table 3: Author co-citation overlay map regarding MTA

Cluster 1 (Red)	Cluster 2 (Green)	Cluster 3 (Blue)	Cluster 4 (Yellow)	Cluster 5 (Purple)	Cluster 6 (Skyblue)	Cluster 7 (Orange)	Cluster 8 (Brown)	Cluster 9 (Skypurple)
Nanyang Technol Univ	China Univ Petr	Aalto Univ	Incheon Natl	Chongqing	Dalhousie Univ	Istanbul Tech	China Univ Geosci	Most
Hong Kong Polytech Univ	Chinese Acad Sci	Admiral Makrov	Korea Inst Maritime	Delft Univ	Macquarie Univ	Karadeniz Tech	Shenzhen Univ	
Rmit Univ	Dalian Maritime Univ	Finnish Geospatial	Korea Inst Ocean	Hubei Key Lab	Men Univ	Natl Engn Res		
Chung Ang Univ	Dalian Univ Technol	Gdansk Univ Tech	Korea Maritime & Ocean	Natl Engn	Ntnu	Ordu Univ		
Natl Sun Yat Sen Univ	Guangdong Ocean Univ	Maritime Univ	Korea Maritime Inst	Shenzhen Tech	Texas A&M Univ	Piri Reis		
Natl Cheng Kung Univ	Harbin Engn Univ	Napa	Mokpo	Southeast Univ	Univ South Eastern	Recep Tayyip		
Cardiff Univ	Key Lab Nav	Norwegian Univ	Shandong Jiatong	Univ Lisbon	Univ Tasmania	Univ Strathclyde		

	Safety Guara		Univ					
Russian Acad Sci	Liverpool John Moores	Tallin Univ Tech	Univ Malaysia	Univ California	Western Norway			
Haukeland Hosp	Peking Univ	Waterbone Transport	Wuhan Inst Technol	Wuhan Univ				
Swansea Univ	Shanghai Jiao Tong Univ							

Source: (Author's construct, 2023)

4. Results and Conclusions

The analysis above is based on all articles (from the economy, management, and business finance) published between 2000 and 2022. The sample consists of 456 articles. The bibliometric visualization network was created using the free VOSviewer, establishing a study based on keywords (keywords that arise under the abstract), quotations, geographical representation, and authorship. Through this evaluation, we should be able to identify the nature of the connection between the writers and the research subject by assessing occurrences and co-citations.

While using VOSviewer, it was crucial to understanding the software's terminology. Each constructed map comprises items. For example, items can be identified as researchers or publications representing the object of interest. The connection between items is outlined through different types of links. These links are bibliographic coupling links for published papers, researchers' co-authorship links, and terms' co-occurrence links.

When the association is strong, every link is symbolized by its force, defined by a specific mathematical value. With their links, items can be classified into different clusters (groups). It may occur when not all items on the chart are grouped into clusters, which means those elements do not relate to any defined clusters. The clusters are marked with a different color, while each element has assigned a specific feature. We might notice that the program uses attributes such as "score" or "weight." The purpose of these attributes is to classify the elements as essential or less significant depending on the attribute received; for example, an increased score stands for more extensive meaning than a decreased score.

Analyzing the results of this study, we found that the MTA topic has limited expansion in the literature. The gaps are considerably big leaving space for further research. The analysis of the keywords proves an interconnection between the MTA, the risk models, safety, management organization and more. The MTA is an important issue in Shipping because it can be used for the determination of the compensation packages of the sea workers as well as for the insurance premiums and the P&I clubs associated with different type of shipping.

The internal factors of MTA should be an issue for further research, and this is actually the main aim of this research. For successful performance, the company must consider the changes and recommendations brought by the two areas. Shipping risk management for the prevention of maritime transportation accidents must consider an important topic in today's turbulent times where Environment Society and Sustainability (ESG) is the new strategy to be followed.

Therefore, although the database provided by WoS consists of numerous scientific research and scientific papers, there is enough space for future research. This article aims to highlight the concept of risk management in maritime transportation in the specialized literature on the Web of Sciences database through existing materials. Although there has been an increased interest in this field especially among countries with the shipping sector highly developed (maritime Universities in China, London Poland, etc), we have noticed that the related studies are still at the beginning, especially if we consider the accounting side of this subject.

The aim of this research is thus embodied in the identification of the conceptual frameworks offered by the specialized literature, thus laying the foundations for future research.

This article makes a valuable contribution to the limited research on the topic of MTA, highlighting the need for further discussion and investigation in the field. However, due to the reliance on the Web of Science database, the study is subject to limitations, including a small number of articles.

In light of this, future research could expand on this study by using a larger sample size, incorporating more keywords and databases. Additionally, future research could involve developing a more comprehensive bibliometric analysis that includes internal factors of MTA, to be used in both qualitative and quantitative statistical analysis and an econometric model. One of the authors is currently working on a doctoral dissertation on the factors influencing MTA.

Funding: This work has been supported by the University of Piraeus Research Center.

References

- Bocken, N.M.P., Short, S.W., Rana, P., Evans, S. 2014. "A literature and practice review to develop sustainable business model archetypes." *Journal of Cleaner Production*, 65, 42-56.
- Chauvin, Ch., Ladriane, S., Show, M., Clostermann, J.P., Benoit L. 2013. "Human and organisational factors in maritime accidents: Analysis of collisions at sea using the HFACS." *Analysis and Prevention*, 59C, 26-37. DOI:10.1016/j.aap.2013.05.006.
- Chen, C.C., Zhu, C., White, E. et al. 2013. "Three-dimensional imaging of dislocations in a nanoparticle at atomic resolution." *Nature* 496, 74-77. <https://doi.org/10.1038/nature12009>.
- Cook, D.J., Mulrow, C.D., Haynes, R.B. 1997. "Systematic reviews: Synthesis of best evidence for clinical decisions." *Annals of Internal Medicine*, 126(5), 376. <https://DOI.org/10.7326/0003-4819-126-5-199703010-00006>.
- Czakon, W. 2011. "Metodyka systematycznego przeglądu literatury." *Przegląd Organizacji*, 3, 57-62.
- De Bellis, N. 2009. "Bibliometrics and Citation Analysis: From the Science Citation Index to Cybermetrics." Scarecrow Press, Lanham MD.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., Lim, W.M. 2021. "How to conduct a bibliometric analysis: An overview and guidelines." *Journal of Business Research*, 133, 285-296.
- Ellegaard, O., Wallin, J.A. 2015. "The bibliometric analysis of scholarly production: How great is the impact?" *Scientometrics*, 105, 1809-1831. <https://DOI.org/10.1007/s11192-015-1645-z>.
- Hart, C. 1998. "Doing a literature review: Releasing the social science research imagination." Sage Publications. <https://DOI.org/10.1080/01422419908228843>.
- Liu, H., Liu, Y., Wang, Y., Pan, C. 2019. "Hot topics and emerging trends in tourism forecasting research: A scientometric review." *Tourism Economics*, 25, 448-468.
- Mulrow, C.D. 1994. "Rationale for Systematic Reviews." *British Medical Journal*, 309(6954), 597-599. <https://DOI.org/10.1136/bmj.309.6954.597>.
- Norton, N. 2001. "Introductory concepts in information science." New Jersey.
- Nowak, P. 2006. "Bibliometria, webometria. Podstawy. Wybrane zastosowania." Wydawnictwo Naukowe UAM, Poznań.
- Polanco, X. 1995. "Infométrie et ingénierie de la connaissance". In: J.M. Noyer (Ed.), *Les sciences de l'information bibliométrie scientométrie infométrie*. Presses Universitaires de Rennes: Rennes.
- Pristrom, S., Yang, Z., Wang, J., Yan, X. 2015. "Major issues associated with maritime security and piracy." *International Conference on Transportation Information and Safety (ICTIS): Business*. <https://DOI.org/10.1109/ICTIS.2015.7232057>, Corpus ID:16321239.
- Pristrom, S., Yang, Z., Wang, J., Yan, X. 2016. "A novel flexible model for piracy and robbery assessment of merchant ship operations." *Reliability Engineering & System Safety*, 155, 196-211. ISSN 0951-8320.
- Pritchard, A. 1969. "Statistical Bibliography or Bibliometrics." *Journal of Documentation*, 25, 348-349.
- Stefaniak, B. 2008. "Bibliometria w zarządzaniu informacją." In: *Zarządzanie informacją w nauce*, ed., D. Pietruch-Reizes, Katowice.
- Tranfield, D., Denyer, D., Smart, P. 2003. "Towards a methodology for developing evidence informal management knowledge by means of systematic review." *British Journal of Management*, 14(3).
- Van Raan, A.F.J. 2005. "For your citations only? Hot topics in bibliometric analysis." *Measurement: Interdisciplinary Research and Perspectives*, vol. 3, 50-62.
- Zampeta, V., Chondrokoukis, G. 2022. "An Empirical Analysis for the Determination of Risk Factors of Work-Related Accidents in the Maritime Transportation Sector." *Risks*, 10(12), 231, <https://doi.org/10.3390/risks10120231>.
- Zampeta, V., Chondrokoukis, G. 2023. "A Comprehensive Approach Through Robust Regression and Gaussian/Mixed-Markov Graphical Models on the Example of Maritime Transportation Accidents." *Journal of Risk and Financial Management*, 16(3):183, <https://DOI.org/10.3390/jrfm16030183>.
- Zhang, J., Yu, Q., Zheng, F., Long, C., Lu, Z., Duan, Z. 2016a. "Comparing keywords plus of WOS and author keywords: a case study of patient adherence research." *Journal of the Association for Information Science and Technology*, 67, 967-972. <https://www.doi.org/10.1002/asi.23437>.
- Zhang, J., Teixeira, P.A., Soares, C.G., Yan, X., Liu, K. 2016b. "Maritime Transportation Risk Assessment of Tianjin Port with Bayesian Belief Networks." *Risk Analysis*, 36(6), 1171-1187. <https://DOI.org/10.1111/risa.12519>.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence



Parental Financial Socialisation and Financial Knowledge: A Structural Equation Modelling Analysis¹

Adam Ndou[†]

Department of Finance, Risk Management and Banking, University of South Africa, South Africa
ORCID: <https://orcid.org/0000-0001-7103-0184>

ARTICLE INFO	ABSTRACT
<p>Article History</p> <p>Received 28 February 2023 Accepted 9 June 2023</p> <p><i>JEL Classifications</i> D14, G51, G53</p>	<p>Purpose: The main aim of the study was to investigate the impact of parental financial socialisation on financial knowledge of young black African adults in rural and low-income area in South Africa. This study was guided by family financial socialisation theory which is cognisant of the various family characteristics, such as family size and socioeconomic status, as predictors of financial outcome through their association with family socialisation process.</p> <p>Design/methodology/approach: The study used quantitative approach and survey design. Primary data on parental financial socialisation was collected from structured questionnaires. A survey was carried out on 500 young black African adults in Fetakgomo Tubatse and Intsika Yethu municipalities. The research hypotheses were tested using structural equation modelling (SEM) analysis.</p> <p>Findings: The study found that parental financial behaviour, parental financial discussion, parental financial communication, and parental financial teaching had significant positive impact on financial knowledge. It is observed that parental financial communication had the strongest impact on financial knowledge. Parental financial monitoring had a significant negative impact on financial knowledge. Thus, the overall results showed that parental financial socialisation has an impact on financial knowledge of young black African adults in rural and low-income area in South Africa.</p> <p>Research limitations/implications: Due to the low levels of general literacy among the respondents, which negatively affected data collection; some young adults did not understand the questionnaire and withdrew from participating in the study. Furthermore, even though confidentiality and anonymity were guaranteed, respondents were reluctant to participate in the study. They feared exposing their financial position and displayed a lack of trust.</p> <p>Originality/value: The current study contributed to the body of knowledge differently to the previous studies because it focused on parental financial socialisation of young black African adults in rural and low-income area. There is no study which has been conducted on parental financial socialisation impact on financial knowledge in rural and low-income area in South Africa. This makes this study so important and warrant that it should be carried out to provide the much-needed results that could help to improve the level of financial knowledge of young black African adults.</p>

Keywords:
Young black African adults, Parents, Financial knowledge, Parental financial socialisation.

¹ This study is based on the PhD thesis entitled "The influence of parental financial socialisation on financial literacy of young black African adults in rural and low-income area in South Africa" of the corresponding author.

1. Introduction

The burning issue globally is the persisting low levels of financial knowledge of young adults (Lusardi et al., 2010; Garg & Singh, 2018), particularly those in developing countries Sub-Saharan Africa, and rural and low-income areas (French & McKillop, 2016; Grohmann, 2018). According to Loke (2015) individuals in low-income area have a lower level of financial knowledge and do not actively manage their personal finances. Financial knowledge is lowest among financially poorer young adults (Cameron et al., 2014). South Africa is one of the most unequal countries in the world, with high level of poverty and unemployment (World Bank, 2022). The legacy of apartheid had a negative impact on the majority of black population who had limited access to the financial system and were excluded from most economic activities (James, 2014). Young black African adults in South Africa are still suffering from structural inequalities of the past. They are suffering from high levels of poverty and unemployment (Statistics South Africa) (STATSSA, 2018). For the few who are working, they are confronted with a challenge of supporting extended family members financially, the colloquial termed 'black tax'. For young people living in poor families, low levels of financial knowledge make it difficult to escape from the cycle of intergenerational poverty (Zhu et al., 2019). Parents from poor families are confronted with a challenge that they might not be in a position to teach their children about finances. There is fear that parents with low levels of financial literacy can teach and pass through to their children wrong financial information. This makes the process of financial socialisation more complicated and would affect young black African adults' development of financial competencies and abilities to manage their finances. Young black African adults in rural and low-income areas are widely affected, putting more pressure on their finances. They are also struggling to effectively manage their finances, highly indebted and are underprivileged by lacking the knowledge and experience of dealing with financial institutions and managing large sums of money (Finmark Trust, 2019). This is also due to high fees and interest rates charged to them as they are considered high risk (Agarwal et al., 2009). According to Antoni (2014) black African consumers have low levels of knowledge regarding issues such as bad debts and are more likely to experience financial problems than other racial groups.

Studies observed that young black African adult's lacks financial knowledge and are not fully equipped to deal with financial challenges and responsibilities on transition to adulthood (Lusardi et al., 2010; Hudson et al., 2017). This is also coupled by limited access to financial education. Ramavhea et al. (2017) argued that financial knowledge of young black adults in rural and low-income areas in South Africa is more worrying because the economy is in a bad state and could be downgraded further and encounter recession. Besides persisting low levels of financial knowledge of black young adults in rural and low-income areas financial socialisation seem to be ignored. Parents play an important role in children upbringing and are able to influence children's behaviour (Clarke et al., 2005), but little is known about their influence on financial knowledge of black young adults in rural and low-income area. Therefore, this study intends to investigate the influence of parental financial socialisation on financial knowledge of young black African adults in rural and low-income area in South Africa. Thus, this study is of national importance to South Africa and to the international community because it intends to fill the gap in literature which according to the researcher's knowledge has been ignored for a very long time, as there seems to be no study that investigate the influence of parental financial socialisation on young black African adults' financial knowledge in rural and low-income area. The only notable studies were conducted by Nomlala (2021), Antoni & Saayman (2021), Antoni et al. (2019), Antoni (2018) & Sallie (2015). Nomlala (2021) investigated financial socialisation of accounting students in South African universities. Antoni & Saayman (2021) determined the influence of financial socialisation mechanisms on the levels of financial literacy of young financial professionals. Antoni et al. (2019) examined the influence of parental financial socialisation techniques on financial behaviour of students. The current study contributed to the body of knowledge differently to these studies because it focused on parental financial socialisation of young black African adults in rural and low-income area. While these studies focused on general financial socialisation of accounting students, young financial professionals, and general students. This confirms the researcher view, after comprehensive review of literature that financial socialisation studies in rural and low-income areas are scant. The current study focused on rural and low-income area in South Africa to investigate the influence of parental influence on financial knowledge of young black African adults. The remainder of this article is structured as follows: Section 2 provides literature review. Section 3 explores conceptual model and hypotheses of the study. Section 4 covers methods used to conduct the study. Section 5 presents empirical results of the study. Section 6 provides conclusion and recommendations.

2. Review of Literature

2.1 Theoretical Review

This study adopted the family financial socialisation theory by Gudmunson & Danes (2011), Piaget's (1952) theory of cognitive development, and Vygotsky's (1956) sociocultural theory. Gudmunson & Danes (2011) drew from the consumer socialisation model by Moschis & Churchill (1978) to incorporate family characteristics, and family interactions and relationships to financial socialisation. The family financial socialisation theory is cognisant of the various family characteristics, such as family size and socioeconomic status, as predictors of financial outcome through their association with family socialisation process. The theory incorporates constructs such as family interpersonal communication, relationship quality, and parenting style to explain and measure family interaction and relationships. Furthermore, purposive family financial socialisation occurs through intentional efforts by family members to financially socialise each other. These efforts vary according to race/ethnicity and nationality. Characteristics such as

gender, age, family structure, and family relationship type highlight family roles tied to cultural values and norms that underlie financial practices. The theory also contains the paths from financial attitudes, knowledge, and capabilities to behaviour and financial well-being, which are intermediary financial socialisation outcomes indicating socially imbued individual characteristics adapted over time (Gudmunson & Danes, 2011). Cognitive development theory's principal focus is the competence the child brings to his behaviour as a consumer. It describes the development of thought processes, including remembering, problem-solving, and decision-making, from childhood through adolescence, to adulthood. The theory holds that children's consumer behaviour is best studied as a developmental phenomenon of skills, knowledge, and attitudes relevant to consumption behaviour. The theory explains that cognitive development occurs in stages of maturity, from childhood to adulthood, and argues that children learn financial matters in stages, based on their cognitions. As children mature, they move through a series of statuses corresponding to different stages in their life cycle (Piaget, 1952). Cognitive development theory is also supported in financial socialisation studies. For example, Friedline (2015) links the ability of children to save and their use of savings accounts with their cognitive, social, and linguistic development, and posits that children are developmentally capable of saving by the age of five or six years. Rea et al. (2019) assert that financial socialisation is implicit, and, as such, is subject to different interpretations, as family members may not fully understand what is happening or why it is happening in a particular way. Financial discussions involve cognitive processes by which financial socialisation contributes to attitude, knowledge, and capabilities. In turn, these cognitions form definitions of financial well-being (Shim et al., 2010). Vygotsky (1956) introduced sociocultural theory as an extension of Piaget's (1952) theory of cognitive development. Vygotsky (1956) claimed that cognitive skills have their origins in social relations, and that they are embedded in a sociocultural backdrop. The emphasis is on the fact that a child's development and learning cannot be studied in isolation from environmental factors or external influences on the child's cognitions and social and cultural activities. The argument is that the social environment and the interaction with that social environment influence children's cognitive development. Thus, culture in the form of social interaction plays an important role in the cognitive development of individuals from an early age (Iqbal, 2015). Vygotsky (1956) further assumed that cognitive development varies across cultures, as cultures use different techniques as memory strategies. Vygotsky's (1956) argument is that learning is a collaborative process whereby meanings are constructed through the process of social interaction, questioning, discussion, and dialogue. Sociocultural theory has been validated regarding the role of culture in children's development. Children's levels of cognitive development not only determine what they will learn about consumption from socialisation agents, but also which socialisation processes will influence them. Thus, financial literacy of children is qualitatively changed between early childhood and adulthood, based on their responses to interactions with the financial environment, not only by their cognitive abilities (Iqbal, 2015).

2.2 Previous studies

Research has shown that parental financial socialisation is impactful to children's development of financial knowledge (Serido & Deenanath, 2016). Studies have compared the influence of parental financial socialisation to other socialisation agents such as school, work, media, and peers and have found that parents seem to be the primary source of financial learning (Grohman et al., 2015). This study measures parental financial socialisation influence on financial knowledge through parental financial behaviour, parental financial monitoring, parental financial discussion, parental financial communication, and parental financial teaching.

Parental financial behaviour is a critical component of parental financial socialisation that can improve financial knowledge of young black African adults. This occurs when children view their parents as role models and do what their parents did when they grow up. When parents pay bills, put money aside for emergencies, they model the financial norms, attitudes, and behaviours that form the foundation for their children's financial values (Buccioli & Veronesi, 2014). Observation of parents' financial behaviours is influential in developing financial knowledge in children that sustain into the future (Garrison & Gutter, 2010). Otto (2009) found that parents' saving example influenced their children's saving skills and financial knowledge. Parents with more experience in financial management are likely to transfer their financial knowledge and skills to children.

Parental monitoring of children's use of money is a mechanism by which parents help children internalise and familiarise with parents' rules and expectations about financial practices. The importance of parental financial monitoring is visibly in the development of sensible financial knowledge. Norvilitis & MacLean (2010) for example in reference to over-indebtedness found that parental monitoring of children's finance is associated with improved financial knowledge to deal with debt which ultimately led to lower level of debt. When children are given the opportunity to manage small amounts of money themselves with little parental monitoring, they start to understand financial responsibility better and increase their confidence in the financial decisions they make and their overall financial knowledge (Jorgensen & Salva, 2010).

Parental financial discussions are sometimes referred to parental financial communication in financial socialisation literature, however, the two are not the same and they differ fundamentally. The main difference between parental financial discussions and parental financial communication is that in parental financial discussions children are involved in discussions about family financial matters and also involved in financial decisions and allow input from their children, while in parental financial communication children are informed about family financial matters (Kim & Torquati, 2019). Parental financial discussion is a process where parents discuss openly financial matters, children are

not only considered as receivers of financial information, but they can also play a role of advising their parents. Solheim et al., (2011) found that parental financial discussions during childhood is an important socialisation mechanism of saving and money management for young adults and improves financial knowledge of young adults.

Parental financial communication involves speaking to children about finances without necessarily requiring their inputs. Children are therefore not involved in family financial matters but informed. For example, parents explaining the family spending plan to children so that they are not surprised if certain items are not considered in the household spending plan or not purchased at all. Parental financial communications are tools for educating children about financial issues such as saving, budgeting, investing, consumer skills, avoiding financial problems and building strong foundational financial well-being and financial knowledge (Kim & Torquati, 2019). Kim et al. (2011) found that higher levels of parent communication about child donations were positively associated with both children's saving for the future schooling and their likelihood of donating to charities.

Studies support the view that parental financial teaching influences financial knowledge. Grinstein-Weiss et al. (2012) assert that greater parental teaching is associated with reduced loan delinquency and foreclosure, and later asset accumulation and outcomes on young adults. Homan (2016) found that young adults who received the most parental financial teaching have fewer loans than those who never received such teaching due to high financial knowledge. Similar studies related to financial well-being of young adults also found that parents influence young adults' financial attitudes and knowledge. Moreover, parents who explicitly taught their children were found to have a greater influence on their children financial knowledge (Kim et al., 2012). Bucciol & Veronesi (2014) revealed that parental teaching to save increases the likelihood that an adult will save by 16% and the saving amount by about 30%.

2.3 Financial Knowledge

Financial knowledge is considered a key dimension of financial literacy (Huston, 2010). Other studies used financial knowledge as a synonym of financial literacy (Huang et al., 2013; Bucher-Koenen et al., 2017). However, financial knowledge is different from financial literacy because financial knowledge is information that is learned, organized, represented, and stored in memory. Individuals can retrieve, use, and update their financial knowledge to create inherent and useful property of the knowledge itself and make reasoning and elaboration regarding their financial decisions (Wang, 2009). Thus, financial knowledge refers to the understanding one has of important personal finance concepts, like budgeting and saving. Additionally, for Delavande et al. (2008) financial knowledge is a particular type of capital acquired in life through learning the ability to manage income, expenditure, and savings in a safe way. Financial knowledge has two important components, namely, objective knowledge and subjective knowledge (Allgood & Walstad, 2016). Objective financial knowledge is often referred as actual financial knowledge while subjective financial knowledge is sometimes referred as perceived financial knowledge in literature (Henager & Cude, 2019). Huston (2010) assert that financial knowledge can be categorised into two spheres, namely, knowledge dimension and application dimension. With knowledge dimension referring to knowledge acquired through education and or experience specifically related to essential personal finance concepts and products. While application dimension refers to the ability and confidence to effectively apply or use knowledge related to personal finance and concepts and products. Financial knowledge seems to impact financial practices and outcomes. According to Braunstein & Welch (2002), a deficiency in financial knowledge impacts the day-to-day management of finances as well as the ability to save money for the long term. Robb & Sharpe (2009) assert that financial knowledge is a significant factor in the credit cards decisions of students. A lack of financial knowledge has been associated with behaviours that led to financial mistakes such as over borrowing, high interest rate mortgages, and limited saving and investment (Lusardi, 2008). Young adults need to have the basic financial knowledge and skills to make important personal financial decisions. Financial knowledge is more likely to have a positive effect on young adult's awareness of money, recording expenses, savings attitudes, and financial behaviour (Supanantaroek et al., 2017). Young black African adults need an understanding of finances in order to become financially stable adults and avoid making poor choices with their money in the future.

3. Methodology

The philosophical assumptions underlying this study is positivism tradition. This implies an objective epistemology and the ontological belief that there is only one true reality (Saunders et al., 2016). In line with positivism, this study uses existing theory to develop hypotheses, which are tested and confirmed, in whole or part, or refuted. This study uses quantitative approach, as it is more formal and can be greatly controlled in testing the relationship between variables and express or explain a phenomenon in amount or quantity (Gerrish & Lacey, 2006). This study adopts non-experimental design because its objective is to explain the relationship between parental financial socialisation and financial knowledge. This design is also widely used in quantitative research. This study used self-administered questionnaire which were distributed to respondents' homes to collect data. Questionnaire were design in line with the objectives of the study and used existing Likert type scales adopted from literature and also self-constructed scales. The Likert scale consisted of 5-point scales that ranged from strongly disagree (1) to strongly agree (5).

This study focuses on low-income and rural areas in South Africa. This is because young black African adults in rural and low-income area in South Africa are financial vulnerable and facing financial challenges. According to STATSSA (2016) Eastern Cape and Limpopo are the two provinces with high level of poverty and with most municipalities classified as B4 categories which indicates rural area. Intsika Yethu Municipality in Eastern Cape have

the highest poverty in South Africa followed by Greater Tubatse and Fetakgomo in Limpopo. Therefore, the study area is Intsika Yethu and Fetakgomo Tubatse municipalities. The total population for this study is 153 694 young black African adults between the age of 18 and 35 in Fetakgomo Tubatse and Intsika Yethu municipalities, with a sample size of 500 calculated through Yamane (1967) formula, Krejcie & Morgan's (1970) table and considering the recommended sample size for conducting Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM) (Tabachnick & Fidell, 2013).

This study used cluster sampling, random sampling, proportionate stratified sampling, and systematic sampling because they afforded all young black African adults in Fetakgomo Tubatse and Intsika Yethu municipalities an equal chance to be included in the sample (Babbie, 2013). Cluster sampling is used to divide and group each municipality into wards, villages, households where young black African adults are visited. Random sampling was used to sample wards from each municipality, where a ward number of each ward is written on a piece of paper, folded, placed in a box and picked one by one until a number of desired wards is reached. To ensure enough representation in this study, at least 50% of the wards are selected. Fetakgomo Tubatse Municipality is made up of 39 wards, with 342 villages and 189 269 households. Therefore $(39 \times 0.50) = 19$ wards are selected. While Intsika Yethu Municipality is made of 21 wards, with 214 villages and 40 448 households. Thus, $(21 \times 50\%) = 10$ wards are selected. Proportionate stratified sampling is used to apportion sample size to each municipality and also to each selected ward based on the population proportion percentage. Simple random sampling is applied again to select villages and households in each ward as young black African adults are visited at their homes to collect data. The geographic map was obtained from Fetakgomo Tubatse and Intsika Yethu municipalities which indicates the villages, streets, and location of households. As displayed on the map, the first village from each ward together with the first household is randomly selected, but if there are no respondents that meet the inclusion criteria in the first household, the next household is visited.

Thereafter, a systematic sampling method is used, where households are selected per interval. As the first household was selected randomly, a systematic procedure is followed as per the determined interval (Godwill, 2015). The interval is calculated by taking sample size and divide by sampled wards. In Fetakgomo Tubatse municipality the researcher counted households $(306/19) = 16$ from 1 to 15 from both sides of the street, then the 16th household will be selected. For Intsika Yethu municipality the interval is $(78/10) = 7$, thus the researcher counts from 1 to 6, from both sides of the street, then the 7th household is selected. If no young adults, the next household is visited. This procedure was repeated until a household with young adults is found then the counting starts again. The same procedure is followed on the next village until a sample size is reached. Thereafter the next ward is visited, applying the same procedure until the data collection is completed by reaching the required sample size. A total of 423 young black African adults completed the questionnaire.

This study measured validity and reliability through construct validity and Cronbach alpha. Construct validity was assessed through EFA by conducting a Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity. The acceptable value of KMO which is suitable and adequate for EFA is 0.50 and above. While Bartlett's test of sphericity is significant for EFA if the significance value is $(p < 0.05)$. Factors loadings of ± 0.30 to ± 0.40 are minimally acceptable, values greater than ± 0.50 are generally considered necessary for practical significance (Hair et al., 2014). This study retained a minimum factor loading of .30 for interpretation. Cronbach alpha was used to measure reliability, as is the most widely used reliability measure of internal consistency (VanderStoep & Johnson, 2009). Cronbach alpha with a score of 0.60 and more were accepted and considered to be reliable (Cohen et al., 2018). Data was further analysed through descriptive statistics and SEM. Descriptive statistics described and summarised data by calculating means and standard deviations. SEM was used to test the relationship between parental financial socialisation and financial knowledge. Further SEM was used to construct and test a model for this study.

3.1 Conceptual Model and Hypotheses

To develop conceptual model and hypotheses, this study adopts family financial socialisation theory by Gudmunson & Danes (2011). Figure 1 indicates the conceptual model and five hypotheses of the study.

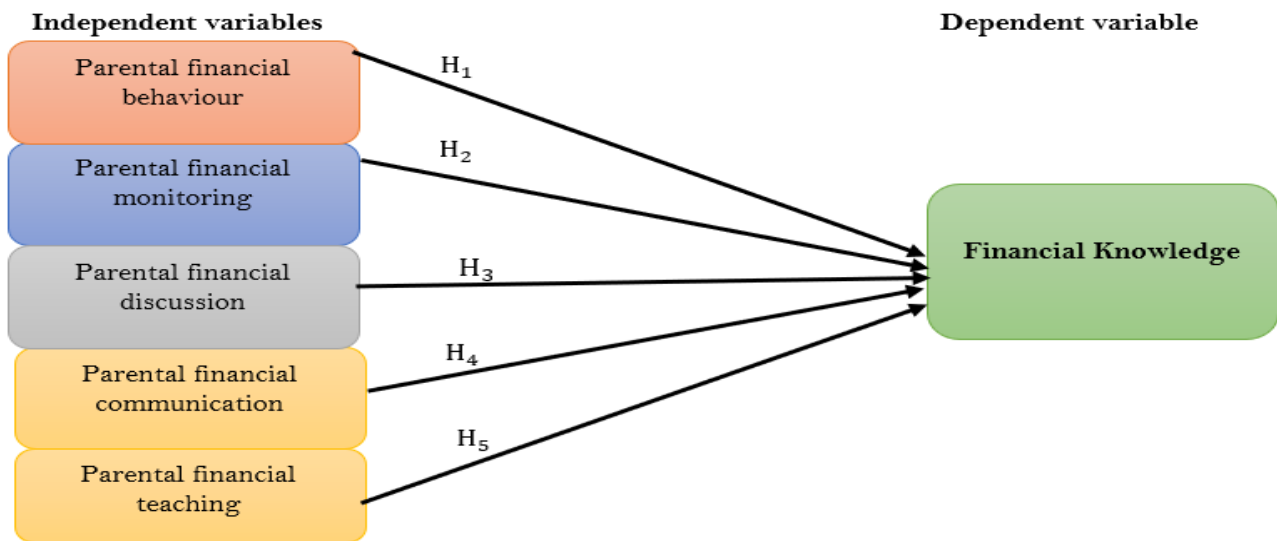


Figure 1: Conceptual model of the study

Source: (Author's construct, 2023)

As depicted in figure 1 the following hypotheses were developed:

- H1: There is a significant positive relationship between parental financial behaviour and financial knowledge.
- H2: There is a significant positive relationship between parental financial monitoring and financial knowledge.
- H3: There is a significant positive relationship between parental financial discussion and financial knowledge.
- H4: There is a significant positive relationship between parental financial communication and financial knowledge.
- H5: There is a significant positive relationship between parental financial teaching and financial knowledge.

4. Results

This section presents the empirical findings and interpretations of the research.

4.1 Descriptive Statistics

Descriptive statistics indicated that majority of the respondents were from Fetakgomo Tubatse municipality (60%) and 40% were from Intsika Yethu municipality. This is in line with this study sample size, where Fetakgomo Tubatse had a large, calculated sample size based on the population. Most of the respondents were female (66.7%) and 33.3% were male. Age was widely spread with all categories attaining at least 20%. This is in line with the population distribution of Fetakgomo Tubatse and Intsika Yethu local municipalities where female population is higher compared to male (STATSSA, 2018). Most respondents were between the ages of 18 to 20 years (28.2%), followed by 31 to 35 years (26.5%), then 26 to 30 years (23.1%) and lastly 21 to 25 years (22.2%). Most respondents were single (28.8%) while a high number were living with their partners (25.2%). This confirms the findings by STATSSA (2018) that there is an increase in a co-habiting (living with a partner) relationships among young adults in South Africa. Majority of respondents indicated that their female parents (62.7%) were more likely to talk about money with them, while male parents (24.2%) are likely to talk to their children about money. Most respondent's parents earn less than R 5 000 (32.2%) and between R 5 000 and R 10 000 (27.8%), while minority earning more than R 20 000 (5.5%). This is in line with the categorisation of Fetakgomo Tubatse and Intsika Yethu as rural and low-income area. For education, most respondents indicated that their parents hold a matric (28.0%) and a high number indicated that their parents do not have a matric (23.3%), those whose parents have diploma (15.7%), degree (14.4%), honours degree (10.6%), masters (7.6%) and doctorate (0.4%). As for occupation most respondents' parents were general workers (12.5%) and self-employed (12.3%). However, there is a high number of parents who are unemployed (11.0%). This also confirms the reality of a persisting high unemployment rate in South Africa.

4.2. Validity and Reliability

To assess the suitability of data to conduct factor analysis, KMO and Bartlett's test of sphericity was used in this study. Table 1 shows the results of the KMO and Bartlett's test of sphericity.

Table 1: KMO and Bartlett's Test

Factors	Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
Parental financial behaviour	0.755	833.565	8	0.000
Parental financial monitoring	0.866	3412.603	43	0.000
Parental financial discussion	0.633	329.856	12	0.000
Parental financial communication	0.969	2126.656	14	0.000
Parental financial teaching	0.768	1924.345	13	0.002
Financial knowledge	0.845	1234.302	86	0.000

Source: Author's construct (2023), SPSS

Table 1 showed that the KMO for all factors ranged from 0.633 to 0.969, above 0.60. The p-value of the Bartlett's test for all factors (p=0.000) is smaller than 0.05, is significant. This result is an indication that the correlation structure of construct is adequate to conduct a factor analysis on the items and that all factors are regarded as valid and reliable.

Table 2 shows the results of the EFA, reliability by depicting the Cronbach's alphas, and descriptive statistics for the constructs and factors of the study.

Table 2: Validity, reliability, and descriptive statistics results

Factors	EFA factor loadings			CA	Descriptive statistics	
	Items	Highest	Lowest	α	μ	SD
Parental financial behaviour	5	0.945	0.631	0.946	3.31	1.24
Parental financial monitoring	4	0.938	0.419	0.860	3.23	1.17
Parental financial discussion	5	0.879	0.555	0.923	3.12	1.26
Parental financial communication	4	0.927	0.665	0.945	2.90	1.38
Parental financial teaching	6	0.951	0.320	0.909	3.03	1.29
Financial knowledge	10	0.976	0.398	0.934	3.20	1.14

Source: Author's construct (2023), SPSS

Table 2 indicated that six factors were extracted by the EFA, with all items loaded onto the factors as expected, with loadings of above 0.30. The overall factor loadings range from 0.320 to 0.976. The Cronbach's alpha coefficients were above 0.6 and were acceptable and considered reliable. The descriptive statistics provided the means and standard deviation. Regarding the means, majority of respondents agreed with the statements measuring parental financial behaviour (3.31), parental financial monitoring (3.23), financial knowledge (3.20), parental financial discussion (3.12), parental financial teaching (3.03) and disagreed with statements measuring parental financial communication (2.90). The standard deviations of all factors are high showing that the respondents' responses varied. However, parental financial discussions had the highest standard deviation of 1.38 indicating that the responses varied mostly with regard to this factor's statements.

4.3. Structural Equation Modelling

The structural equation modelling (SEM) was used in this study. SEM offers numerous advantages over conventional analysis, including greater flexibility regarding assumptions, inclusion of latent variables into the analyses and allows the study to measure any combination of relationships by examining a series of dependent relationships simultaneously while considering potential errors of measurement among all variables (Kline, 2005). Therefore, for this study SEM is used to test the relationship between parental financial socialisation variables (independent variables) such as parental financial behaviour, parental financial monitoring, parental financial discussion, parental financial communication, and parental financial teaching and financial knowledge (dependent variable). SEM is also used to test the model for this study. Table 3 shows the regression weights for model variables.

Table 3: Regression weight of the financial knowledge model
Regression Weights: (Group number 1- Default model)

	Estimate	S.E.	C.R.	S.R.W.	p
Financial knowledge <-- Parental financial behaviour	0.190	0.035	5.467	0.227	0.000
Financial knowledge <-- Parental financial monitoring	-0.160	0.034	4.651	0.187	0.002
Financial knowledge <-- Parental financial discussion	0.230	0.041	5.985	0.251	0.000
Financial knowledge <-- Parental financial communication	0.452	0.131	6.179	0.413	0.000
Financial knowledge <-- Parental financial teaching	0.153	0.111	4.119	0.166	0.001

Estimate= estimated path coefficient (prediction) for arrows in the model
 SE= standard error
 CR= critical ratio
 SRW= standardised regression weights
 P= probability value (<0.05=significant at 1%***)

Table 3 indicated that the casual relationships have a p value less than 0.05 indicating 95% or more level of confidence. The estimates range from 0.153 to 0.452. Parental financial behaviour has a significant positive linear relationship to financial knowledge and its contribution is 0.190 and a significant p value of 0.000. This means that an increase in the value of parental financial behaviour leads to an increase in the value of financial knowledge. Parental financial monitoring has a negative significant influence on financial knowledge and its contribution is -0.160 and a significant p value of 0.002. This meant that an increase in the value of parental financial monitoring led to a decrease in the value of financial knowledge. Parental financial discussion was observed to have a significant influence on financial knowledge and its contribution is 0.230 and a significant p value of 0.000. Thus, an increase in the value of parental financial discussion leads to an increase in the value of financial knowledge. Parental financial teaching has a significant positive relationship to financial knowledge and its contribution is 0.153 with a significant p value of 0.000. Therefore, an increase in the value of parental financial teaching leads to an increase in the value of financial knowledge. It is observed that parental financial communication has the highest contribution to financial knowledge (0.452 or approximately 45%). Table 4 indicates the squared multiple regression correlations of the financial knowledge model.

Table 4: Squared multiple regression correlations of the financial knowledge model
Squared multiple correlations: (Group number 1- Default model)

	Estimate
Financial knowledge	0.491

Table 4 indicated that the independent variables explain 49% ($R^2=0.491$) of the financial knowledge model. The R^2 of financial knowledge model represents large practical effect size (Kraft, 2020). This means that the financial knowledge model is valid, reliable, and acceptable.

The goodness of fit indices was also determined. Fit indices are used to inform the researcher how closely the data fit the model (Hair et al., 2014). Table 5 indicates the results of the financial knowledge model goodness of fit indices.

Table 5: Financial knowledge model goodness of fit indices

Index	Recommended value	Actual value	Remark
Chi-square (CMIN)	< 0.05	0.001	Very good
Goodness-of-Fit Index (GFI)	≥ 0.95 (not generally recommended)	1.000	Very good
Comparative Fit Index (CFI)	≤ 1 (values close to 1 indicate a very good fit)	0.936	Very good
Root Mean Square Error of Approximation (RMSEA)	< 0.08	0.073	Very good
Standardised Root Mean Square Residual (SRMR)	< 0.08	0.043	Good
Normed Fit Index (NFI)	≤ 1 (values close to 1 indicate a very good fit)	0.626	Good
Tucker-Lewis Index (TLI)	≤ 1 (values close to 1 indicate a very good fit)	0.901	Very good

Source: Author's construct (2023), AMOS

As indicated in table 5, the goodness of fit indices showed a good fit between the data and the financial knowledge model. All the goodness of fit indices confirm that the data fit the model significantly (CMIN = 0.001, GFI = 1.000, CFI = 0.936, RMSEA = 0.073, SRMR = 0.043, NFI = 0.626 and TLI = 0.901). This means that the model fits the data being tested and is valid, reliable, and acceptable. Figure 2 presents the parental financial socialisation model.

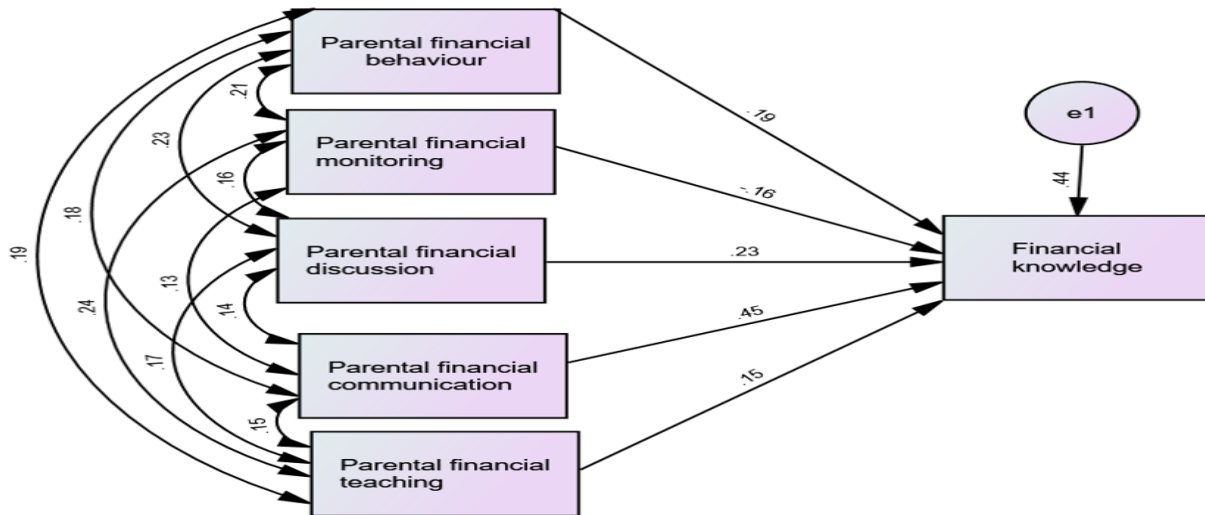


Figure 2: Parental financial socialisation model

Source: Author's construct (2023), AMOS

Considering the results of the SEM and the model the decision to accept or reject hypothesis is indicated in table 6.

Table 6: Hypotheses decision

Hypotheses	Decision
H1: There is a significant positive relationship between parental financial behaviour and financial knowledge.	Accept
H2: There is a significant positive relationship between parental financial monitoring and financial knowledge.	Reject
H3: There is a significant positive relationship between parental financial discussion and financial knowledge.	Accept
H4: There is a significant positive relationship between parental financial communication and financial knowledge.	Accept
H5: There is a significant positive relationship between parental financial teaching and financial knowledge.	Accept

Source: Author's construct (2023)

SEM results shown in figure 2 showed that parental financial behaviour, parental financial discussion, parental financial communication, and parental financial teaching had significant positive impact on financial knowledge. This may be because the sample was adequate enough to compensate for any deficiency in responses.

It is observed that parental financial communication had the strongest impact on financial knowledge. This result was surprising because parents in rural and low-income areas in South Africa uphold cultural values and believe that discussing financial matters with children is a taboo. So, it was interesting to see that parental financial communication had a strongest impact.

Parental financial monitoring had a significant negative impact on financial knowledge. This was somehow expected as parents in rural and low-income areas apply rigid parenting style which is high on control and monitoring of children behaviour.

Therefore, hypotheses H1, H3, H4 and H5 were accepted, while H2 was rejected. The hypotheses decisions were indicated in table 6. Thus, it is concluded that parental financial socialisation has impact on financial knowledge of young black African adults in rural and low-income area in South Africa.

This study showed mixed results, on one hand in support and on the other hand refuting the previous empirical studies. The results of this study are consistent with the findings of previous studies in parental financial behaviour by showing that there is a significant positive relationship between **parental financial behaviour** and financial knowledge. Garrison and Gutter (2010) also found that parental financial behaviour is influential in developing financial knowledge of children that can be sustained into the future. Tang (2017) found that parents' financial behaviour will also influence their children development of general skills and financial knowledge during adolescence. This study used the same methods as that of Garrison and Gutter (2010) and Tang (2017), maybe this explains why the results are consistent. However, the sample characteristics are completely different, as this study focused on young adults in rural and low-income areas.

This study contradicted previous studies relating to **parental financial monitoring** by showing that there is no significant positive relationship between parental financial monitoring and financial knowledge. Norvilitis & MacLean (2010) found that parental monitoring of children's finance is associated with improved financial knowledge.

Jorgensen & Salva (2010) found that parental financial monitoring leads to better understanding of financial responsibility and increased confidence in financial decision-making and financial knowledge of young adults. The differences in the results may be because parents in rural and low-income areas, especially in South Africa monitored and controlled their children's finances without necessary empowering them to make sound financial decisions. Culture has a role to play here because parents from cultural background believe in controlling not monitoring.

For **parental financial discussions**, this study agrees with previous studies by showing that there is a significant positive relationship between parental financial discussions and financial knowledge. Solheim et al. (2011) found that parental financial discussions during childhood is an important socialisation mechanism of saving and money management for young adults and improves financial knowledge of young adults. This is somehow surprising that parents in rural and low-income areas engaged in parental financial discussions with their children which translated in their children being financial knowledgeable. Parents in rural and low-income areas still uphold culture and believes that money issues should not be discussed with children.

Similarly, this study is consistent with other studies in **parental financial communication** by showing that there is a significant positive relationship between parental financial communication and financial knowledge. Kim & Torquati (2019) found that parental financial communication is a tool for educating children about financial issues such as saving, budgeting, investing, consumer skills, avoiding financial problems and building strong foundational financial well-being and financial knowledge. This study results are the same with other studies because parents in rural and low-income areas in South Africa appears to be moving away from cultural notion and believe that finances should not be communicated with children.

Furthermore, this study supports the findings of previous studies in **parental financial teaching** by showing that there is a positive significant relationship between parental financial teaching and financial knowledge. Kim et al. (2012) found that parents who explicitly taught their children about finances were found to have a greater influence on their children financial knowledge. The field of parental financial teaching is still at infancy in South Africa but interestingly parents in South Africa, especially in rural and low-income areas are moving in line with what other parents in developed countries are doing which is teaching their children about financial matters and improving their financial knowledge.

5. Conclusion and Recommendations

This study through SEM investigated the impact of parental financial behaviour, parental financial monitoring, parental financial discussion, parental financial communication, and parental financial teaching on financial knowledge. SEM was also used to propose a financial knowledge model for this study. The validity and reliability of the proposed model was performed through the goodness of fit indices which confirmed that the data fit the model significantly. This study excluded other potential factors which may affect parental financial socialisation because it was impossible to include more factors and it was assumed that parents are capable to teach, discuss, communicate financial matters with their children. SEM results showed that parental financial behaviour, parental financial discussion, parental financial communication, and parental financial teaching had significant positive impact on financial knowledge. It is observed that parental financial communication had the strongest impact on financial knowledge. Parental financial monitoring had a significant negative impact on financial knowledge. Thus, it is concluded that parental financial socialisation has impact on financial knowledge of young black African adults in rural and low-income area in South Africa. This study produced mixed results, in support and refuting previous empirical studies. This showed that the field of parental financial socialisation still need more studies to understand the impact it has on financial knowledge. Young black African adults' financial knowledge is important to ensure healthy financial well-being. Thus, young black African adults need to have the basic financial knowledge to make imperative financial decisions. Parents have a bigger role to play in improving financial knowledge of young black African adults. Parents should be keenly aware that their actions and behaviours around money, and their own financial decision-making, will likely leave a lasting impression.

Therefore, this study recommends that parents should increase the amount of direct financial communication between them and their children. This may be done through including the child in the family financial matters along with discussing situations and appropriate alternatives with them. This may also include verbally discussing their decision-making process when making a purchase with the child and include children in household budget to ensure that young black African adults improve their financial knowledge. Parents are also advised to seek out and encourage children and young adults to partake in formal financial education opportunities. Financial educators, financial service professionals such as financial institutions, financial counsellors and planners, and policy makers should be interested in the findings of this study. Financial educators should rigorously plan, design, implement financial education programmes for young black African adults in rural and low-income areas to ensure that they are able to provide the most positive impact possible on financial knowledge of young black African adults. Financial education programmes should also be tailored to teach parents about personal financial management so that they are able to teach their children sound financial management practices and be a good financial role model to their children. Similarly, financial educators, financial practitioners and government should design financial programmes targeted to parents with less than matric and tertiary education levels to enhance their financial knowledge to improve financial knowledge and financial well-being of young adults.

This study was not without limitations. Due to the low levels of general literacy among the respondents, which negatively affected data collection; some young adults did not understand the questionnaire and withdrew from participating in the study. Furthermore, even though confidentiality and anonymity were guaranteed, respondents were reluctant to participate in the study. They feared exposing their financial position and displayed a lack of trust.

This study contributed to the body of knowledge of parental financial socialisation and financial knowledge by showing that parental financial socialisation has impact on financial knowledge of young black African adults in rural and low-income area in South Africa. This was done through SEM, which was also a methodology contribution as there is no study which has done this before. This study also provided recommendations to parents and financial educators in quest to improve financial knowledge of young black African adults in rural and low-income areas in South Africa.

References

- Agarwal, S.J., Driscoll, J.C., Gabaix, X. & Laibson, D. (2009). The age of reason: financial decisions over the life cycle with implications for regulation, *Brookings Papers on Economic Activity*, 2: 51-117.
- Allgood, S., & Walstad, W.B. (2016). The effects of perceived and actual financial literacy on financial behaviours, *Economics Inquiry*, 54(1), 675-697.
- Antoni, X.L. (2018). The role of family structure and financial socialisation in influencing students' financial capabilities, PhD thesis. Nelson Mandela Metropolitan University, Port Elizabeth.
- Antoni, X.L. (2014). Financial literacy and behaviour among the black community in Nelson Mandela Bay, MCom. Nelson Mandela Metropolitan University. Port Elizabeth.
- Antoni, X.L., Rootman, C., & Struwig, F.W. (2019). The influence of parental financial socialisation techniques on student financial behaviour, *International Journal of Economics and Finance Studies*, 11(2), 72-88. <https://doi.org/10.34109/ijefs.201911205p>
- Antoni, X.L., & Saayman, M. (2021). The influence of financial socialisation mechanisms on young financial professionals' financial literacy levels in the Eastern Cape, *Academy of Accounting and Financial Studies Journal*, 25(3), 1-15.
- Babbie, E. (2013). *The Practice of Social Science Research*. International edition. 13th edition. Wadsworth: Cengage Learning.
- Braunstein, S., & Welch, C. (2002). Financial literacy: An overview of practice, research, and policy. Available from: <http://www.federalreserve.gov/pubs/bulletin/2002/1102lead.pdf> [Accessed 15 May 2019].
- Buccioli, A., & Veronesi, M. (2014). Teaching children to save: what is the best strategy for lifetime savings? *Journal of Economic and Psychology*, 45, 1-17.
- Bucher-Koenen, T., Lusardi, A., Alessie, R., Van Rooij, M. (2017). How financially literate are women? An overview and new insights, *The Journal of Consumer Affairs*, 51(2), 255-283.
- Cameron, M.P., Calderwood, R., Cox, A., Lim, S., & Yamaoka, M. (2014). Factors associated with financial literacy among high school students in New Zealand, *International Review of Economics Education*, 16, 12-21.
- Clarke, M.C., Heaton, M.B., Israelsen, C.L. & Eggett, D.L. (2005). The acquisition of family financial roles and responsibilities, *Family and Consumer Sciences Research Journal*, 33(4), 321-340.
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education*. 8th edition. London: Routledge.
- Delavande, A., Rohwedder, S., & Wills, R.J. (2008). Retirement planning and the role of financial literacy and cognition, Working Paper 2008-190. MI Retirement Research Center.
- Finmark Trust. (2019). Finscope South Africa 2019 pocket guide. Available from: https://finmark.org.za/system/documents/files/000/000/242/original/FinScope_SA_2019_Pocket_Guide_2020.pdf?1604679365#:~:text=FinScope%20gives%20some%20clues%20on,of%20the%20COVID%2D19%20pandemic. [Accessed 30 March 2022].
- French, D., & McKillop, D. (2016). Financial literacy and over-indebtedness in low-income households, *International Review of Financial Analysis*, 48, 1-11.
- Friedline, T. (2015). A development perspective on children's economic agency, *Journal of Consumer Affairs*, 49(1), 39-68.
- Garg, N., & Singh, S. (2018). Financial literacy among youth, *International Journal of Social Economics*, 45(1), 173-185.
- Garrison, S.T., & Gutter, M.S. (2010). Gender differences in financial socialisation and willingness to take financial risks, *Journal of Financial Counselling and Planning*, 21(2), 60-83.
- Gerrish, K., & Lacey, A. (2006). *The research process in nursing*. 5th ed. London: Blackwell.
- Godwill, E.A. (2015). *Fundamentals of research methodology: a holistic guide for research completion, management, validation and ethics*. New York: Nova Publishers.
- Grinstein-Weiss, M., Spader, J.S., Yeo, Y.H., Key, C.C., & Freeze, E.B. (2012). Loan performance among low-income households: does prior parental teaching of money management matter? *Social Work Research*, 36(4), 257-270.
- Grohmann, A. (2018). Financial literacy and financial behaviour: evidence from the emerging Asian middle class, *Pacific-Basin Finance Journal*, 48, 129-143.
- Grohmann, A., Kouwenberg, R. & Menkhoff, L. (2015). Childhood roots of financial literacy, *Journal of Economic Psychology*, 51, 114-113.
- Gudmunson, C.G., & Danes, S.M. (2011). Family financial socialisation: theory and critical review, *Journal of Family and Economic Issues*, 32, 644-667.
- Hair, J.F. Jr., Black, W.C., Babin, B.J., & Anderson, R. E. (2014). *Multivariate data analysis*. 7th edition. Harlow: Pearson.
- Henager, R., & Cude, B.J. (2019). Financial literacy of high school graduates: long- and short-term financial behaviour by age group, *Journal of Family and Economic Issues*, 40, 564-575.

- Homan, A.M. (2016). The influence of parental financial teaching on saving and borrowing behaviour. Msc thesis. University of Groningen.
- Huang, J., Nam, Y., & Sherraden, M.S. (2013). Financial knowledge and child development account policy: a test of financial capability, *The Journal of Consumer Affairs*, 47(1), 1-26.
- Hudson, C., Young, J., Anong, S., Hudson, E. & Davis, E. (2017). African American financial socialisation, *The Review of Black Political Economy*, 44(3-4), 285-302.
- Huston, S.J. (2010). Measuring financial literacy, *The Journal of Consumer Affairs*, 44(2), 296-316.
- Iqbal, H.M. (2015). Educational theories of cognitive development, *International Encyclopedia of the Social & Behavioural Sciences*, 4, 51-57.
- James, D. (2014). Deeper into a hole? Borrowing and lending in South Africa, *Current Anthropology*, 55(9), 17-28.
- Jorgensen, B.L., & Savla, J. (2010). Financial literacy of young adults: the importance of parental socialisation, *Family Relations*, 59, 465-478.
- Kim, J., Chatterjee, S., & Kim, J.E. (2012). Debt burden of young adults in the United States, *Journal of financial Counselling and Planning*, 23(2), 55-67.
- Kim, J., LaTaillade, J. & Kim, H. (2011). Family processes and adolescents' financial behaviors, *Journal of Family and Economic Issues*, 32, 668-679.
- Kim, J.H., & Torquati, J. (2019). Financial socialisation of college students: domain-general and domain-specific perspectives, *Journal of Family and Economic Issues*, 40(2), 226-236.
- Kline, R.B. (2005). *Principles and practice of structural equation modeling*. 2nd edition. New York: The Guilford Press.
- Kraft, M.A. (2020). Interpreting effect sizes of education interventions. *Educational Researcher*, 49(4), 241-253.
- Krejcie, R.V., & Morgan, D.W. (1970). Determining sample size for research activities, *Educational and Psychological Measurement*, 30, 607-610.
- Loke, Y.J. (2015). Financial knowledge and behaviour of working adults in Malaysia, *The Journal of Applied Economic Research*, 9(1): 18-38.
- Lusardi, A. (2008). Financial literacy: an essential tool for informed consumer choice? Working Paper 14084. *National Bureau of Economic Research*.
- Lusardi, A., Mitchell, O. & Curto, V. (2010). Financial literacy among the young, *Journal of Consumer Affairs*, 44 (2), 358-380.
- Moschis, G.P., & Churchill, G.A. (1978). Consumer socialisation: A theoretical and empirical analysis, *Journal of Marketing Research*, 15(4), 599-609.
- Nomlala, B. (2021). Financial socialisation of accounting students in South Africa, *International Journal of Finance & Banking Studies*, 10(2), 1-15.
- Norvilitis, J.M., & MacLean, M.G. (2010). The role of parents in college students' financial behaviours and attitudes, *Journal of Economic Psychology*, 31(1), 55-63.
- Otto, A.M.C. (2009). The economic psychology of adolescent saving. PhD thesis, University of Exeter: Exeter.
- Piaget, J. (1952). *The origin of intelligence in children*. New York: International University Press.
- Ramavhea, G., Fouche, J. & Van der Walt, F. (2017). Financial literacy of undergraduate students a case study of a public university in South Africa, *International Journal of Economics and Finance Studies*, 9(2), 48-65.
- Rea, J.K., Danes, S.M., Serido, J., Borden, L.M., & Shim, S. (2019). Being able to support yourself: young adults' meaning of financial well-being through family financial socialisation, *Journal of Family and Economic Issues*, 40(2), 250-268.
- Robb, C.A., & Sharpe, D.L. (2009). Effect of personal financial knowledge on college students' credit card behaviour, *Journal of Financial Counselling and Planning*, 20 (1), 25-43.
- Sallie, N. (2015). The impact of socialisation factors on financial literacy and financial security amongst employees in the financial services industry. MBA thesis. University of Pretoria, Pretoria.
- Saunders, M.N.K., Lewis, P., & Thornhill, A. (2016). *Research methods for business students*. 7th edition. Harlow: Pearson.
- Serido, J., & Deenanath, V. (2016). *Financial parenting: promoting financial self-reliance of young consumers*. *Handbook of consumer finance research*. 2nd edition. New York: Springer Science and Business Media.
- Shim, S., Barber, B.L., Card, N.A., Xiao, J.J., & Serido, J. (2010). Financial socialisation of first-year college students: the roles of parents, and education, *Journal of Youth and Adolescence*, 39(12), 1457-1470.
- Solheim, C. A., Zuiker, V. S., & Levchenko, P. (2011). Financial socialization family pathways: reflections from college students' narratives. *Family Science Review*, 16, 97-112.
- Supanantarook, S., Lensink, R. & Hansen, N. (2017). The impact of social and financial education on savings attitudes and behaviour among primary school children in Uganda, *Evaluation Review*, 41(6), 511-541.
- STATSSA. (2018). Poverty trends in South Africa: an examination of absolute poverty between 2006 and 2015. Report No: 03-10-06. Available from: <http://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf> [Accessed 18 March 2019].
- STATSSA. (2016). Community survey 2016, statistical release P0301. Available from: http://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016_Statistical-releas_1-July-2016.pdf [Accessed 12 May 2019].
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. 6th edition. Boston, MA: Allyn & Bacon.
- Tang, N. (2017). Like father like son: how does parents' financial behaviour affect their children's financial behaviour? *The Journal of Consumer Affairs*, 51(2), 284-311.
- VanderStoep, S.W. & Johnson, D. D. (2009). *Research methods for everyday life: blending qualitative and quantitative approaches*. San Francisco: Wiley.
- Wang, A. (2009). Interplay of investors' financial knowledge and risk taking, *The Journal of Behavioural Finance*, 10: 204-213.
- World Bank. (2022). Inequality in Southern Africa: an assessment of the Southern African customs union. Available from: <https://documents1.worldbank.org/curated/en/099125303072236903/pdf/P1649270c02a1f06b0a3ae02e57eadd7a82.pdf> [Accessed 30 March 2022].
- Yamane, T. 1967. *Statistics: An Introductory Analysis*, 2nd edition. New York: Harper and Row.

Vygotsky, L.S. (1956). *Thinking and speech: selected psychological studies*, Moscow: Izdatel'stov APN RSFSR.

Zhu, A.Y.F., Yu, C.W.M., & Chou, L. (2019). Improving financial literacy in secondary school students: a randomised experiment, *Youth & Society*, 1-24.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence



Exploring the Impact of Financial and non-Financial Motives on Employee Performance. A Survey of Indonesian Employees.

Maria Argyropoulou ^{†1}, Wynne Aprilia, Rachel Argyropoulou, Dionisia Tzavara

¹ Brunel University, College of Engineering, London UK

ARTICLE INFO

Article History

Received 26 June 2023

Accepted 25 August 2023

JEL Classifications

M12

ABSTRACT

Purpose:

Employees in any workplace around the world should feel motivated to achieve optimal results. Older and more recent research in this area demonstrates the importance of motivation to employee productivity and organizational performance. This research aims to determine not only the role of work motivation on employee performance but also the magnitude of its impact, both theoretically and practically.

Design/methodology/approach:

Quantitative data were gathered by using a questionnaire with 27 close-ended questions. Data was collected from 150 employees in Indonesia with at least one year of work experience. The analysis of this study is carried out with the program SPSS 26.

Findings:

The results of this study show a positive relationship between employee motivation and employee performance, which supports previous research findings and underscores the importance of motivation as an effective tool for today's managers who must respond to unprecedented challenges in a rapidly changing environment. The most important finding from this research is that financial awards is not a statistically significant predictor of employee performance which supports the theory that intrinsic rewards play the most important role in motivational strategy.

Research limitations/implications:

Data from respondents in Indonesia were used for this study. Further research in other international locations is needed to generalise the findings globally. The results of this research suggest that companies, especially those with a majority of employees between the ages of 18 and 29, should strengthen mutual relationships within the company, involve employees in the decision-making process, and provide more opportunities for career advancement, promotions, and employee participation to improve the performance of their employees.

Originality/value:

This study contributes to theory by going a step further and examining the impact of three specific factors on employee performance: financial factors, career aspirations, and mutual relationships.

Keywords:

Employee motivation,
employee performance,
financial incentives,
Indonesia.

1. Introduction

Human resources play a key role in any organization, and the overall success of an organization in achieving its strategic goals is highly dependent on the performance level of its employees. Organizations need employees with high levels of motivation, productivity, and commitment to their jobs (Schaufeli et al., 2009). In recent years, there has been increased interest in the relationship between performance, motivation, and related outcomes. Several researchers have confirmed the positive relationship between employee motivation and performance in either the public sector (Mohamud et al., 2017; Kiruja & Mukuru, 2013) or the private sector (Chien et al., 2020; Ratnawati et al., 2020), the service sector (Hakim et al., 2021), and the manufacturing sector (Jose & Bijin, 2019). Employee encouragement is directly proportional to their performance (Nizam & Shah, 2015; Hakim et al., 2021). The higher the motivation of employees in performing their work, the more they can improve their performance (Sapta et al., 2022). Most workers who enjoy their work perform great and are more effective (Deci & Flaste, 1995), and good

[†] Corresponding Author: Maria Argyropoulou

Email: maria.argyropoulou@brunel.ac.uk

DOI: 10.25103/ijbesar.161.04

performance can improve the organization's performance (Kuswati, 2020). Lack of motivation is the main cause of poor work performance and unmet goals (Afful-Broni, 2012; Kuswati, 2020; Burhanudin et al., 2023), therefore, studying the work motivation of each employee will benefit the company in the long run (Nilasari et al., 2021).

The COVID-19 pandemic has significantly changed the way people work, affecting the routines and activities of employees and changing their work behaviour. According to Narayanamurthy & Tortorella (2021), the impact of COVID-19 on work, i.e., work environment, job insecurity, and virtual contact, has a significant impact on employee performance. As work is performed from home and with minimal supervision, work motivation plays an even greater role.

External factors such as financial incentives are presented as a huge source of employee motivation (Deci & Flaste, 1995; Mohamud et al., 2017; Pangastuti et al., 2020). Employee motivation, however, goes beyond financial rewards (Okine et al., 2021). Intrinsic factors play a greater role than extrinsic factors when it comes to employee motivation (Ryan and Deci, 2017). There could be several elements or factors that may impact employee motivation, such as cultural and geographic differences (Chien et al., 2020), relationships with colleagues, and/or perceived organizational support (Tumi et al., 2021), and research findings outside Europe are needed (Kuvaas et al., 2020).

This research aims to determine not only the role of work motivation on employee performance but also the magnitude of its impact, both theoretically and practically. Considering the above, this study aims to answer the following research questions:

RQ1: Do mutual relationships in work play an important role in employee performance?

RQ2: Do work motivation factors relating to career aspiration really affect employee performance?

RQ3: Do work motivation factors relating to finance impact employee performance?

2. Theoretical background and hypotheses development

2.1 Employee performance

Performance is the achievement of objectives (Chrisnanto & Riyanto, 2020), in accordance with assigned responsibilities (Mangkunegara, 2005). Performance is measured by comparing work results against a standard set by each organisation, i.e., predetermined criteria agreed upon by both parties (Rivai & Basri, 2005). In terms of management, performance is defined as the quality offered or services provided by someone who accomplishes the work (Luthans, 2005). Singh & Jain (2013) defined performance as the achievement of specific tasks measured against predetermined or identified standards for accuracy, completeness, effort, and speed. Employee performance is described as the ability of employees to accomplish their respective work goals, meet expectations, and achieve the standards set by their organisations (Afrizal et al., 2014). Supporting the same, Kamisah (2012) argued that employee performance is the amount of employee contribution to the organisation, including quantity, quality, use of time, and cooperation, whereas Abdurrahman (2018) stated that work quality, quantity, condition, behaviour, and work assessment are the primary indicators of employee performance.

While motivated employees will continuously improve their performance (Chien et al., 2020), a systematic approach to increasing employee motivation is essential to achieve the desired outcome. Waiyaki (2017) stated that job performance is an employee contribution that plays an important role in the growth of an organisation, and employee performance is measured using quality and quantity as parameters (Pawar, 2019).

Work quality is the accuracy of the work performed based on the requirements and standards (Augustinus & Halim, 2021; Kuswati, 2020), including the ability to anticipate problems that arise and find alternative solutions to these situations (Sari, 2021). According to Aima et al. (2017), work quality is determined by the accuracy, thoroughness, and competence of the work. The quality of work and its implementation reflects the commitment of employees to the organisation. Bao and Nizam (2015) stated that employees who are passionate about the quality of their work can be an excellent factor in improving employee performance.

In contrast to work quality, **work quantity** is the amount of work targeted (Kuswati, 2020) within a given time period (Aima et al., 2017). Work quantity can also be defined by time management and the ability of employees to complete a large number of tasks within deadlines (Augustinus & Halim, 2021).

Another essential aspect of maintaining satisfactory employee performance is punctuality. **Punctuality** is an implementation of time and attendance control (Kuswati, 2020). Punctuality also refers to meeting deadlines without extensions (Siregar & Evanita, 2019), and is the most required work behaviour in the workplace (Suwondo and Sutanto, 2015).

Considering several aspects, including punctuality, **work assessment** evaluates the skills and knowledge required to achieve organisational goals (Augustinus & Halim, 2021). Work assessment can be determined by the employees' skills to perform the job satisfactorily, based on the job descriptions and the direction given by the company (Kuswati, 2020).

2.2 Work motivation

Motivation is the key psychological factor that strengthens an employee's sense of belonging to the particular company and encourages them to do their job wholeheartedly (Kiran, 2016). Hakim et al. (2021) pointed out that

motivation can be a driving force that creates enthusiasm for work and makes employees want to work collectively and effectively. Motivation encourages employees to work harder and longer in their organisations and increases job enjoyment while achieving work goals (Honore, 2009), impacting positively their performance (Purnomosidi & Priadana, 2020; Ekundayo, 2018) and increasing organisational performance (Sekhar et al., 2013). Therefore, it is important for organisations to identify factors that motivate employees to reach their full potential (Nilasari et al., 2021).

Employee performance is influenced by internal and external factors. Intrinsic motivation is a personal desire of an individual to engage in an activity that is perceived as exciting and enjoyable (Ryan & Deci, 2000). Herzberg's motivation-hygiene theory (Herzberg et al., 1959) traditionally explained that intrinsic factors (e.g., job challenges, personal growth, and contribution) are related to job satisfaction and motivation, whereas extrinsic factors (e.g., working conditions, compensation, and company image) do not play a role. Park & Jang (2017) also found that positive outcomes are more strongly associated with intrinsic than extrinsic work values. However, Brislin et al. (2005) found in their study that extrinsic motivation, such as wages, bonuses, awards, and promotions, create the intrinsic effect of appreciation for a job well done.

Employees with excellent work performance usually possess several types of motivation simultaneously (Nduka, 2016). Some are motivated only by positive motivators such as career advancement, self-efficacy, fulfilment of ambitions, and validation through recognition. Others, however, have to do the job out of fear, fear of losing the job, and fear of not making ends meet. Radošević & Ristić (2019) mentioned a combination of positive and negative "motivators" for employee performance.

Since the interpretation of motivation is still arguable, this research distinguishes three types of work motivation: **motivation factors relating to mutual relationships, motivation factors relating to career aspiration, and motivation factors relating to finance** based on a study by Javorčková et al. (2021). In addition, an analysis of the impact of these factors on employee performance is presented to prove the null hypothesis:

H₀: There is no significant impact of work motivation on employee performance.

2.2.1 Motives Relating to Mutual Relationships (X₁)

Work engagement is believed to be a reciprocal emotional relationship created through organisational support, mutual trust among team members, and personal enthusiasm (Schaufeli et al., 2009; Taris et al., 2004), which is a critical element in creating high productivity and an engaging atmosphere in the workplace (Zigarmi et al., 2009) to maintain excellent organisational performance. Considering the above arguments, leads to the first research question:

RQ1: Do mutual relationships in work play an important role in employee performance?

Employees are highly motivated by a supportive work environment, familiarity, and mutual respect (Buelens & Van den Broeck, 2007). Thus, a non-toxic work environment boosts employee motivation (Badrianto & Ekhsan, 2019). Irawati et al. (2021) in their research, concluded that the relationship between work colleagues is the most important factor for work motivation and performance. Moreover, Gallie et al. (2009) assert that semi-autonomous teamwork systems can replace supervisory control with a less visible but constraining condition that encourages employees to adhere to organisational goals.

Theories of high-performance management systems underpin teamwork as a set of structural components that improve organisational effectiveness by enhancing employee motivation (Ramsay et al., 2000). Teamwork expands employees' ability to use their knowledge and skills (Vaskova, 2007). Task efficiency goes hand in hand with teamwork improvement (Tabassi et al., 2012) and produces high quality performance (O'Leary-Kelly et al., 1994). Furthermore, team collaboration also leads to solving the practical problem within the team (Kozłowski & Bell, 2003), which leads to better performance outcomes (Atuahene-Gima, 2003). Since team members are likely to form a contagious collective motivational structure for mutual benefit, excellent individual work motivation can positively influence teammates (Hackman, 2002). This is essential for creating collaborative growth (Hackman, 1987) through positive relationships among team members (Morgeson & Hofmann, 1999), with collective actions being more important than individual ones.

"Communication goes hand in hand with teamwork " to ensure a good working environment. Communication is one of the most important human activities in an organisation or business. Organisational communication is an essential tool for assessing work motivation and organisational commitment (Noe et al., 1990), and excellent communication between employees is critical to the success of an organization (Kolev & Tadić, 2017). Effective interpersonal communication between employees occurs when it delivers excellent results through understanding and willingness to be criticized, ultimately leading to impressive employee performance (Grant, 2012).

Communication also contributes significantly to the quality of work-related relationships that motivate individuals in the workplace. So et al. (2018) concluded that improved communication efficiency between employees is directly responsible increasing employee motivation and performance as it brings enjoyment to work, dedication, and commitment to the organisation (Rajhans, 2012). In addition, misunderstandings between team members affect organisational productivity and can set off a chain reaction that deteriorates the relationship between employees and leads to low work motivation (Ma'ruf et al., 2019).

Since many of the above literatures have found that mutual relationships, including teamwork and communication, can have a major impact on employee performance, the hypotheses are as follows:

H₀₁: Work motivation factors relating to mutual relationships create no impact on employee performance.

Following the null hypothesis, the alternative hypothesis is as follows:

Ha1: Work motivation factors relating to mutual relationships impact employee performance.

2.2.2 Motivation Factors Relating to Career Aspiration (X2)

Lent & Brown (2013) divide career motivation into three aspects: Career Identity (London, 1993), Career Insight, and Career Resilience, which prompts employees to take a risk and action in developing themselves. The second aspect, career motivation, represents the motivation of employees to advance in their careers. Companies with promising career advancement and equal promotion opportunities will boost employees' willingness to participate in developmental movements (Applebaum et al., 2001) and can motivate employees to improve their performance (Augustinus & Halim, 2021). Hence, the second research question is raised:

RQ2: Do work motivation factors relating to career aspiration really affect employee performance?

According to Gupta (2011), a **promotion** refers to a rise in the corporate hierarchy that is associated with greater responsibility, higher status, and higher salaries. Promotions reward employees for their outstanding work and encourage them to perform more efficiently and effectively (Asaari et al., 2019).

Employees with high work **involvement** give their best (Cycyota et al., 2016) and feel more connected to their jobs (Ramani & Kumar, 2008). Therefore, organisations should involve their employees more often in key decision-making processes or, in other words, give employees more responsibility. This type of employee empowerment can lead to higher employee work motivation.

Powell & Buede (2009) outline three pillars of decision-making: the decision itself, the process, and the person who has the right to make the decisions. Employees with a sense of involvement can develop the organisation's **decision-making ability** to increase productivity (Augustinus & Halim, 2021). Purcell et al. (2003) found that an employee who is too constrained is less motivated than an employee who is involved in the goal setting and decision-making processes.

Recognition is one of the most cost-effective rewards given by the organisation to acknowledge the contribution of employees in the organisation (Bosco, 2014). For some individuals, recognition and publicity are considered more valuable than financial awards (Laurie, 2007). Seidel (1974) mentioned that awards, certificates, and other similar rewards can increase employee motivation and performance (Kosfeld & Neckermann, 2011). In a study by Babbie (2004), recognition and employee appraisal (Smith, 2010) were mentioned as motivating factors in organisations.

The above research findings show that that career motivation has a significant role in employee performance. Therefore, the alternative hypothesis is illustrated as follows:

Ho2: Work motivation factors relating to career aspiration bring no impact on employee performance.

Following the null hypothesis, the alternative hypothesis is as follows:

Ha2: Work motivation factors relating to career aspiration impact employee performance.

2.2.3 Motivation Factors Relating to Finance (X3)

Nowadays, money is associated with the physiological and security levels in Maslow's hierarchy of needs (Meltzer, 2022). Danish & Ali (2010) claim that financial rewards are the most functional tool for an organisation to motivate employees to behave positively to achieve organisational goal. The above lead to the third research question:

RQ3: Do financial factors impact employee performance?

Salary is a fixed payment that an individual receives from his or her employer at a specific time (Rivai, 2014), even if goals or specific deadlines are not met (Gaul & Jimmy, 2014). Rynes et al. (2004) compared the effect of salary with other aspects and found that salary has the greatest influence compared to the other aspects. Arshad & Safdar (2012) confirmed this theory by mentioning that an organisation with a fair salary level can promote employee motivation and ensure a promising future for the company. Also, Wasiu & Adebajo (2014) state that low salaries or unspecified payment terms lead to poor performance and less engaged employees.

Incentives or financial rewards are intentionally given to certain employees whose performance is above standard to encourage their work motivation and increase their productivity (Cascio, 1995). The main goal of incentives is to give employees more responsibility and encourage them to improve the quality and quantity of their work (Ramaditya et al., 2020). Incentive motivation is used in organisations through bonuses and other types of financial compensation for extra work (Ibrahim & Brobbey, 2015). Akbar (2016) points out that the provision of an incentive system should create a mutual relationship between employees and the company. An incentive system must be sufficient, equal, and fair (Al-Naqbi et al., 2018) to bridge the gap between company goals and employee expectations.

Compensation is any income in the form of money or goods that employees receive in return for their services to the firm (Crane et al., 2016). Employee's compensation is special benefits paid in addition to salaries, such as travel allowances, meal allowances, communication allowances, overtime pay, and health and safety insurance. Fair compensation by the company is necessary to improve employee performance (Gula, 2008; Namasivayam et al., 2007).

Considering the above, finance is expected to influence employee performance. Therefore, this study also focuses on the following hypotheses:

Ho3: Work motivation factors relating to finance creates no impact on employee performance.

Following the null hypothesis, the alternative hypothesis is as follows:

Ha3: Work motivation factors relating to finance impact employee performance.

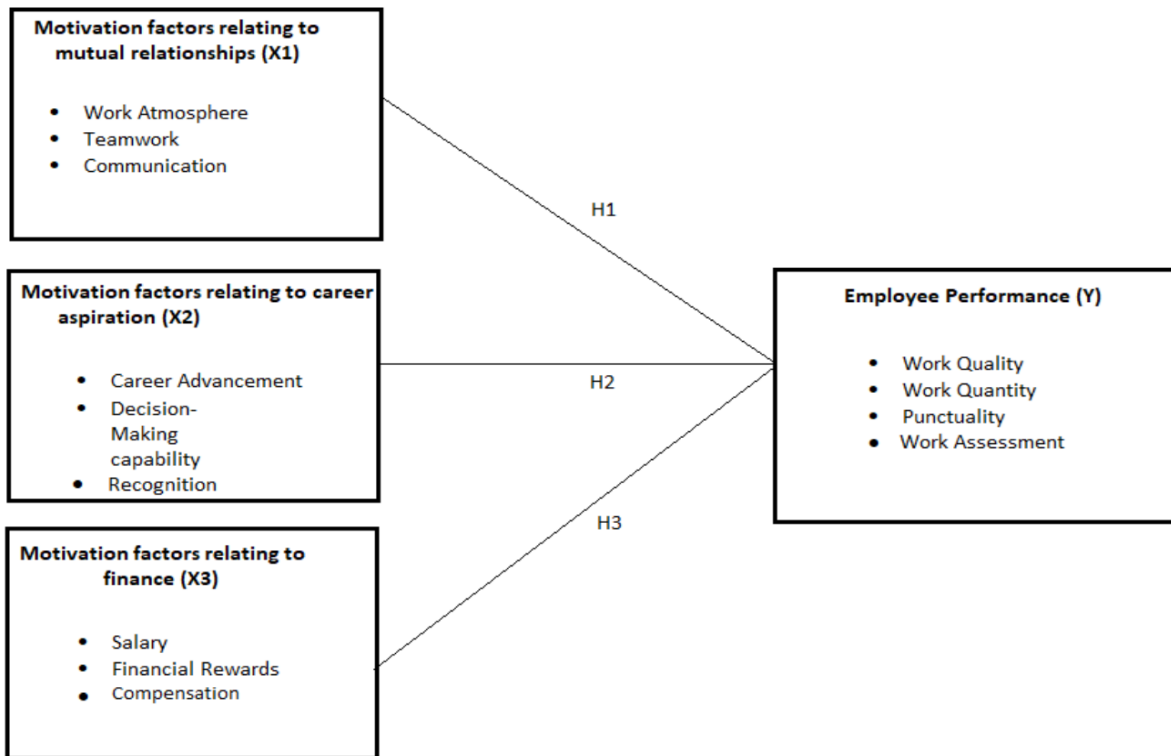


Figure 1 The research model.

3. Methodology

3.1 Population and sample

The population of interest in this study is male and female employees in Indonesia, with the questionnaire posted on social media. This includes adding the questionnaire link to Instagram bio and story, posting messages on Facebook and personal messenger, and group messages via WhatsApp to reach the target number of 150 employees residing in Indonesia. The questionnaire was distributed via JISC Online Surveys provided by Brunel University's service team IT. The survey was distributed from September 1, 2022 to September 21, 2022 with a response rate of 100%. The sample size in this study is employees with a focus on employees aged 18 and older with at least one year of work experience.

3.2 Data collection methods

The primary technique of data collection in this study is the use of a questionnaire. The questionnaire is divided into four sections and contains statements that respondents can rate with alternative answers in intervals from one to five. In this questionnaire, the Likert scale is used, a scale of 1 for rating level of "Strongly Disagree", scale 2 for "mildly disagree", scale 3 for "neutral", scale 4 for "mildly agree", and scale 5 for "strongly agree". The analysis of this research is processed by SPSS 26 program tools.

3.3 Operationalisation of Constructs

Table 1. Questionnaire design

No	Constructs	Pertinent Literature	Questionnaire Question

1	Motivation factors relating to mutual relationships (X ₁)	<ul style="list-style-type: none"> - Supportive atmosphere in the workplace (Kuswati, 2020; Javorčíková et al., 2021; Buelens & Van den Broeck, 2007; Zigarmi et al., 2009; Badrianto & Ekhsan, 2019) - Good teamwork (Javorčíková et al., 2021; Gallie et al., 2009; Vaskova, 2007; Kozlowski & Bell, 2003; Atuahene-Gima, 2003; Ramsay et al., 2000; Hackman, 2002) - Communication in the workplace (Kuswati, 2020; Javorčíková et al., 2021; Noe et al., 1990; Kolev & Tadić, 2017; Grant, 2012) - Sense of belonging (Rajhans, 2009) - Outstanding relationship between co-workers (Schaufeli et al., 2009; Taris et al., 2004; Irawati et al., 2021) 	1-6
2	Motivation factors relating to career aspiration (X ₂)	<ul style="list-style-type: none"> - Career advancement (Javorčíková et al., 2021; Applebaum et al., 2001) - Fair promotions (Gupta, 2011; Asaari et al., 2019) - Employee involvement (Kuswati, 2020; Javorčíková et al., 2021; Cycyota et al., 2016; Ramani & Kumar, 2008) - Authority in the decision-making process (Kuswati, 2020; Powell & Buede, 2009; Augustinus & Halim, 2021; Purcell et al., 2003) - Recognition (Kuswati, 2020; Bosco, 2014; Laurie, 2007; Seidel, 1974; Kosfeld & Neckermann, 2011) 	7-15
3	Motivation factors relating to finance (X ₃)	<ul style="list-style-type: none"> - Acceptable salary level (Javorčíková et al., 2021; Rivai, 2014; Gaol & Jimmy, 2014; Rynes et al., 2004; Arshad & Safdar, 2012) - Financial rewards or Bonus (Javorčíková et al., 2021; Cascio, 1995; Ramaditya et al. (2020); Ibrahim & Brobbey, 2015; Akbar, 2016; Al-Naqbi et al., 2018; Werner & Ward 2004; Shibly & Weerasinghe, 2009) - Reasonable Compensation (Crane et al., 2016; Gula, 2008; Namasivayam et al., 2007) 	16-21
4	Employee Performance (Y)	<ul style="list-style-type: none"> - Quality (Aima et al., 2017; Sari, 2021; Augustinus & Halim, 2021; Kuswati, 2020; Bao and Nizam, 2015) - Quantity (Augustinus & Halim, 2021; Kuswati, 2020; Aima et al., 2017) - Punctuality (Siregar & Evanita, 2019; Kuswati, 2020; Suwondo and Sutanto, 2015) - Work Assessment (Augustinus & Halim, 2021) 	22-27

4. Analysis and results

A questionnaire is considered reliable if respondents' answers are consistent or stable over time. If the Cronbach's alpha value is more than 0.70, the data is reliable. Tables 2-5 show the results of the reliability test for this study.

Table 2. Reliability Test - Motivation Factors Relating to Mutual Relationships

Reliability Statistics	
Cronbach's Alpha	N of Items
0.888	6

Table 3. Reliability Test - Motivation Factors Relating to Career Aspiration

Reliability Statistics	
Cronbach's Alpha	N of Items
0.929	9

Table 4. Reliability Test - Motivation Factors Relating to Finance

Reliability Statistics	
Cronbach's Alpha	N of Items
.883	6

Table 5. Reliability Test - Employee Performance

Reliability Statistics	
Cronbach's Alpha	N of Items
.892	6

Since in all cases the value of Cronbach's Alpha is greater than 0.7, the data above is considered reliable.

Normality Test

The normality test of the data should be satisfied before determining if there is similarity between the independent variables, which can be observed through the P-plot image. If the distribution of the points in the plot is close to the diagonal, it can be concluded that the data in the regression model are normally distributed between the variables. (Chrisnanto & Riyanto, 2020). Figure 2 depicts the results of the normality test. According to the P-plot diagram, the distribution of the data is close to the diagonal. The location of these points suggests that the regression model follows a normal distribution.

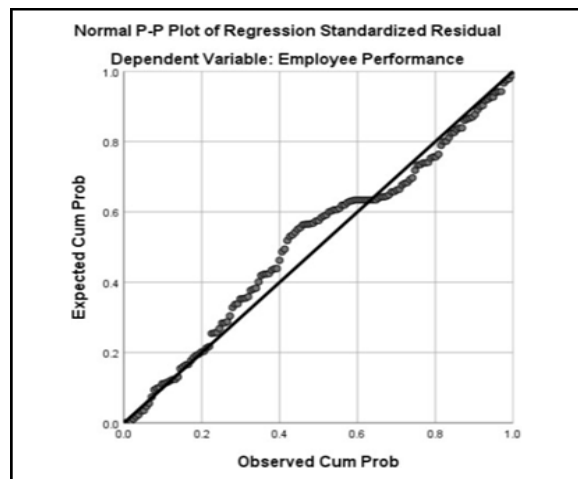


Figure 2 Normality Test

Heteroscedasticity Test

The heteroscedasticity test in this study was performed using the Scatterplot chart. A good model exists when the plot does not have a particular pattern, such as convergence in the middle, narrowing and then widening, or vice versa (Chrisnanto & Riyanto, 2020). As shown in Fig. 3, the pattern formed from the data points is random because it does not follow any particular pattern. Thus, this regression model passed the heteroscedasticity test.

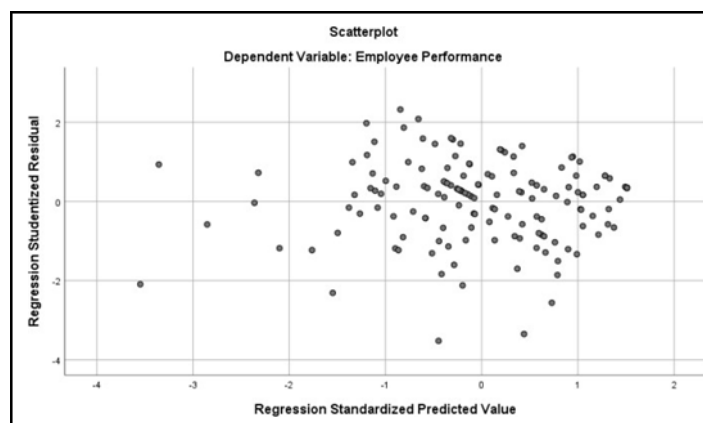


Figure 3 Heteroscedasticity Test

Multicollinearity Test

A multicollinearity test is performed to avoid the presence of strong correlations between independent variables. An acceptable regression model should not have multicollinearity. The analysis results of the Variance Inflation Factor (VIF) value should be less than 10 to conclude that there is no evidence of multicollinearity among the independent variables (Chrisnanto & Riyanto, 2020).

Table 6. Multicollinearity Test

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5.977	1.156		5.173	.000		
	Mutual Relationships	.544	.071	.589	7.710	.000	.426	2.346
	Career Aspiration	.111	.043	.201	2.568	.011	.407	2.459
	Finance	.061	.068	.072	.903	.368	.395	2.532
a. Dependent Variable: Employee Performance								

From the results of the multicollinearity test in Table 10, the VIF value for all variables is less than 10, namely 2.346, 2.459, and 2.532. In summary, the regression model for the independent variables shows no signs of multicollinearity.

Multiple regression test

Table 7. Multiple Regression Test

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.977	1.156		5.173	.000
	Mutual Relationships	.544	.071	.589	7.710	.000
	Career Aspiration	.111	.043	.201	2.568	.011
	Finance	.061	.068	.072	.903	.368
a. Dependent Variable: Employee Performance						

The constant value of 5.977 can be interpreted to mean that if the independent variable is considered 0 or constant, the employee's performance is 5.977.

The regression coefficient of the mutual relationships variable of 0.544 indicates the importance of these variables for employee performance. A positive sign indicates a positive effect, meaning that employee performance increases by 0.544 units when there is one additional unit of the mutual relationships variable, assuming that the other variables are held constant.

The regression coefficient of the career aspiration variable of 0.111 shows the positive influence of this variable on employee performance. One additional unit of the career aspiration variable increases employee performance by 0.111 units assuming other variables are held constant.

0.061 as the regression coefficient for the finance variable shows that employee performance increases by 0.061 units when the financial variable is increased by one unit, holding the other variables constant.

4.1 Hypotheses testing

Simultaneous Significance (F-test)

The F-test seeks to determine the effect of the independent and dependent variables simultaneously with a significance of 0.05. If the Sig. value is lower than 0.05, then the hypothesis is accepted and means that all variables have an effect. (Chrisnanto & Riyanto, 2020). Table 8 shows the results from the F-test.

Table 8. F-test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1678.819	3	559.606	85.509	.000 ^b
	Residual	948.940	145	6.544		
	Total	2627.758	148			
a. Dependent Variable: Employee Performance						
b. Predictors: (Constant), Finance, Mutual Relationships, Career Aspiration						

The Sig. value of 0.00 from the above F-test results, which is less than 0.05, indicates that the variables “mutual relationships”, “career aspiration” and “finance” collectively influence the variable "employee performance". This means that at least one of the above three independent variables significantly influences the dependent variable.

Partial Significant Test (T-test)

This t-test aims to determine the proportion of the influence of each independent variable individually (partially) on the dependent variable. If the significance value in the coefficient table is less than 5% or 0.005, then the independent variable partially significantly influences the dependent variable. On the other hand, if it is greater than 5% or 0.005, then the independent variable has partially no effect on the dependent variable (Chrisnanto & Riyanto, 2020). The results of the t-test are presented in Table 9.

Table 9. T-test

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.977	1.156		5.173	.000
	Mutual Relationships	.544	.071	.589	7.710	.000
	Career Aspiration	.111	.043	.201	2.568	.011
	Finance	.061	.068	.072	.903	.368
a. Dependent Variable: Employee Performance						

The t-count value of the Mutual Relationships variable is 7.710 with a significant level of 0.000. Since the Sig. value of 0.000 is less than 0.05, it is concluded that mutual relationships strongly influence employee performance.

As with the previous variable, with a significance level of 0.011 and a t-value of 2.568, it is found that career aspiration has a particular impact on employee performance.

Overall, it is found that the mutual relationship has the most influential effect. Career aspiration also has a visible impact on employee performance. On the other hand, the influence of finance on employee performance is found to be very low.

4.2 Determination Coefficient Test (R²)

Table 10 presents the results of the determination coefficient test. The value of the coefficient of determination (R²) or adjusted R square is 0.631. Thus, the total effect of the three independent variables, namely mutual relationships, career aspiration, and finance, on employee performance is 0.632 or 63.2%, while the remainder is influenced by other factors that are not clarified in this study.

Table 10. Determination Coefficient Test (R²)

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.799 ^a	.639	.631	2.55820
a. Predictors: (Constant), Finance, Mutual Relationships, Career Aspiration				
b. Dependent Variable: Employee Performance				

5 Discussion

The results of the T-test answer Q1, Q2, and Q3 in this study and prove that Ha1, Ha2, and Ha3 are correct. Several studies confirm that healthy working environment and high-quality workplace relationships can stimulate employees

increase productivity (Brhane & Zewdie, 2018). The t-value of 7.710 for the variable mutual relations in this research means that this variable has the greatest influence on job performance. These findings are consistent with previous studies by Rajhans (2009) and Anitha (2014), who concluded that effective employee relations and teamwork are strong influencers of performance. The results of the F-test in this study show that at least one of the three independent variables has a significant effect on employee performance, which clearly refutes the null hypothesis and confirms the alternative hypothesis. This is also supported by the results of the determination coefficient test (R^2), which shows that mutual relationships, career aspiration, and finance influence employee performance 63.2%. This result is consistent with previous research by Chrisnanto & Riyanto (2020), Kuswati (2020), and Purnomosidi & Priadana (2020), which found that work motivation significantly affects employee performance. However, looking at table 9 the following decisions are made:

- H1: Work motivation factors relating to mutual relationships impact employee performance (accepted)
- H2: Work motivation factors relating to career aspiration impact employee performance (partially accepted at the significance level of 0.011)
- H3: Work motivation factors relating to finance impact employee performance (rejected)

There is research evidence that employees have low morale and perform poorly when there is no recognition after good performance and no feedback after task completion (Kiruja & Mukuru, 2013). This is also supported by this study as Ha2 was confirmed by the significance level of 0.011 for the career aspiration variable with a t-count value of 2.568, indicating that this variable has a significant impact on employee performance. These results are consistent with the findings of Augustinus & Halim (2021), and Babbie (2004) who found that employees are willing to work hard when they know that they will be promoted or can advance in their career. However, in some other studies, recognition and appreciation were found to influence employee motivation more than promotion opportunities (Asaari et al., 2019). On the other hand, Li & Huang (2017) concluded that career aspirations of hospitality employees in China are positively related to self-reported service performance but have no influence on supervisor-rated service performance.

The most important finding in this study is the rejection of H3 which indicates a low impact of the financial awards on employee performance. This is displayed by the low t-count value of the T-test of 0.903. It can be assumed the study participants generally have different views on money and finances. These results are partially consistent with the work of Al-Naqbi et al. (2018), who concluded in their study that moral incentives are no less important than financial incentives. Werner (2004) and Shibly & Weerasinghe (2009) concluded that financial rewards are moderate or significant work motivators for employees and have a positive and significant effect on employee performance Pangastuti et al (2020).

6. Conclusions, limitations and future research directions

This study examined the perennial question of what motivates employees to perform at work. Our study provided experimental evidence of the effects of financial and nonfinancial incentives on performance. The results of this study suggest that companies should strengthen mutual relationships within the organisation, involve employees in the decision-making process, and provide more opportunities for career advancement, promotion, and employee participation to improve employee performance. Based on our findings, organisations are recommended to create a conducive and harmonious work environment by avoiding boredom at work, nurturing inter-team relationships, and building a bridge between team members to avoid misunderstandings. Finally, our results support previous literature on the questionable effects of extrinsic rewards.

This study has some limitations. All respondents are from Indonesia and reside there. We can explain the rejection of this hypothesis by the Indonesian culture, where society promotes strong relationships in which everyone takes responsibility for fellow members of their group. According to Hofstede's model, Indonesia has one of the lowest scores in the world rankings for individualism, with a score of 14, compared to the higher Asian rank of 23 and world rank of 43. The score for this Dimension indicates that the Indonesian society is Collectivist as compared to Individualist. This is a manifest in a close long-term commitment to the member 'group', is that a family, extended family, or extended relationships.

Future studies should be conducted in other geographic locations to compare results worldwide. In addition, only three independent variables were used in this study: Motivational factors related to mutual relationships, career aspirations, and finances. The results of this study also show that the three variables used influence employee performance 63.2%. However, the rest is yet to be defined. Moreover, work motivation is not the only factor that influences employee performance. For future research on similar topics, it is recommended to analyse different types of independent variables to deepen the topic and gain more complex insights.

Acknowledgements

This article is based on a research project submitted to Brunel University as part of the master's degree programme in Engineering Management.

References

- Abdurrahman, N. H., 2018, "The Effect of Interpersonal Communication Skills and Work Motivation on Performance of 'Marketing Employee'", *International Journal of Engineering & Technology*, 7, 2, pp. 190-195
- Afful-Broni, A., 2012, "Relationship between Motivation and Job Performance at the University of Mines and Technology, Tarkwa, Ghana: Leadership Lessons", *Creative Education*, 3, 3, pp. 309-314.
- Afrizal, P. R., Musadieg, M. A., Ruhana, I., 2014, "Pengaruh Konflik Kerja Dan Stres Kerja Terhadap Kepuasan Kerja (Studi Pada Karyawan Pt. Taspen (Persero) Cabang Malang)", *Jurnal Administrasi Bisnis (JAB)*, 8, 1, pp. 1-10.
- Aima, H., Adam, R. & Ali, H., 2017, "Model of Employee Performance: Competence Analysis and Motivation (Case Study at PT. Bank Bukopin, Tbk Center)", *Journal of Research in Business and Management*, 4, 11, pp. 49-59.
- Akbar, A. A., 2016, "Hubungan Lingkungan kerja dan pemberian insentif terhadap prestasi kerja karyawan back-office hotel pacific Balikpapan". *Jurnal Psikologi*, 4, 2.
- Al-Naqbi, R., Yusoff, P., Ismail D., 2018, "The Effect of Incentive system on job performance motivation as mediator for public sector organization in Uae", *International Journal of Engineering & Technology*, 4, 7, pp. 382-388.
- Anitha J., 2014, "Determinants of employee engagement and their impact on employee performance", *International Journal of Productivity and Performance Management*, 63, 3, pp. 308-323.
- Applebaum, H.S., Ayre, H., Shapiro, B., 2001, "Career management in information technology: a case study", *Career Development International*, 7, 3, pp. 142-158
- Arshad, M.Z., Safdar, M., & Ellahi, S., 2012, "Does Salary Work as a Motivational Agent? A Study of Airport (Ground Handling) Services Sector of Pakistan", *School of Doctoral Studies (European Union) Journal*, pp. 171-176.
- Asaari, M. H. A. H., Desa, N. M. & Subramainam L., 2019, "Influence of Salary, Promotion, and Recognition toward Work Motivation among Government Trade Agency Employees", *International Journal of Business and Management*, 14, 4, pp. 48-59.
- Atuahene-Gima, K., 2003, "The effects of centrifugal and centripetal forces on product development speed and quality: How does problem solving matter?" *Academy of Management Journal*, 46, pp. 359-373.
- Augustinus, D.C. & Halim, C. F., 2021, "The Effect of Motivation Towards Employee Performance for Café Workers in Medan", *Journal of Accounting & Management Innovation*, 5, 1, pp. 44-56.
- Babbie, H., 2004, *Improving business profitability through human resource management*, Washinton: Shown Publications Ltd.
- Badrianto, Y. & Ekhsan, M., 2019, "The Effect of Work Environment and Motivation on Employee Performance of PT. Hasta Mulia Sejahtera Cikarang", *Journal of Research in Business, Economics, and Education*, 1, 1, pp. 64-70.
- Bao, C. & Nizam, I., 2015, "The Impact of Motivation on Employee Performance in the Electronics Industry in China", *International Journal of Accounting and Business Management*, 3, 2, pp. 29-45.
- Bosco, B. M., 2014, *Reward Management Practices and Employee Performance at Nakumatt Holdings Ltd*, Doctoral dissertation, University of Nairobi, Nairobi, Kenya. Retrieved from <http://erepository.uonbi.ac.ke>
- Brhane, H. & Zewdie, S., 2018, "A Literature Review on the Effects of Employee Relation on Improving Employee Performance", *International Journal in Management and Social Science*, 6, 4, pp. 66-76.
- Brislin, R.W., MacNab, B., Worthley, R., Jr, F. K. & Zukis, B., 2005, "Evolving Perceptions of Japanese Workplace Motivation, An Employee-Manager Comparison", *International Journal of Cross Cultural Management*, 5, 1, pp. 87-104.
- Buelens, M., & Van den Broeck, H., 2007, "An Analysis of Differences in Work Motivation between Public and Private Sector Organizations", *Public Administration Review*, 67, 1, pp. 65-74.
- Burhanudin, B., Pratiwi, D.F. & Apriyani, Y., 2023, "The Effect of Work Motivation and Work Discipline on Employee Performance", *International Journal Of Humanities Education And Social Sciences (IJHESS)*, 2, 5, pp. 1453 - 1467.
- Cascio, W. F., 1995, *Managing Human Resources, Productivity, Quality Of Work Life Profit*, Singapur:Mc Grawhill Book Co.
- Chien G. C. L., Mao I., Nergui E. & Chang W., 2020, "The effect of work motivation on employee performance: Empirical evidence from 4-star hotels in Mongolia", *Journal of Human Resources in Hospitality & Tourism*, 19, 4, pp. 473-495.
- Chrisnanto, C. & Riyanto, S., 2020, "The Effect of Work Discipline, Organizational Commitment and Work Motivation on Employee Performance of the Directorate General of Construction Development Minister for Public Works and Housing Republic of Indonesia", *International Review of Management and Marketing*, 10, 5, pp. 159-164.
- Crane, A.D., Michenaud, S. & Weston, J.P., 2016, "The Effect of institutional ownership on payout policy: Evidence from index thresholds", *InReview of Financial Studies*, 29, 6, pp. 1377-1408.
- Cycyota, C. S., Ferrante, C. J., Schroeder, J. M., 2016, "Corporate social responsibility and employee volunteerism: What do the best companies do?", *Business Horizons*, 59, 3, pp. 321-329.
- Danish, R. & Ali, U., 2010, "Impact of reward and recognition on job satisfaction and motivation: An empirical study from Pakistan", *International journal of business and management*, 5, 2, pp. 159-167.
- Deci, E. L. & Flaste, R., 1995, *Why we do what we do: Understanding self-motivation*, Penguins Books.
- Ekundayo, O. A., 2018, "The Impact of Motivation on Employee Performance in Selected Insurance Companies in Nigeria", *International Journal of African Development*, 5, 1, pp. 31-42.
- Gallie, D., Zhou, Y., Felstead, A., Green, F., 2009, "Teamwork, Skill Development and Employee Welfare", *British Journal of Industrial Relations*, 50, 1, pp. 23-46.
- Gaol, C. H. R. & Jimmy. L., 2014, *A to Z Human Capital (Ma-najemen Sumber Daya Manusia) Konsep, Teori, dan Pengembangan dalam Konteks Organisasi Publik dan Bisnis*. Jakarta: PT. Gramedia Widiasarana.
- Grant, A.M., 2012, "Leading with meaning: beneficiary contact, prosocial impact, and the performance effects of transformational leadership", *Academy of Management Journal*, 55, 2, pp. 458-476.
- Gula, R., 2008, "Legal protection of wolves in Poland: Implications for the status of the wolf population", *European Journal of Wildlife Research*, 54, 2, pp. 163-170.
- Gupta, C. B., 2011, *Human Resource Management*, New Delhi: Sultan Chand & Sons Hackman.
- Hackman, J. R., 2002, *Leading teams: Setting the stage for great performances*. Boston, MA: Harvard Business School Press.

- Hackman, J. R., 1987, "The design of work teams". Lorsch (Ed.), *Handbook of organizational behavior*, Englewood Cliffs, NJ: Prentice-Hall, pp. 315-342.
- Hakim A. L., Faizah E. N., & Nujulah F., 2021, "The Effect of Work Motivation and Work Discipline on Employee Performance", *SINERGI: Jurnal Ilmiah Ilmu Manajemen*, 11, 2, pp. 34-42.
- Herzberg, F., Mausner, B. & Snyderman, B., 1959, *The Motivation to Work*, Wiley, New York.
- Honore, J., 2009, "Employee motivation", *Consortium Journal of Hospitality & Tourism*, 14, 1, pp. 63-75.
- Ibrahim, M. & Brobbey, V. A., 2015, "Impact of Motivation on Employee Performance. The Case of Some selected Micro Finance Companies in Ghana", *International Journal of Economics, Commerce and Management*, III, 11, pp. 1218-1236.
- Irawati, L., Khaeruman & Farradia, Y., 2021, "Analysis of The Work Motivation Factors On An Employee Performance", *International Journal of Educational Research & Social Sciences*, 2, 4, pp. 730-735.
- Javorčíková, J., Vanderková, K., Ližbetinová, L., Lorincová, S. & Hitka, M., 2021, "Teaching Performance of Slovak Primary School Teachers: Top Motivation Factors", *Education Sciences*, 11, 7, p. 313.
- Jose, S.V. & Bijin, P., 2019, "Employee Motivation and Organization Productivity (A Study of Some Selected Handloom Firms in state of Kerala)", *Science, Technology and Development*, 08, pp. 301-309.
- Kamisah, A.L., 2012, "A Study on Stress Among Customer Service Officer and Executives in Central Region, Employees Provident Fund", Universiti Utara Malaysia. Retrieved from: <http://www.etsd.uum.edu.my/3016>
- Kiran, D. R., 2016, *Total Quality Management: Key Concepts and Case Studies*, 1st Edition, Elsevier Science & Technology.
- Kiruja, E.K. & Mukuuru, E., 2013, "Effect of Motivation on Employee Performance in Public Middle Level Technical Training Institutions In Kenya", *International Journal of Advances in Management and Economics*, 2, 4, pp. 73-82.
- Kolev, D. & Tadić, D., 2017, "Korporativna interna komunikacija kao faktor efikasnog poslovanja merena „think-feel-do“ metodom (Case study)", *Časopis za ekonomiju i tržišne komunikacije*, 7, 2, pp. 213-234.
- Kosfeld, M. & Neckermann, S., 2011, "Getting more work for nothing? Symbolic awards and worker performance. Symbolic Awards and Worker Performance", *American Economic Journal: Microeconomics*, 3, 3, pp. 86-99.
- Kozlowski, S. W. J., & Bell, B. S., 2003, "Work groups and teams in organizations". *Handbook of psychology: Industrial and organizational psychology*, London: Wiley, pp. 333-375.
- Kuswati Y., 2020, "The Effect of Motivation on Employee Performance", *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities*, 3, 2, pp. 995-1002.
- Kuvaas, B., Buch, R., & Dysvik, A., 2020, "Individual variable pay for performance, controlling effects, and intrinsic motivation". *Motivation and Emotion*, 44, pp. 525-533.
- Laurie, Mullins. J., 2007, *Management and organisational behavior*, Practice Hall, Inc.
- Lent, R. W. & Brown, S. D., 2013, "Social cognitive model of career self-management: Toward a unifying view of adaptive career behavior across the life span", *Journal of Counseling Psychology*, 60, 4, pp. 557-568.
- Li, Y. & Huang, S., 2017, "Hospitality service climate, employee service orientation, career aspiration and performance: A moderated mediation model", *International Journal of Hospitality Management*, 67, pp. 24-32.
- London, M., 1993, "Relationships between career motivation, empowerment and support for career development", *Journal of Occupational and Organizational Psychology*, 66, 1, pp. 55-69.
- Luthans, F., 2005, *Organizational Behavior*, McGraw-Hill, New York (US).
- Ma'ruf, F., Hadari, I. R. & Amalia, D., 2019, "Employee Motivation and Performance Models", *International Review of Management and Marketing*, 9, 6, pp. 80-86.
- Mangkunegara, A. P., 2005, *HR Performance Evaluation*, Refika Aditama, Bandung.
- Meltzer, L., 2022, "Understanding the Maslow's Hierarchy of Financial Needs". Available at: <https://thecentsofmoney.com/understanding-the-maslows-hierarchy-of-financial-needs/>
- Mohamud, S.A., Ibrahim, A.A. & Hussein, J.M., 2017, "The effect of motivation on employee performance: Case study in Hormuud company in Mogadishu Somalia", *International Journal of Development Research*, 9, 11, pp. 17009-17016.
- Morgeson, F. P., & Hofmann, D. A., 1999, "The structure and function of collective constructs: Implications for multilevel research and theory development", *Academy of Management Review*, 24, pp. 249-265.
- Namasivayam K., Miao L., & Zhao, X., 2007, "An investigation of the relationships between compensation practices and firm performance in the US hotel industry", *International Journal of Hospitality Management*, 26, 3, pp. 574-587.
- Narayanamurthy, G. & Tortorella, G., 2021, "Impact of COVID-19 outbreak on employee performance – Moderating role of industry 4.0 base technologies", *International Journal of Production Economics*, 234, p. 108075
- Nduka, O., 2016, *Employee Motivation and Performance*, Thesis, Centria University of Applied Sciences.
- Nilasari, B. M., Nisfiannoor, M. & Devinta. F. R. M., 2021, "Changes in Motivation That Affect Employee Performance during the Covid 19 Pandemic", *Journal of Applied Management (JAM)*, 19, 2, pp. 435-447.
- Nizam, K. & Shah, F. M., 2015, "Impact of Employee Motivation on Organizational Performance in Oil and Gas Sector of Pakistan", *International Journal of Managerial Studies and Research (IJMSR)*, 3, 12, pp. 7-15.
- Noe, R.A., Noe, A.W. & Bachhuber, J.A., 1990, "An investigation of the correlates of career motivation", *Journal of Vocational Behavior*, 37, 3, pp. 340-356.
- Okine, G.N.B., Addeh, G.Y.A., Olusola, B.E. & Asare, I., 2021, "Employee Motivation and its Effects on Employee Productivity/Performance", *Journal of Economics and Sustainable Development*, 12, 16, pp. 99-108.
- O'Leary-Kelly, A.M., Martocchio, J.J. & Frink, D.D., 1994, "A review of the influence of group goals on group performance", *Academy of Management Journal*, 37, pp. 1285-1301
- Pangastuti, P.A.D., Sukirno, S. & Efendi, R., 2020, "The Effect of Work Motivation and Compensation on Employee Performance", *International Journal of Multicultural and Multireligious Understanding (IJMMU)*, 7, 3, pp. 292-299.
- Park, R. & Jang, S.J., 2017, "Mediating role of perceived supervisor support in the relationship between job autonomy and mental health: moderating role of value-means fit", *The International Journal of Human Resource Management*, 28, 5, pp. 703-723.
- Pawar, B. S., 2019, *Employee Performance and Well-being*, 1st edn. Taylor and Francis. Available at: <https://www.routledge.com>
- Powell, A. R., & Buede, M. D., 2009, *The project managers guide to making successful decision*, Vienna: Management concepts.

- Purcell, J., Kinnie, N., Hutchinson, S., Rayton, B. & Swart, J., 2003, *Understanding the People and Performance Link: Unlocking the Black Box*, London, Chartered Institute of Personnel and Development.
- Purnomosidi A. & Priadana M. S., 2020, "The effect of direct compensation and work motivation on employee performance (Study at a Government Office in Bandung Regency)", *Jurnal Ekonomi, Bisnis & Entrepreneurship*, 14, 1, pp. 30-35.
- Radošević T. & Ristić, M. R., 2019, "Quality of work life shown in correlations between employees work motivation and indicators of external communication of an organization", *Proceedings on Engineering Sciences*, 1, 2, pp. 801-814
- Rajhans, K., 2009, "Effective Organizational Communication: a Key to Employee Motivation and Performance", *Interscience Management Review (IMR)*, 2, 2, pp. 145-149.
- Ramaditya, M., Liana, L. R., Maronrong, R., 2020, "Does Interpersonal Relations and Work Incentives Affect Work Motivation and Organizational Commitments?", *Jurnal Analisis Bisnis Ekonomi*, 18, 2, pp. 70-82.
- Ramani, G. & Kumar, V., 2008, "Interaction orientation and firm performance", *Journal of Marketing*, 72, 1, pp. 27-45.
- Ramsay, H., Scholarios, D. & Harley, B., 2000, "Employees and high-performance work systems: testing inside the black box", *British Journal of Industrial Relations*, 38, 4, pp. 501- 31.
- Ratnawati, E., Sukidjo, S., & Efendi, R., 2020, "The effect of work motivation and work experience on employee performance", *International Journal of Multicultural and Multireligious Understanding*, 7, 8, pp. 109-116.
- Rivai, V. & Basri, A. F. M., 2005, *Performance Appraisal: Sistem yang Tepat untuk Menilai Kinerja Karyawan dan Meningkatkan Daya Saing Perusahaan*, PT Raja Grafindo Persada, Jakarta (ID).
- Rivai, V., 2014, *Manajemen Sumber Daya Manusia untuk Perusahaan: dari Teori Ke Praktik, Edisi Ketiga*, Raja Grafindo Persada, Jakarta: PT.
- Ryan, R. M., & Deci, E. L., 2000, "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being", *American Psychologist*, 55, pp. 68-78.
- Ryan, R. M., & Deci, E. L., 2017, *Self-determination theory: basic psychological needs in motivation, development, and wellness*, The Guilford Press, New York.
- Rynes, S. L., Gerhart, B., & Minette, K. A., 2004, "The Importance of Pay in Employee Motivation: Discrepancies Between What People Say and What They Do", *Human Resource Management*, 43, 4, pp. 381-394.
- Sapta, I.K.S, Gunantra, I.W. & Widnyana, I.W., 2022, "The Role Of Work Competence, Motivation, And Work Environment In Improving Employee Performance: A Study At Regional Planning, Research, And Development Board Tabanan Regency", *Journal of Business and Behavioural Entrepreneurship*, 6, 1, pp. 69-86.
- Sari, A. W., 2021, "Effects of Work Motivation as Variables Intervening Between Autocratic Leadership and Transformational Leadership on Employee Performance in Family Business: (Study at PT. Andalan Medika Sejahtera Abadi)", *International Journal of Review Management Business and Entrepreneurship (RMBE)*, 1, 2, pp. 320-331.
- Schaufeli, W. B., Bakker, A. B. & Van Rhenen, W., 2009, "How changes in job demands and resources predict burnout, work engagement, and sickness absenteeism", *Journal of Organizational Behavior*, 30, pp. 893-917.
- Seidel, H. F., 1974, "Employee Motivation and Recognition", *American Water Works Association*, 66, 7, pp. 412-413.
- Sekhar, C., Patwardhan, M. & Singh, R. K., 2013, "A Literature Review on Motivation", *Global Business Perspectives*, 1, 4, pp. 471-487.
- Shibly, M. A. M. & Weerasinghe, T. D., 2009, "The Impact of Financial Rewards on work Motivation of Operational Level Employees: Evidence from a Leading Manufacturing Organization in Sri Lanka", *Sri Lanka Journal of Advanced Social Studies*, 09, 01, pp. 01 - 17
- Singh, J.K. & Jain, M., 2013, "A Study of employee's job satisfaction and its impact on their performance", *Journal of Indian Research*, 1, 4, pp. 105-111
- Siregar, F. L. S. & Evanita, S., 2019, "The Effect of Transformational Leadership, Organization Climate and Work Discipline on Employee Performance at Royal Denai Group Hotel Bukittinggi", *Advances in Economics, Business and Management Research*, 124, pp. 749-754.
- Smith, Z., 2010, *Impact of human resource management on organizations*, Allan Publications, New Jersey.
- So, I. G., Djunggara, N.A.A., Fahrobi, R. Bachtiar H., Simamora B.H. and Ruangkanjanases, A. (2018) Effect of Organisational Communication and Culture on Employee Motivation and Its Impact on Employee Performance, *Pertanika Journal of Tropical Agricultural Science*, 26, 2, pp.1133-1142
- Suwondo, D. I. & Sutanto E. M., 2015, "Hubungan Lingkungan Kerja, Disiplin Kerja, dan Kinerja Karyawan", *Jurnal Manajemen dan Kewirausahaan*, 17, 2, pp. 135-144
- Tabassi, A.A., Ramli, M., Hassan, M. A.A. & Bakar, A.H.A., 2012, "Effects of training and motivation practices on teamwork improvement and task efficiency: The case of construction firms", *International Journal of Project Management*, 30, 2, pp. 213-224
- Taris, T. W., Van Horn, J. E., Schaufeli, W. B. & Schreurs, P. J., 2004, "Inequity, burnout and psychological withdrawal among teachers: A dynamic exchange model", *Anxiety, Stress and Coping*, 17, pp. 103-122
- Tumi, N.S., Hasan, A. N. & Jamshed, K., 2021, "Impact of Compensation, Job Enrichment and Enlargement, and Training on Employee Motivation". *Business Perspectives and Research*, 10, 3, pp. 1-19.
- Vaskova, R., 2007, "Teamwork and High Performance Work Organisation", Dublin: European Foundation for the Improvement of Living and Working Conditions, Available at: <https://www.eurofound.europa.eu/publications/article/2007/teamwork-and-high-performance-work-organisation>
- Waiyaki, E. W., 2017, *Effect of Motivation on Employee Performance: A Case of Pam Golding Properties Limited, Nairobi*, Doctoral dissertation, United States International University-Africa.
- Wasiu, B., & Adebajo, A.A., 2014, "Reward System and Employee Performance in Lagos State (A Study of Selected Public Secondary School) Kuwait", *Kuwait Chapter of Arabian Journal of Business and Management Review*, 3, 8, pp. 14-28.
- Werner, S. & Ward, S.G., 2004, "Recent Compensation Research: An eclectic review", *Human Resource Management Review*, 14, 2, pp. 201-227
- Zigarmi, D., Nimon, K., Houson, D., Witt, D. & Diehl, J., 2009, "Beyond engagement: Toward a framework and operational definition for employee work passion", *Human Resource Development Review*, 8, 3, pp. 300-326.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence



Exploring the Intrinsic Factors Influencing Return on Assets: A Case Study of the Hotel Industry in Selected EU Countries

Goran Karanovic ^{†1}

¹University of Rijeka, Faculty of Tourism and Hospitality Management

ARTICLE INFO	ABSTRACT
Article History	Purpose: The main aim of this study was to determine the intrinsic factors (total equity, trade receivable turnover, working capital turnover, long term debt, current ratio, debt to total assets ratio, debt to equity ratio, net sales revenue trend, total operating revenue trend, shareholders' equity trend, cash to total assets, current liabilities to total liabilities) that influence the financial performance of the Hotel Industry in select Central and Eastern European Union countries. Return on Assets (ROA) was used in this study as measure of financial performance.
Received 26 July 2023 Accepted 2 September 2023	Design/methodology/approach: The paper uses panel data fixed effects model to examine dependent variable ROA as measure of the financial performance of select Tourism and Leisure Industry companies from Central and Eastern EU member states. The intrinsic factors were applied as independent variables. The applied panel data fixed effects model in the study was utilised to determine the impact of the intrinsic factors on financial performance. The data were obtained from EMIS data base. Overall data encompassed 614 companies from select eight Central and Eastern EU member states for the period 2015-2022.
<i>JEL Classifications</i> G32, L25, L83, C33	Findings: The model performed in this study discovered that intrinsic factors including total equity, trade receivable turnover, current ratio, debt to total assets ratio, as well as cash to total assets had a significant impact on the ROA. Total equity, current ratio, cash to total assets have positive impact as opposed to the trade receivable turnover debt to total asset, while years 2020 and 2021 had negative impact on the ROA.
	Research limitations/implications: This study was limited just on the select eight central and eastern European Union countries; moreover, the database EMIS used for this study lacks certain variables that are frequently used in similar studies. Result confirmed the importance of intrinsic factors and their influence on the financial performance of the leisure industry.
	Originality/value: This study contributes to the existing body of theory on financial performance through research on the new practitioners' perception of the intrinsic factors relative to financial performance. There are very few empirical studies which examine financial performance variables in the Central and Eastern European leisure industry. Consequently, this study aims to bridge the gap between the available literature and body of research.
Keywords: Intellectual Capital, ERM Structure Practices, Organizational Performance	

1. Introduction

The tourism and connected hotel industry stand widely acknowledged for their significant role in contributing to the economic prosperity of both developed and developing countries, asserting their prominence as some of the most financially rewarding sectors within the service industry. Robust academic studies emphasize the significant role of the tourism sector in driving economic growth and development. Positioned amongst the world's rapidly burgeoning industries, aside from the period during and post COVID-19, it stimulates notable economic advantages and facilitates job creation. In accordance with the World Trade and Tourism Council's (WTTC) economic report, the economic outcomes arising from the tourism and travel sector are evaluated through the lens of their contributions to global Gross Domestic Product (GDP) and workforce engagement. WTTC specified that in 2020, this sector accounted for

[†]Corresponding Author: Goran Karanovic
e-mail: gorank@fthm.hr

approximately 10.3% of the global GDP and supported 10.4% of the global labour force. Notably, during the 2016-2020 timeframe, this sector played a pivotal role in generating a substantial 25% of all employment opportunities worldwide (*World Travel and Tourism Council: Economic Impact 2020, 2020*). Nevertheless, it is essential to underscore the profound impact of the COVID-19 pandemic on this sector. Currently, WTTC statistics have witnessed a noticeable decline, with the industry's GDP contribution reduced to approximately 7.6% and the creation of 22 million new jobs (*World Travel and Tourism Council: Economic Impact Report 2023 Global Trends, 2023*).

Consequently, the tourism and travel sector, underscored by its core constituent, the hotel industry, assume a fundamental role in fostering the progression of tourism. In alignment with the body of academic research (Balaguer & Cantavella-Jordá, 2002; Brida et al., 2016; Perles-Ribes et al., 2017; Comerio & Strozzi, 2019) there exists a widely held perception of a bidirectional relationship between the growth of tourism demand and economic growth. This phenomenon is evident through the reduction in unemployment rates, the augmentation of capital within the economy, and the expansion of export activities.

Even though an extensive body of scholarly studies investigated hotel financial performance in developed countries, there exists a research gap concerning intrinsic variables affecting financial performance of hotel industry of Central and Eastern EU countries, with the available literature being limited to (Skuflic & Mlinaric, 2015; Dimitric et al., 2019; Karanovic et al., 2020; Doncheva & Stoyancheva, 2021). The author in this study empirically tests for the first time the influence of intrinsic variables total equity, trade receivable turnover, working capital turnover, long term debt, current ratio, debt to total ratio, debt to equity ratio, net sales revenue trend, total operating revenue trend, shareholders' equity trend, cash to total assets, current liabilities to total liabilities. Based on prior literature research diverse variables were used in similar studies. The EMIS database for select eight central and eastern EU countries was used, with additional limitations to the search imposed in the form of the a) minimum total assets being more than 1 million €, and b) the number of employers being more than 5, thus obtaining an overall sample of 614 hotel companies fulfilling the above criteria.

The study findings showed that the total equity, trade receivables turnover, liquidity, leverage, cash to total assets and years 2020 and 2021 influence hotel profitability.

The following structure is employed in the study. The study commences with an introductory section (1) and proceeds to section 2, which comprises a comprehensive literature review relating to financial performance within the hospitality industry, accompanied by the formulation of research hypotheses. Section 3 methodically presents the data sample and the application of the econometric model employed. In section 4 an extensive analysis of the empirical results unfolds. Finally, the study concludes with section 5, wherein concluding remarks are provided along with recommendations for potential avenues of future research.

2. Review of Literature

The financial performance of the hotel industry has been subject to in-depth examination in various studies (Sami & Mohamed, 2014; Ben Aissa & Goaid, 2016; Lucha et al., 2016; Menicucci, 2018; Prakash & Nauriyal, 2021; Soni et al., 2022). Scholarly discourse has accorded significant attention to the financial performance in various industries (Spanos et al., 2004; Mahajan et al., 2018; Lesáková et al., 2019; Tadic et al., 2019; Bhayani & Butalal, 2021; Mighty & Granco, 2021; Cardil et al., 2023) investigating extensively into its theoretical groundworks and diverse empirical dimensions. Within the sphere of hospitality industry performance studies, exhaustive investigations have been conducted to explore a variety of company intrinsic and extrinsic variables, that are recognized as principal drivers of profitability. These studies can be categorized into two primary approaches: the first primarily integrates financial data, while the second approach incorporates various intrinsic and other extrinsic variables. As an instance, these latter studies (Sami & Mohamed, 2014; Bresciani et al., 2015; Lado-Sestayo et al., 2017; Lado-Sestayo & Vivel-Búa, 2018, 2020; Menicucci, 2018; Lima Santos et al., 2020; Karhunen & Ledyeva, 2021) include size, location, ownership structure, hotel affiliation, internationalization, first activity of the hotel, education (of the general manager and/or financial manager), population density, proximity to the airport, seasonality, number of stars, chain branding, occupancy rate etc. In their research Sami & Mohamed (2014) conclude that hotels affiliated within international chains or franchises, and this is in line with the study carried by (Karhunen & Ledyeva, 2021). In addition, Sami & Mohamed (2014) state that hotels strategically located in coastal or attractive area, demonstrate superior financial performance compared to standalone hotels. They employed Return on Assets as measure of profitability. Furthermore, their study confirmed that higher education level of education among general and financial experts have significant and positive impact to the hotel profitability. In the empirical analysis of determinants of performance in the Italian hotel industry Bresciani et al. (2015) verified only category (stars) as significant to the hotel performance. In their analysis as measure performance was used revenue per available room (RevPAR). Similar measure of financial performance and total net revenue per available room (TRevPAR) was employed in the study of Spanish hotels performed by (Lado-Sestayo et al., 2017). The study affirmed that several factors significantly influence hotel performance. These factors encompass hotel location, including its proximity to the central business district – CBD and transport nodes as well its positioning relative to the competitors. Moreover, the hotel size was identified as an important factor impacting profitability, with noteworthy findings revealing a U-shaped relationship. Furthermore, effective management practice, particularly in terms of good asset management were found to exert a positive influence on a hotel performance. The same measure total – net revenue per available room (TRevPAR) – for hotel

performance at Portugal hotel was used by (Lima Santos et al., 2020). Their results reveal that number of stars, location (districts Lisbon, Funchal and Braganca) as well and room size matter. On the other hand in other study of authors Lado-Sestayo & Vivel-Búa (2018) employed return on assets (ROA) and return on equity (ROE) as a measure of the profitability with application of least squares path modelling (PLS). Independent variables used to measure hotel profitability were number of rooms, liquidity, leverage, distance from central business district and nearest airports, density of the location, market share, occupancy rate, seasonality. The findings of this study pointed out that both characteristic of the hotel and the attributed of the tourist destination concurrently influence hotel performance. Similar results were obtain by same authors (Lado-Sestayo & Vivel-Búa, 2020) but in this study they applied multi-layered neural network method that included a lag of profitability as the input and other input variables are related to hotel and tourist destinations like size, efficiency, market and demand share, seasonality, distance to transport nodes, competition, agglomeration or urbanization. The original finding of this study was linked to the conclusion that ICT capabilities and competencies can help a hotel create a competitive advantage. Menicucci (2018) conducted an extensive examination of the factors affecting the Italian hospitality industry. Her research encompassed a wide array of profitability metrics, including return on equity (ROE), return on assets (ROA), occupancy rate and gross operating profit per available room. Study conclusion is in the line with previous studies results, proving that financial crises, the business model and ownership structure affect the profitability of hotel firms. Specifically, findings suggest that factors such as size, international presence, strategic location, accommodation as first activity and chain hotels have positive influence on profitability.

On the other side studies exist that were performed only with financial and performance ratios. Chambers & Cifter (2022) used ROA and ROE as profitability measures, while sales, debt, size, GDP, cash, and working capital were applied for other independent variables. In the study (Dimitric et al., 2019) authors used the same indicator as profitability measure ROA, while cash flow to operating revenue (CFOR), net asset turnover (NAT), productivity of employees (PROD), solvency ratio (SOLR), firm size (Size) and company age (Age) were taken as exploratory variables. In study (Soni et al., 2022) was investing liquidity, net asset turnover (NAT), foreign earnings intensity (FXINT), proprietary ratio (PROP), firm size (SIZE), and firm age (AGE) and their impact on firms' return on assets (ROA). They obtained liquidity and size to be significant and had positive impact to ROA. Similarly, well-accepted financial variables such as current liability debt, financial stability, size, growth, sale growth, EBIT and their impact on the ROA and ROE were tested in study (Kalas et al., 2019). These authors utilised multivariate analysis of variance along with multiple regression models, both of which validated that current liquidity and debt have significant impact on profitability measured by ROA, in contrast to the result for ROE, which were not statistically significant. This study is established on existing research disclosing just financial ratios, incorporating and expanding prior variables. The main hypothesis, built upon the foundation of previous research, has been articulated as:

H₀: There is significant impact of selected intrinsic factors on the hotel industry profitability.

3. Dataset and methodology

3.1 Dataset and sample selection

In order to investigate the intrinsic determinants of hotel profitability an unbalanced panel data of 614 select hotel companies from eight Central and Eastern European Union member states was performed, covering the period 2015-2022. The dataset was extracted from the EMIS database with the following limitations within the query: the minimum total assets were more than 3 mill. €, the number of employees was higher than 5, the total equity was more than 500.000 €. Furthermore, limitations were imposed based on industry classification; only companies that have NAICS industry description "Hotels (except Casino Hotels) and Motels (72111)" were considered for inclusion. Initially, the database covered 913 companies. However, companies with operational status "closed" and "in liquidation" as well as those with substantial gaps in their data for the majority of the observed period, were excluded from the sample. The countries included in this study are European Union central and eastern countries Slovenia, Croatia, Hungary, Slovakia, Czech Republic, Poland, Romania and Bulgaria. For the purpose of creating a comparative analysis and measuring the contribution of total tourism to GDP, data for the years 2019 and 2022 is provided for eight selected counties as follows: Croatia (25,6% in 2019 and 25,8% in 2022), Slovenia (10,8% 2019 vs 9,2% in 2022), Hungary (8,3% and 6,6% in 2022), Bulgaria (9,9% in 2019 vs 6,5 in 2022), Romania (6% in 2019 and 5,5% in 2022), Slovakia (6,3% and 4,6% in 2022), Czech Republic (6,2% in 2019 and 4% in 2022) and Poland (4,8% in 2019 vs 4% 2022) (Statista, 2023). It's important to note that the impact of the COVID-19 has resulted in a noticeable decrease in the tourism to GDP ratio, compared to the pre-pandemic period.

3.2 Methodology

For this study the author followed the methodology applied in the studies (Mahajan et al., 2018; Dakic & Mijic, 2020; Bhayani & Butalal, 2021). Considering the panel data acquired, the model incorporated the intrinsic variables, allowing for the impact of these factors on hotel profitability performance to be assessed, as measured by ROA. Since the proposed model has a considerably high number of predictors in those cases according to the (Baltagi, 2005), panel

data was used, thus providing more variability and less collinearity among observed predictors. Therefore, the following panel regression test is performed:

$$ROA_{it} = \beta_0 + \beta_1 TE_{it} + \beta_2 TRT_{it} + \beta_3 WCT_{it} + \beta_4 LTD_{it} + \beta_5 CR_{it} + \beta_6 DTAR_{it} + \beta_7 DER_{it} + \beta_8 NSRT_{it} + \beta_9 TORT_{it} + \beta_{10} SET_{it} + \beta_{11} CTA_{it} + \beta_{12} CLTL_{it} + \xi_i \quad (1)$$

Where the i is as subscript for observation 614 companies ($i = 1, \dots, 614$), and t is for time ($t = 1, \dots, 8$). The variables in the models are described as follows:

- TE - Total equity
- ROA - Return on Assets (ROA) (%)
- TRT - Trade Receivable Turnover (x)
- WCT - Working Capital Turnover (x)
- LTD - Long term Debt
- CR - Current Ratio (x)
- DTAR - Debt to Total Assets Ratio (%)
- DER - Debt to Equity Ratio (%)
- NSRT - Net Sales Revenue Trend (%)
- TORT - Total Operating Revenue Trend (%)
- SET - Shareholders' Equity Trend (%)
- CTA - Cash to Total Assets (%)
- CLTL - Current Liabilities to Total Liabilities (%)

4. Results

The empirical findings and interpretations of the study are presented in this section. Descriptive statistics are presented in the table (1) below:

Table 1: Descriptive statistics

Number of observations=2744	Mean	Std. Dev.	Min	Max
ROA	4.82	11.48	-89.11	119.78
TE	3484.96	2501.47	-6238	22739
TRT	-2020.41	111640.3	-5847388	71321.44
WCT	2.70	146.75	-2748.76	4878.49
LTD	1588.96	4228.74	-3.42	63822.52
CR	5.23	27.14	-8.75	722.76
DTAR	17.13	22.54	-.09	163.66
DER	109.55	1673.47	-5013.43	81537.82
NSRT	354776.3	1.86e+07	-153577.1	9.73e+08
TORT	17733.21	921632.2	-272421.3	4.83e+07
SET	80.47	2339.04	-9361.12	113049.1
CTA	8.81	13.61	-28.25	97.17
CLTL	91.37	2055.94	-.11	107733

ROA of the observed companies sample in period 2015-2022 averaged 4,82% with the minimum of -89,11 up to 119,78 at the maximum. It needs to be highlighted that during the period from 2020 to 2022, the entire sector was profoundly affected by COVID-19, resulting in an overall decrease in ROA. The something inferior mean results of the hotel industry can be linked to the pandemic and post-pandemic impact. Total equity of the hotel industry designates it as capital intensive industry with the average 3484,96 with range -6238 up to 22739. Average trade receivables turnover (TRT) with average negative -2020,41, with minimum of 5847388 and maximum 71321,44 indicating inefficient collection process of the whole industry. Unlike the TRT, the working capital turnover (WCT) is optimal and in average is 2,70 with the min-max range -2748,76-4878,48. Ratios that are positive are the following: cash ratio (CR) with the average 5,23 what is higher 5 times than usual results for hotels (see Macrotrends.net for more) and TORT total operating revenue trend has positive score in average totals 17733,21, as well as net seals revenue trend (NSRT) with the average 3454776,3. Current liabilities in total liabilities are exceeding 90% what is indicating that industry was huge short term liabilities share in total.

In multiple regression analysis, the variance inflation factor (VIF) is frequently applied as indicator of multicollinearity. Acceptable level of VIF is ten and is recommended as the maximum appropriate level of acceptance. As evident in the table 2 results of VIF tested, there is no present collinearity given that all results are lower than 10.

Table 2: Multicollinearity statistics

Variable	VIF	1/VIF
TE	1.07	0.932296
TRT	1.02	0.982158
WCT	1	0.99764
LTD	1.78	0.561105
CR	1.03	0.969859
DTAR	1.83	0.546678
DER	1.03	0.972714
NSRT	1.01	0.986703
TORT	1.01	0.991477
SET	1.01	0.993596
CTA	1.11	0.903679
CLTL	1	0.997757
year		
2015	1.96	0.510765
2016	1.36	0.735558
2017	1.84	0.543989
2018	4.13	0.242294
2019	4.55	0.219821
2020	4.43	0.225833
2021	4.34	0.230288
2022	3.95	0.253332
Mean VIF	2.02	

After that, the model was tested with the Breusch and Pagan Lagrangian multiplier test for random effects $X^2(1, N = 2744) = 518.24$, $p < 0,001$, with the conclusion that random effects is more suitable than pooled OLS. Next, joint F test was performed for fixed effects where $F(613, 2110) = 4.13$, $p < 0,001$ indicating that fixed effects is suitable than pooled OLS. After that, Hausman's specification test was applied for a choice between a fixed effect (FE) and a random effect (RE) model.

Hausman test based on disturbance variance estimate from efficient estimator i
 $X^2(13) = 65,48$, $p < 0,001$ (2)

Hausman test based on disturbance variance estimate from consistent estimator
 $X^2(13) = 65,67$, $p < 0,001$ (3)

Indicating that fixed effect model is more suitable for the selected panel data than random effect model. Additionally, test of overidentifying restrictions: fixed vs random effects – Sargan-Hansen statistics was performed, also indicating that fixed effect is more suitable than random effects: $X^2(20) = 85,377$, $p < 0,001$ (5)

Further, joint tests of significance for year variables were implemented where the results, $F(8, 2110) = 50.38$, $p < 0,001$, indicated that years should be included in original model. Based on previous stated results for fixed effects model are presented in table 3.

Table 3: Result from fixed effects model

ROA	Coef.	Std. Err.	t	$P > t $
TE	0,00087***	0,000143	6,06	0,000
TRT	-6,93e-06***	1,56e-06	-4,44	0,000
WCT	0,00113	0,00120	0,94	0,346
LTD	0,00024	0,000146	1,63	0,103
CR	0,0457***	0,00861	5,31	0,000
DTAR	-0,103***	0,0226	-4,54	0,000
DER	4,16e-05	0,000104	0,40	0,689
NSRT	-3,17e-09	9,37e-09	-0,34	0,735
TORT	-1,18e-07	1,81e-07	-0,65	0,514
SET	0,00011	7,50e-05	1,43	0,152
CTA	0,238***	0,0238	10,03	0,000
CLTL	-1,53e-05	8,24e-05	-0,19	0,853

year				
2015 year	0,125	1,093	0,11	0,909
2016 year	0,200	1,526	0,13	0,896
2017 year	-0,703	1,170	-0,60	0,548
2018 year	0,422	0,918	0,46	0,646
2019 year	0,588	0,909	0,65	0,517
2020 year	-7,279***	0,908	-8,02	0,000
2021 year	-1,716*	0,922	-1,86	0,063
2022 year	2,343**	0,950	2,47	0,014
Cons	1,935405	1,026242	1,890	0,059
sigma_u	9.780			
sigma_e	7.930			
rho	0.603			
Number of observations = 2,744		R-sq		
Number of groups = 614		Within = 0,2701		
		Between = 0,066		
		Overall = 0,1460		

It is observed that the variables total equity, trade receivables turnover, current ratio, debt to total assets ratio, cash to total assets and years 2020 and 2021 are significant. Total equity, current ratio, cash to total assets have a positive and significant impact on the return on assets, whereas trade receivables turnover debt on total assets ratio, and years 2020 and 2021 have negative impact and are inversely related to the observed dependent variable. The total equity presents the ability of the company for exercising leverage, additionally the positive perception of the company in the market and it has positive impact to the ROA of the hotel industry. The current ratio also reveals positive impact to ROA as well as cash to total assets. The negative impact has trade receivable turnover indicating and debt to total assets ratio what presents logical connection. As leverage is raising the risk premium is rising and, respectively, the cost of capital. Years 2020 and 2021 had a negative and significant impact, which is connected to the COVID period.

5. Conclusion and Recommendations

This study addressed the analysis of the intrinsic factors of hotel industry financial performance of the eight selected Central and Eastern European Union member states, with the specific focus on the significance of the return of assets (ROA) as measure of profitability. This analysis involved a sample of 614 hotel companies from Croatia, Slovenia, Hungary, Slovakia, Czech Republic, Poland, Romania and Bulgaria over the period of 2015-2022. The findings provide novel insight into the Central and Eastern European countries' hospitality industry underlining the importance of the intrinsic factors when assessing financial performance of the hotels. Only few studies have investigated the variables of hotel industry of select central and eastern counties; therefore, this paper attempts to bridge this gap.

The analytical approach undertaken in this study encompassed the use of panel data fixed effects model. Results obtained in the analysis suggest that total equity, current ratio, and cash to total assets have a positive impact on the return on assets of the hotel industry, while trade receivables turnover debt to total assets ratio, and years 2020 and 2021 have negative influence on ROA. Considering the preceding contributions in the literature and comparing the collected data to them, this study yields the following conclusions. The COVID-19 negative impact on the profitability performance is undisputable and it is in line with numerous previous studies. The hotel industry in the selected countries has effective working capital management notable through current ratio and working capital turnover. Moreover, total equity results imply higher total equity has positive ROA, and it is in line with previous literature. On the contrary, the higher leverage indicates lower ROA, which was expected due to the risk premium i.e. risk of debt payment default. Hotel companies with higher leverage can affect the financial options and negotiation position in terms of financial resources and arrangements, consequently exerting an influence on its overall profitability.

The research limitations arise from the lack of data on extrinsic variables as well as intrinsic variables of business model (location, chain/franchise, education etc.). Also, this study was limited just on a narrow geographic area - the select eight Central and Eastern European Union member states – thus, for future research it is recommended that all EU countries should be included in the sample. Additionally, for future research it is suggested to include extrinsic variables such as GDP, inflation, monetary policy etc. as well as other intrinsic variables (stated above).

This research provides valuable information for both academics and hotel owners and managers as it addresses the management of financial performance in the hotel industry, and as such, delivers valuable evidence for everyone concerned.

References

- Ben Aissa, S. & Goaid, M. (2016) 'Determinants of Tunisian hotel profitability: The role of managerial efficiency', *Tourism Management*, 52, pp. 478–487. Available at: <https://doi.org/10.1016/j.tourman.2015.07.015>.
- Balaguer, J. & Cantavella-Jordá, M. (2002) 'Tourism as a long-run economic growth factor: the Spanish case', *Applied Economics*, 34 (7), pp. 877–884. Available at: <https://doi.org/10.1080/00036840110058923>.
- Baltagi, H.B. (2005) *Econometric Analysis of Panel Data*. Third. Chichester: John Wiley & Sons, Ltd.
- Bhayani, S.J. & Butalal, A. (2021) 'A Study on Determinants of Financial Efficiency of Selected Pharmaceutical Companies in India: Panel Data Analysis', *Pacific Business Review (International)*, 14(4), pp. 1–11.
- Bresciani, S., Thrassou, A. & Vrontis, D. (2015) 'Determinants of performance in the hotel industry - an empirical analysis of Italy', *Global Business and Economics Review*, 17(1), p. 19. Available at: <https://doi.org/10.1504/GBER.2015.066531>.
- Brida, J.G., Cortes-jimenez, I. & Pulina, M. (2016) 'Has the tourism-led growth hypothesis been validated? A literature review', *Current Issues in Tourism*, 19(5), pp. 394–430. Available at: <https://doi.org/10.1080/13683500.2013.868414>.
- Cardil, A., Gallizo, J.L. & Salvador, M. (2023) 'Factors that affect profitability in the Spanish pig farming industry', *Spanish Journal of Agricultural Research*, 21(3), p. e0106. Available at: <https://doi.org/10.5424/sjar/2023213-19828>.
- Chambers, N. & Cifter, A. (2022) 'Working capital management and firm performance in the hospitality and tourism industry', *International Journal of Hospitality Management*, 102, p. 103144. Available at: <https://doi.org/10.1016/j.ijhm.2022.103144>.
- Comerio, N. & Strozzi, F. (2019) 'Tourism and its economic impact: A literature review using bibliometric tools', *Tourism Economics*, 25(1), pp. 109–131. Available at: <https://doi.org/10.1177/1354816618793762>.
- Dakic, S. & Mijic, K. (2020) 'Regression analysis of the impact of internal factors on return on assets: a case of meat processing enterprises in Serbia', *Strategic Management*, 25(1), pp. 29–34. Available at: <https://doi.org/10.5937/StraMan2001029D>.
- Dimitric, M., Tomas Žikovic, I. & Arbula Blecich, A. (2019) 'Profitability determinants of hotel companies in selected Mediterranean countries', *Economic Research-Ekonomska Istraživanja*, 32(1), pp. 1977–1993. Available at: <https://doi.org/10.1080/1331677X.2019.1642785>.
- Doncheva, D. & Stoyancheva, D. (2021) 'Cost and profit efficiency: the case of Bulgarian hotel industry', *Eastern Journal of European Studies*, 12(2), pp. 190–212. Available at: <https://doi.org/10.47743/ejes-2021-0210>.
- Kalas, B., Mirovic, V. & Pavlovic, N. (2019) 'Profitability Determinants of Hotel Industry in AP Vojvodina', in V. Bevanda and S. Stetic (eds) 4th International Thematic Monograph: Modern Management Tools and Economy of Tourism Sector in Present Era. Belgrade, pp. 47–62. Available at: <https://doi.org/10.31410/tmt.2019.47>.
- Karanovic, G., Stambuk, A. & Jagodic, D. (2020) 'Profitability performance under capital structure and other company characteristics: an empirical study of Croatian hotel industry', *Zbornik Veleučilišta u Rijeci*, 8(1). Available at: <https://doi.org/10.31784/zvr.8.1.21>.
- Karhunen, P. & Ledyeva, S. (2021) 'Is Chain Affiliation a Strategic Asset or Constraint in Emerging Economies? Competitive Strategies and Performance in the Russian Hotel Industry', *Management International Review*, 61(3), pp. 403–427. Available at: <https://doi.org/10.1007/s11575-021-00445-y>.
- Lado-Sestayo, R. & Vivel-Búa, M. (2018) 'Profitability in the hotel sector: a PLS approach', *Journal of Hospitality and Tourism Technology*, 9(3), pp. 455–470. Available at: <https://doi.org/10.1108/JHTT-10-2017-0118>.
- Lado-Sestayo, R. & Vivel-Búa, M. (2020) 'Hotel profitability: a multilayer neural network approach', *Journal of Hospitality and Tourism Technology*, 11(1), pp. 35–48. Available at: <https://doi.org/10.1108/JHTT-08-2017-0072>.
- Lado-Sestayo, R., Vivel-Búa, M. & Otero-González, L. (2017) 'Determinants of TRevPAR: hotel, management and tourist destination', *International Journal of Contemporary Hospitality Management*, 29(12), pp. 3138–3156. Available at: <https://doi.org/10.1108/IJCHM-03-2016-0151>.
- Lesáková, Ľ., Ondrušová, A. & Vinczeová, M. (2019) 'Factors Determining Profitability of Small and Medium Enterprises in Selected Industry of Mechanical Engineering in the Slovak Republic – the Empirical Study', *E+M Ekonomie a Management*, 22(2), pp. 144–160. Available at: <https://doi.org/10.15240/tul/001/2019-2-010>.
- Lima Santos, L., Malheiros, C., Gomes, C., & Guerra, T. (2020) 'TRevPAR as Hotels Performance Evaluation Indicator and Influencing Factors in Portugal', *Euro-Asia Tourism Studies Journal*, 1 (December 2020), pp. 1–21. Available at: <https://doi.org/10.58345/KQMJ7114>.
- Lucha, C., Ferreira, G., Walker, M., & Groover, G. (2016) 'Profitability of Virginia's Agritourism Industry: A Regression Analysis', *Agricultural and Resource Economics Review*, 45(1), pp. 173–207. Available at: <https://doi.org/10.1017/age.2016.12>.
- Mahajan, V., Nauriyal, D.K. & Singh, S.P. (2018) 'Efficiency and Its Determinants: Panel Data Evidence from the Indian Pharmaceutical Industry', *Margin: The Journal of Applied Economic Research*, 12(1), pp. 19–40. Available at: <https://doi.org/10.1177/0973801017738416>.
- Menicucci, E. (2018) 'The influence of firm characteristics on profitability: Evidence from Italian hospitality industry', *International Journal of Contemporary Hospitality Management*, 30(8), pp. 2845–2868. Available at: <https://doi.org/10.1108/IJCHM-04-2017-0219>.
- Mighty, M. & Granco, G. (2021) 'Modeling Profitability in the Jamaican Coffee Industry', *Agriculture*, 11(2), p. 121. Available at: <https://doi.org/10.3390/agriculture11020121>.
- Perles-Ribes, F., Bel, A. & Moreno-Izquierdo, L. (2017) 'Is the tourism-led growth hypothesis valid after the global economic and financial crisis? The case of Spain 1957–2014', *Tourism Management*, 61, pp. 96–109. Available at: <https://doi.org/10.1016/j.tourman.2017.01.003>.
- Prakash, J.V. & Nauriyal, D.K. (2021) 'Automotive Components Industry and Profitability Factors: Evidence from India', *Vision: The Journal of Business Perspective*, 25(2), pp. 209–223. Available at: <https://doi.org/10.1177/0972262920955007>.
- Sami, B.A. & Mohamed, G. (2014) 'Determinants of tourism hotel profitability in Tunisia', *Tourism and Hospitality Research*, 14(4), pp. 163–175. Available at: <https://doi.org/10.1177/1467358414543970>.
- Skufflic, L. & Mlinarić, D. (2015) 'Mikroekonomske determinante profitabilnosti hrvatske hotelske industrije', *Ekonomski Pregled*, 66(5), pp. 477–494.

- Soni, T.K., Arora, A. & Le, T. (2022) 'Firm-Specific Determinants of Firm Performance in the Hospitality Sector in India', *Sustainability*, 15(1), p. 554. Available at: <https://doi.org/10.3390/su15010554>.
- Spanos, Y.E., Zaralis, G. & Lioukas, S. (2004) 'Strategy and industry effects on profitability: evidence from Greece', *Strategic Management Journal*, 25(2), pp. 139–165. Available at: <https://doi.org/10.1002/smj.369>.
- Tadic, J., Jevtic, J. & Jancev, N. (2019) 'Modeling of critical profitability factors: Empirical research from food industry in Serbia', *Ekonomika poljoprivrede*, 66(2), pp. 411–422. Available at: <https://doi.org/10.5937/ekoPolj1902411T>.
- World Travel and Tourism Council: Economic Impact 2020 (2020).
- World Travel and Tourism Council: Economic Impact Report 2023 Global Trends (2023).

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence



Earnings Management Ethicality and Application in the Kenyan Public Sector: A Critical Review

Robert Odek ^{†1}, Kalundu Kimanzi²

¹ Department of Economics, Accounting, and Finance, Jomo Kenyatta University of Agriculture and Technology, Kenya

² Department of Economics, Accounting, and Finance, Jomo Kenyatta University of Agriculture and Technology, Kenya

ARTICLE INFO

Article History

Received 14 February 2023

Accepted 03 April 2023

JEL Classifications

G32, L25, L30, O34

ABSTRACT

Purpose:

This is a critical review of the empirical literature on earnings management ethicality and its application in public sector organizations in the Kenyan context.

Design/methodology/approach:

Semi-systematic review approach and thematic/content analysis technique were utilized in forming opinions on deductions of the study by reviewing previous publications between 2008-2022.

Findings:

Outcomes of this study portray that the main factors influencing the management of earnings include; a conducive environment that permits practicing creative accounting without stakeholders' knowledge, dodging declaring losses in the economic reports, meeting analyst predictions, circumventing submission of higher taxes, to qualify access to debt, contracting motivations, and to accomplish perks knotted to performance. Moreover, there is legitimate and illegitimate management of earnings since there is no consensus in regard to the ethicality of earnings management. Further, this review evidences that both accrual and real earnings management techniques are practiced by managers during reporting. Additionally, there are mixed results as to whether creative accounting is practiced in the public sector or not, and with reference to Kenya, no studies on earnings management ethicality have ever been conducted.

Research limitations/implications:

There are limited studies on earnings management ethicality in the public sector both in Kenya and globally. Besides, this is a qualitative study that depended on the previously published data in its entirety. This then, implies that all the findings here are not first-hand and are purely dependent on the findings of other studies that had been published. The researcher, therefore, had no control in regard to ascertaining the accuracy of the previous data analyzed. In mitigating these limitations, the majority of the publications included in this study were from high ranked journals. The bulk of the literature reviewed was from research work already conducted in other countries.

Originality/value:

This study contributes to accounting theory as an area of study. It depicts the deductive approach of research which can then be embraced by other graduate accounting students in furthering accounting research. Besides, it contributes to strategy makers like the Kenya Accounting Standards Board in the formulation and implementation of accounting principles. It also forms a basis for further research in the management of earnings and its ethicality among public sector firms. That is, no other study has been done in Kenya and just a few studies have been carried out globally.

Keywords:

Earnings Management,
Earnings Management
Ethicality, Techniques of
Earnings management

1. Introduction

Earnings management is the act of improving a company's economic reports with an aim of portraying a particular better image which may not be the real case Hamilton et al. (2018). This is done by aggressively applying particular accounting techniques and standards that will favour the wrong results reflected in accounting reports. Management of earnings is therefore experienced when managers and those in charge of making decisions use their professional judgment during financial reports preparation so as to present financial reports in a manner that is misleading to the

[†] Corresponding Author: Robert Odek
e-mail: roba.odek@gmail.com

users of the financial information with an aim of either influencing contractual outcomes or public perception of the company. As advanced by Aziatul et al. (2015), earnings management is where the management utilizes its discretion in preparing and reporting accounting information.

The advent of earnings management is strongly evidenced by the recent world financial crisis when one of the leading disgraces in contemporary ages transpired as a consequence of deceptive records conveyed by the enterprise Enron, at the period when it was the seventh largest company in the US, which declared a 100 billion income the year before its insolvency in 2001. Enron was later taken to court-martial where countless persons were established to be guilt-ridden for fraud. Such cases have since led to great research work in regard to earnings management.

The principal drive of presenting economic declarations is to provide yearly firm's economic status to equally outside and in-house patrons in a dependable and well-timed fashion Aziatul et al. (2015). The subject matter in the report is the reported earnings which are utilized by the key stakeholder in decision making of the firm's future. However, as a result of information asymmetry, managers are being opportunistic in their reporting by only conveying to the public, the corporation's economic evidence which in their opinion, describes what champions their own interests. The selfish drive among managers hence does not allow them to report the true view of the company reports. Usually, the original aim of earnings communication should be to depict the true and genuine economic position of the firm indicating sources of revenue, cost allocations, and appropriations. However, as reported in various literature, this has not been the case for some firms that manage their earnings. Besides, earnings management has been researched by various authors. However, this topic has not been detailed with respect to public sector firms. Particularly in Kenya, no research in regard to the management of earnings in the public sector has been carried out describing the ethical aspects of the same. Based on the foregoing, it is, therefore, necessary to carry out this review. The objectives of this study include to; review the theoretical foundations of earnings management, reviewing motivators of earnings management, reviewing techniques of earnings management, reviewing the ethicality of earnings management, reviewing the applicability of earnings management in the public sector, and establishing if earnings management is still a researchable area.

Kenyan Perspective

Earnings management has indeed been a point of interest for various researchers in Kenya. Several studies have been carried out in the same area with diverse topics and industries. Based on this current study, several pieces of literature in regard to earnings management were reviewed as evidenced in the following table.

Table 1: Summary of Sampled Kenyan Studies on Earnings Management

The study	Nature of the study
Githaiga et al. (2022)	Board characteristics and earnings management. Does firm size matter?
Kapkiyai et al. (2022)	Audit Committee Effectiveness and Earnings Management Among Publicly Listed Firms in Kenya
Vekaria et al. (2022)	Tribal Connections and Earnings Quality Of Companies In Kenya
Kamau et al. (2017)	Correlation between Earnings Management and Financial Distress among Selected Firms in Kenya
Chelogoi et al. (2022)	Effect Of Corporate Governance On Earnings Management Of Firms Listed In Nairobi Securities Exchange
Outa et al. (2022)	The impact of corporate governance code on earnings management in listed non-financial firms: Evidence from Kenya
Joshua et al. 292016)	Determinants of Earnings Management Practice among Non-Listed Firms in the Motor Industry in Kenya
Mafunga et al. (2019)	Managerial Ownership And Earnings Management Of Listed Insurance Companies In Kenya
Muchoki et al. (2015)	The effect of corporate governance practices on earnings management of companies listed at the Nairobi securities exchange
Oruke et al. (2021)	Earnings Management: Acritical Review
Wawerui et al. (2013)	Corporate Governance, Firm Characteristics and Earnings Management in an Emerging Economy
Wangui et al. (2017)	Earnings Management And Financial Performance Of Listed Non-Financial Firms In Nairobi County, Kenya
Phyllice et al. (2021)	Influence Of Earnings Management On Financial Performance Of Agricultural Firms Listed In Nairobi Securities Exchange

From the above table 1, it is evidenced that several studies have been conducted in Kenya in regard to the management of earnings. However, these studies have majorly been in the private sector and not among public sector organizations. Besides, studies on the management of earnings have not been conducted in relation to ethicality. Oruke et al. (2021) critically reviewed the management of earnings. However, their study only concentrated on control mechanisms and not motivators or techniques like the present study. In fact, their study result as regards to motivators of management of earnings was inconclusive. In addition, a similar study Oruke et al. (2021) had been done in India and thus theirs ought to have taken a different approach by concentrating on the Kenyan context and specifically in the Public Sector firms. It is only this study by Oruke et al. (2021) that has to a smaller extent offered to

review the management of earnings critically locally and globally which has since not offered a solution in the Kenyan context. In view of the foregoing, there is a need for further research among public sector organizations, considering the ethicality of the management of earnings.

2. Review of Literature

2.1 Theoretical Review

Positive Accounting theory

Positive accounting theory elucidates how a firm's administration treats the relevant standards by selecting one of the other accounting guidelines amid the numerous alternatives existing. The positive accounting theory was first made known by Watts & Zimmerman (1990) as a theory hesitant with clarifying accounting practices by the administration and accountant without stipulating the consequent practice that the firm should embrace. Following this theory, organization administration can implement two kinds of conduct: beneficial behaviour and opportunistic behaviour (Mahjoub & Miloudi, 2015). Therefore, Positive theory offers three clarifying traditions to describe the use of earnings management by executives:

a) Bonus plan hypothesis

This supposition envisages that administrators act speculatively when the business has compensation and bonus plans using accounting approaches that escalates the confirmed earnings and increase the compensation and rewards that executives get (Watts & Zimmerman, 1990).

b) Debt covenant hypothesis

This bit suggests that in firms involved in financing and debt contracts, their management does participate in opting for accounting policies that increase revenue which when presented to the creditors, will then allow access to debts. Administrators implement this approach to ease financing contract terms and decrease defaulting overheads (Watts & Zimmerman, 1990).

c) The political Cost hypothesis

This supposition envisages that firms are more possibly able to apply accounting choices that decrease stated earnings since bigger corporations are more visible to political attention than smaller businesses (Watts & Zimmerman, 1990).

Agency Theory

Agency theory was originated by Jensen & Meckling (1976) and it specifies the affiliation between investors and managers. It is founded on the precept that the agent (executive) accepts to achieve certain obligations for the master (stockholders) and the principal undertakes to reward the agent (Odek & Oyugi, 2021). Thus, equity owners grant the management the duty of running the corporation on their behalf (Alfadhael & Jarraya, 2021). This theory thus explains that equity owners bring and invest capital. On the other hand, the management is charged with the duty of running the organization in the best interest of the equity holders Atmadje et al. (2021).

This theory is applicable in this case in the sense that the equity owners expect the manager to act in their interest. On the other hand, the manager may also end up acting in his own interest thus creating an agency conflict. This process in the long run results in information asymmetry where the manager having information on the dealings of the company uses his discretion to arrive at the financial reports to present to the directors. Thus earnings management.

Signalling Theory

Signal theory explicates the distribution of info that transpires amongst organization executives and concerned parties related to evidence accessible via economic declarations (Yasa, 2010). It is described in signal theory that managing directors possess correct detail in regard to a corporation's worth. When the administration conveys the info to the marketplace, the marketplace will re-join to this info as a signal that can influence firm value and is reproduced in stock prices (Purwanto, 2004). The manager as the person who manages the daily operations of the organization is in possession of the large useful information in relation to the daily operations of the firm. Thus he/she is indebted to present a signal about the status of the organization to the owner (Alfadhael & Jarraya, 2021). The signalling theory forms a foundation of this study in the sense that the information which managers give to the stakeholders is what signals the response from the financial statements users. That is, managers can either decide to give positive information by increasing earnings or negative information by reducing earnings.

2.2 Previous studies

2.2.1 Motivators of Earnings management

Hamilton et al. (2018) in their survey on the naughty list or the nice list conducted in the USA among managers, reported that executives are extra ready to participate in revenue-escalation earnings management when they are aware they can do so devoid of being noted by the users. Implying that one of the important motivators of managers toward managing a firm's earnings is when they can manage the earnings without being noticed by the users of the financial reports.

Aziatul et al. (2015) analyzed the association between opportunistic behaviours (free cash flow and profitability), monitoring mechanisms (leverage), and pressure behaviours (financial distress) toward earnings management. It was an empirical exploration with an illustration of Malaysian publicly listed corporations from the year 2010 to 2012.

They concluded that executives tend to practice creative accounting with an aim of avoiding declaring losses in the bottom line.

Duncan (2001), in his article on twenty pressures to manage earnings in the USA, commented that influences include; experts' predictions, access to debt marketplaces, rivalry, predetermined responsibility, a thriving share marketplace, new monetary dealings, marketplace disregard of big burdens, merger appeal, executive reward, temporary emphasis, impractical strategies, and budgets, period-end requests from stockholders, stages of extreme income succeeded by fear of subsequent deterioration, hiding illegitimate dealings, individual advantages, career advancements, concentration on the group, and job retaining are amid the motives that motivate earnings management and that the effects of the latter variables in different countries may be different.

Adhikari et al. (2005) in their study investigated the connection concerning effective tax rates (ETR) and creative accounting in a non-Western context. Their study examined the application of bookkeeping choice by Malaysian businesses in reaction to an expected change in tax rules. They predicted that big Malaysian businesses with little effective tax rates minimize face value returns preceding a lessening in corporate tax rates with an aim of influencing tax policy. They also commented that their experiential effects were congruent with preceding confirmation in the US that corporations use accounting choices to realize economic objectives. Their findings hence infer that the greater the tax rate, the greater the chances that managers of corporations will practice earnings reductions so as to reduce taxes paid.

Aman & Hamid (2006) examined the explanations for the management of earnings in Malaysia by applying a trial of corporations listed on the Kuala Lumpur Stock Exchange. They reported that the debt-to-equity ratio is an important motivator toward earnings management. They explain that firms that are not capable of internally financing their operations are more prone to practice unrestricted bookkeeping accruals to portray an improved status of their businesses to outer users of economic declarations.

Jessica & Emma (2015) conducted a study on earnings management in private Swedish companies. Their thesis aimed to inspect the reality of creative accounting in Swedish private limited firms and influences, which may distress its existence throughout the last nine years. They studied a populace of more than 5 000 corporations and 48 000 interpretations. They discovered that corporations manage their earnings to overcome losses. They also noted that these companies that practice earnings management don't apply the services of the big four audit firms.

Joshua & Agness (2016) in a study to probe the causes of earnings management exercise amongst non-listed corporations in the motor industry in Kenya concluded that the most important contract-related incentives which encourage creative accounting are suppliers' agreement without the organization, outward agreement motivations with clienteles, the requirement of senior administration staffs to observe precautionary measures in regard to their term and the contract which comes with compensations as a consequence of improved performance.

2.2.2 Techniques of Managing Earnings

Earning management techniques refer to the methods applied by various management of organizations to practice creative accounting whenever they are reporting the economic situation of the company as detailed herein.

1. Big Bath

Lenka (2020) expounds that this practice is centered on the belief in manipulating the accumulation of overheads. For instance, in the present year, the executive declares all conceivable expenses associated with incomes, and a lucrative yet to come year is arranged. This is a procedure repeatedly applied in controlling of new organizational changes, where fresh supervisors can assign accountability for massive losses to the previous firm administrators. The real-world implication of this practice resides in the fact that if we contemplate lesser incomes, the enterprise will declare an added loss to present an even poorer commercial outcome, which in turn circumvents a future loss. This procedure seems to be about operational rearrangement, impairment of assets, and obsolete processes.

2. Income Minimization

A corporation with voluminous yield will be additionally probable to embrace this method with the motive of circumventing political burden and revenue tax reflection since this practice would necessitate the administration to upsurge the overheads so as to diminish the declared returns (Aziatul et al., 2015). This technique is applicable in the Kenyan industry based on the fact that many companies would want to report low earnings as a result of tax planning purposes.

3. Income Maximization

Positive accounting theory has the viewpoint that executives could participate in an arrangement of increasing declared final proceeds for extra pay drives (Ratsula, 2010). Therefore, this is possible frequently for the advantage of personalities such as executives and not for the profit of stockholders.

4. Income Smoothing

Executives could smooth declared proceeds for a given period with the object of receiving a comparatively continuous reward (Ratsula, 2010). The method was intentionally applied with the aim to reduce the impulsiveness of declared revenue. Frequently the administration will decline to depict the low declared incomes; thus, they will level the incomes as a practice to reflect fair earnings. The possibility of the method being opted for as a means to achieve perceived creative returns will be contingent on the object of the administration Aziatul et al. (2015).

5. Cookie jar reserve

This method of managing earnings arises from the ability of the accounting guiding principles to be flexed. The basics of this method are the hoarding of numerous sums till it is the correct period to upsurge or drop the return them based on the status at hand. The use of global principles or nationwide rules as executives lead to an approximation and record of the overheads sustained from the actions of the present year, even if they are ready in the yet to come periods. It is the approximation of charges that offers room for creative accounting (Lenka, 2020).

Analogy of cookie jar reserve goods returned

Receivables ought to be noted at a net attainable price. This is the concluding price that will be the final collection. Consequently, the executive is compelled to consider all conceivable aspects that influence the collection of receivables, such as return of goods. If executives contemplate a reimbursement or change of the sale value, they are obligated to note these evidences. Consider that the goods to clients this year shall be brought back in the actual sum of thousand euro, this transaction will be captured this year, by declaring the cost and the incidental allowance. The probable worth of items brought back in itself consist the management of earnings (Lenka, 2020).

6. Additional accrual centred earnings management methods

Table 2: Other accrual-based Earnings management techniques

Accruals based earnings management
Influence the time of proceeds and costs (for instance, note the sale prior to items dispatch/ recognize the expense on a later date)
Inadequately capitalize expenses (for instance, proceeds on construction ventures or overhaul and maintenance expenditure)
Infer accounting principles beyond limits and not as expected to expedite sales and/or extend costs
Choose the time to embrace fresh accounting canon (for instance, adoption as soon as it publicized against holding till acceptance is compulsory) based on its influence on income
Use professional judgment in accounting estimations to attain upper earnings in given circumstance (for instance, by choosing depreciation method, salvage value, or useful life)
Categorize items in regard to earnings they accrue (that is, re-categorize a trading security as available-for-sale to avoid an unrealized loss from being declared in net returns)
Real Earnings Management
Entice consumers to buy extra products at year end more they else would (for instance, by reducing prices or providing sales discounts or favourable credit condition)
Opt when to acquire or dispose assets in regards to earnings effects which may lead to (for instance, to avoid recording depreciation on a new machine, avoid a loss on the sale of an investment, or achieve a gain on sale)
Postponement of appointment of staffs to devoid recognizing different staff-related overheads in the present reporting period
Decrease or push forward research and development expenditure, publicity costs, or optional sales, and managerial expenditures chastely to increase returns.
Upsurge manufacture to create extra stock and take down cost of goods sold (COGS) through diversifying fixed costs over a larger number of units, hence working down the cost per unit

Source: Hamilton et al. (2018)

2.2.3 Earnings management Ethicality

Earnings management ethicality refers to the acceptable nature of management of earnings by executives in organizations. It is where there is an agreement on whether management of earnings is accepted or not accepted among executives. The same has been empirically reviewed here in.

Aziatul et al. (2015) suggests that the management of earnings may be ethical or not ethical. Illegitimate earnings management would logically impact falsified economic declarations, hence resulting to misinforming of the consumers of monetary statements. On the other hand, legitimate earnings management occurs if the principles applied are in line General Accepted Accounting Principles (GAAP). GAAP permits numerous bookkeeping options and necessitates abundant approximation. Because there are several options to convey the firm's income, there is no exact thresh hold past which use of a particular accounting principle is illegal, in that way; the administration or the corporation have the opportunity to opt which ever ways to declare final returns, provide they abide with the GAAP, Nur et al (2015)

Lawrence et al. (2009) remarks in their article that nearly entire falsified economic declarations could be branded as earnings management, though not entire earnings management is referred to as falsified. Besides, they further hold that ethicality of earnings management could be viewed from both ends; illegal and not illegal at the same time. Morris & Mintz (2008) elucidates that there exists no harmony as to when management of earnings is unethical behaviour as contrasted to not of good quality or even required executive conduct. Accordingly, various executives trust that some kinds of earnings management behaviour are tolerable or even necessary.

Hamilton et al. (2018) contends that controllers embrace a conventional method by alerting against inherently unethical earnings management, reasoning that it twists an organization's true income and deceives the investing

public. On the other hand, they also suggest that among the responses received in their survey among managers on the ethicality of earnings management, some were in dilemma by accepting that creative accounting is within the continuum ranging from admissible understandings of accounting standards to absolute deception, with several accounting options being within the middle ground so that, it's neither completely ethical nor unethical.

2.2.4 Earnings Management application in the public sector organizations

Creative accounting is a usual exercise in the private sector (Bisogno & Donatella, 2022). However, currently, earnings management is attracting the concern of various public-sector intellectuals, who are interested in the application of accrual accounting schemes. Though scholars and practitioners were uncertain on the topic of earnings and management, currently this position has changed as studies are being intensified in this area. Bergmann et al. (2019) clarify that it is unanimously accepted that in the current era, organizational decisions cannot be based on cash accounting information only. Subsequently, earnings management in the public sector is an area that still calls for more research both in developed and developing countries like Kenya. As compared to cash accounting, accrual reporting relies heavily on principle-based standards where the accountant is at liberty to apply professional judgment. However, as advanced by Bisogno & Donatella (2022), in extremely political environments, there is often a hazard that professional judgment under given settings may be dangerous since it permits opportunism in the declaration of economic reports.

Hoang et al. (2016) study applying monetary statistics from Ho Chi Minh Stock Exchange and Hanoi Stock Exchange, and the printed yearly news of the corporations listed in Vietnam examined the influence of government ownership on the management of earnings of Vietnamese listed organizations. They established that state-owned enterprises (SOEs) do not practice creative accounting through accruals compared to privately owned enterprises (POEs), while conventionally, it is believed that SOEs are more susceptible to employing creative accounting.

Beck (2018) in her study on opportunistic financial reporting around municipal bond issues examined two actions of professional judgment in government economic statements: abnormal accruals in full accrual financial statements, and other financing sources and uses in modified accrual financial statements using a unique dataset of hand-collected financial data from California. She concluded that comprehending the method government officers express their professional judgment in the final organization disclosures is a prerequisite for countries, controllers, and scholars to deduce and screen monetary presentations. Besides, she found indication that municipals practice professional judgment through accrued accounting practice thus evidencing earnings management in the public sector.

Cohen et al. (2019) examined earnings management practices in local governments (LGs). They employed a wide trial of Greek and Italian LGs. The Greek databank considered the time from 2002 to 2015 with about 4,300 trials, and the Italian databank considered the time from 2008 to 2015 with about 1,130 trials. The discoveries from the investigation provided an indication that LGs participate in earnings management, the major influence being the electoral cycle.

Maxime & Nils (2017) in their study of personal background influences a finance minister to cook the books in the Swiss cantons used a panel data set of 26 cantons over the period 1980–2012. Their study revealed that Financial Ministers practice creative accounting regardless of their individual or philosophical background with the exemption that skilled economists inclined toward applying falsified bookkeeping. Furthermore, strict economic guidelines encourage Financial Ministers near extra surplus-hiding bookkeeping.

Capalbo et al. (2021) led a study on the association between accounting and the political process beyond the political cost hypothesis, detailing the information that a positive association is present between elections and earnings management in Municipally-Owned Entities (MOEs). Their examination applied a trial of 3557 Italian utility entities considering 506 enterprises for which one single municipality had the absolute majority of shares. The trial spanned a 6-year period as well as, on average, two election dates for each entity. Their empirical outcome affirmed the association between elections and earnings management of municipally owned entities. Moreover, their results illustrated that, during election periods, Municipally Owned Entities are more likely to issue an upsurge in their revenue.

Seraina & Charitini (2021) explored whether NHS hospitals in England managed their earnings upward before applying to the government for a foundation trust (FT) status—a scheme that permitted them superior monetary liberty and administration independence. The research work showed that NHS Foundation Trust adjusted discretionary accruals upward for up to two years before applying for Foundation Trust status. Henceforth, inducements that the government avails to public organizations may pose a weighty consequence on their conduct—just as a private area.

3. Methodology

This research work implemented a semi-systematic or narrative review methodology. According to Wong et al. (2013) semi-systematic review is deliberate for areas that have been intellectualized in a different way and studied by several groups of researchers within varied disciplines and that hamper a full systematic review procedure. That is, rereading every single article that could be applicable to the topic is just but not likely, so a different tactic must be settled on. Besides a semi-systematic review permitted observation of how this research topic has proceeded over time and developed across investigation civilizations.

The study targeted previous publications on the management of earnings. Therefore, not all the articles ever published were considered.

All the data were collected from past journals in regard to the management of earnings. That is, publications from 2008-2022 were reviewed as regards the study topic

The current study applied thematic/content analysis to form opinions about the deductions from the study. Thematic or content analysis is a universally applied practice for recognizing, scrutinizing, and commenting on patterns in the form of themes within a script (Braun & Clarke, 2006).

4. Results

Appraisal of empirical studies submits the following factors as the fundamental reasons why managers practice management of earnings; a conducive environment that permits practicing creative accounting without stakeholders' knowledge, dodging declaring losses in the economic reports, meeting analyst predictions, circumventing submission of higher taxes, to qualify access to debt, contracting motivations, and to accomplish perks knotted to performance. Based on the foregoing, it is concluded that the latter motivators for earnings management are true since previous studies reviewed were global and were not only done in a specific country. Thus, the findings can be generalized as applicable in organizations globally and hence correct to this extent.

Centered on the empirical literature on the ethicality of earnings management, it is true to conclude that there is no consensus as regards the ethicality of earnings management. In other words, ethicality is devoted to the intention of the manager during the preparation of the financial reports. So that if the purpose of the financial report is that which favours the shareholders and will enable the prosperity of the company in the long run, then earnings management is beheld as ethical. However, shall the objective for managing earnings be for the manager's personal benefit, then that would amount to unethical earnings management. This then guides the prerequisite of academic researchers to still carry out supplementary studies to establish the ethicality of earnings management. Besides, based on the findings on the ethicality of earnings management, insufficient studies have been done on the same hence the need for more studies.

Undeniably earnings management cannot be ignored in the public sector. Likewise, studies additionally advise that one of the key motivators of earnings management is the application of accrual-based accounting in the public sector. This then poses the question as to whether the public sector should stick to a cash accounting basis or apply accrual accounting. Definitely cash accounting has its own weaknesses and to be more specific when it comes to reporting assets. However, accrual accounting also has its own deficiencies which appear to be more badly compared to the limitations of cash accounting. That is, accrual accounting promotes earnings management which has been evidenced over the years to have resulted in the global financial crisis. It is contemplated that the Government of Kenya and through the Public Sector Accounting Standards Board (PSASB) could embrace accrual accounting in semi-autonomous government agencies in the financial year 2023/2024. However, the question remains with regard to the level of preparedness to implementation of accrual-based accounting. Has Kenya Public Sector Accounting Standards Board considered the side effects of accrual accounting and its negative impact on the Kenyan economy in the long run? This still remains an area to be addressed by further studies on earnings management in the public sector.

5. Conclusion and Recommendations

Based on the reviewed literature as regards earnings management in the public sector, it is evidenced to a greater extent, that public sector companies manage their earnings. However, there are also some studies that have opined that earnings management is practiced to a smaller extent in the public sector. Therefore, there are inconclusive outcomes as to whether earnings management is practiced in the public sector or not. Thus, further studies still need to be done on the same.

5.1 Theoretical implication

A theory is a set of ideas used to explain real-world observations. Hence, this study contributes to accounting theory as an area of study. It depicts the deductive approach of research which can then be embraced by other graduate accounting students. That is, accounting as a practice is currently embracing the scientific aspect which requires a normative approach where the practice is first based on theory. The theories are then utilized by the practitioners in actual practice. The deductive approach is therefore a real-life situational research practice.

5.2 Practical implication

This study contributes to strategy makers like the Kenya Accounting Standards Board in the formulation and implementation of accounting principles.

5.2 Research implication

The study forms a basis for further research in the management of earnings and its ethicality among public sector firms. That is, no other study has been done in Kenya and just a few studies have been carried out globally offering more gaps for further scholarly work. In view of the foregoing, studies should be intensified particularly on public organizations.

5.3 Research limitations

There are limited studies on earnings management ethicality in the public sector both in Kenya and globally. Besides, this is a qualitative study that depended on the previously published data in its entirety. This then, implies that all the findings here are not first-hand and are purely dependent on the findings of other studies that had been published. The researcher, therefore, had no control in regard to ascertaining the accuracy of the previous data analyzed. In mitigating these limitations, the majority of the publications included in this study were from high ranked journals. The bulk of the literature reviewed was from research work already conducted in other countries.

References

- Adhikari, A., Derashid, C., & Zhang, H. (2005, May 31). Earnings Management to Influence Tax Policy: Evidence from Large Malaysian Firms. *Journal of International Financial Management & Accounting*, 16, 142-163. <https://doi.org/10.1111/j.1467-646X.2005.00115.x>
- Alfadhael, S., & Jarraya, B. (2021). Earnings management and its applications in Saudi Arabia context: Conceptual framework and literature review. *Accounting*, 7(5), 993-1008. DOI: 10.5267/j.ac.2021.3.009
- Aman, I., & Hamid, P. (2006, May). Earnings management in malaysia: a study on effects of accounting choices. *Malaysian Accounting Review*, 5(1), 185-209. [.https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiRnoi_9MH_AhVJVqQEHXiiC3AQFnoECBEQAQ&url=https%3A%2F%2Fcore.ac.uk%2Fdownload%2Fpdf%2F78276666.pdf&usg=AOvVawoGZa5DHkB0kNKVat_Waldz](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiRnoi_9MH_AhVJVqQEHXiiC3AQFnoECBEQAQ&url=https%3A%2F%2Fcore.ac.uk%2Fdownload%2Fpdf%2F78276666.pdf&usg=AOvVawoGZa5DHkB0kNKVat_Waldz)
- Atmadja, A. T., Saputra, K. A., Tama, G. M., & Paranoan, S. (2021). Influence of Human Resources, Financial Attitudes, and Coordination on Cooperative Financial Management. *Journal of Asian Finance, Economics and Business*, 8(2), 563-570. DOI 10.13106/jafeb.2021.vol8.no2.0563
- Aziatul, W., Nur, A., & Zuraidah, S. M. (2015, April). Earnings Management: An Analysis of Opportunistic Behaviour, Monitoring Mechanism and Financial Distress. 7th International Conference On Financial Criminology 2015 13-14 April 2015, Wadham College, Oxford, United Kingdom. 28, pp. 190-201. United Kingdom: Elsevier B.V. DOI 10.1016/S2212-5671(15)01100-4
- Beck, A. W. (2018, July 2nd). Opportunistic financial reporting around municipal bond issues. *Review of Accounting Studies*, 23, 785-826. doi:<https://doi.org/10.1007/s11142-018-9454-2>
- Bergmann, A., Fuchs, S., & Christoph, S. (2019). (A theoretical basis for public sector accrual accounting research: current state and perspectives. *Public Money and Management*, 39(8), 560-570. doi:10.1080/09540962.2019.1654319
- Bisogno, M., & Donatella, P. (2022). Earnings management in public sector organizations: a structured literature review. *Journal of Public Budgeting Accounting & Financial Management*, 34(6), 1-25. doi:DOI 10.1108/JPBFAFM-03-2021-0035
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101. doi:<https://doi.org/10.1191/1478088706qp063oa>.
- Capalbo, F., Lupi, C., Smarra, M., & Marco, S. (2021). Elections and earnings management: evidence from municipally-owned entities. *Journal of Management and Governance*, 707-730. <https://doi.org/10.1007/s10997-020-09523-z>
- Chelogoi, S. (2017). Effect Of Corporate Governance On Earnings Management Of Firms Listed In Nairobi Securities Exchange. *International Journal of Economics, Commerce and Management*, 5(8), 641-654. <https://ijecm.co.uk/volume-v-issue-8/>
- Cohen, S., Bisogno, M., & Malkogianni, I. (2019, September 13th). Earnings management in local governments: the role of political factors. *Journal of Applied Accounting Research*. <https://doi.org/10.1108/JAAR-10-2018-0162>
- Duncan, James R. (Jul 2001). Twenty pressures to manage earnings. *The CPA Journal*; New York Vol. 71, Iss. 7, : 32-37.
- Githaiga, P., Kabete, P., & Bonareri, T. C. (2022). Board characteristics and earnings management. Does firm size matter? *Cogent Business & Management*, 9(1), 1-16. doi:10.1080/23311975.2022.2088573
- Hamilton, E. L., Hirsch, R. M., Murthy, U. S., & Rasso, J. (2018). The Nuaghty list or the nice list? Earnings Management in the Days of Corporate Watchdogs Lists. Montvale: Institute of Management Accountants. <http://dx.doi.org/10.2139/ssrn.2103384>.
- Hoang, T., Abeysekera, I., & Shiguang, M. (2016). State ownership and earnings management: empirical evidence from Vietnamese listed firms. 1st International Conference on Finance and Economics, (pp. 257-268). Ho 'chi Minh City, Viet Nam. <https://ro.uow.edu.au/buspapers/689/>
- Jensen, M. (2000, December). A Theory of the Firm: Governance, Residual Claims and Organizational Forms. 3(4), 305-360. Retrieved from <http://hupress.harvard.edu/catalog/JENTHF.html>
- Jessica, H., & Emma, H. (2015, May 29th). Earnings Management in Private Swedish Companies. <https://core.ac.uk>
- Joshua, K., & Agness, N. (2016). Determinants of Earnings Management Practice among Non-Listed Firms in the Motor Industry in Kenya. *International Journal of Science and Research*, 5(9), 623-633. doi:10.21275/ART20161646
- Kamau, C., Banafa, A., & Kariuki, S. (2022). Correlation between Earnings Management and Financial Distress among Selected Firms in Kenya. *Research Square*. doi: <https://orcid.org/0000-0002-8085-0421>
- Kapkiyai, C., Cheboi, J., & Komen, J. (2020). Audit Committee Effectiveness and Earnings Management Among Publicly Listed Firms in Kenya. *SEISENSE Journal of Management*, 3(2), 31-44. doi: <https://doi.org/10.33215/sjom.v3i2.292>
- Lawrence, P. G., Patricia, A. T., & Richard, A. W. (2009). The Ethics of Earnings: The Ethics of Earnings: Perceptions after Sarbanes-Oxley. 11(1). <https://www.imanet.org>
- Lenka, S. (2020). Motives and techniques of earnings management used in a global environment. *SHS Web of Conferences, Globalization and its Socio-Economic Consequences* 2020. doi:<https://doi.org/10.1051/shsconf/20219202060>
- Mafunga, M., Fwamba, R., & Ondiek, A. (2019). Managerial ownership and earnings management of listed insurance companies in Kenya. *The strategic Journal of Business & Change management*, 6(4), 120-130. <http://www.strategicjournals.com/index.php/journal/article/view/1376>
- Mahjoub, I., & Miloudi, A. (2015). Earnings management: A review of literature. *Euro and the European Banking System: Evolutions and challenges*. University of IASI. DOI: 10.5267/j.ac.2021.3.009
- Maxime, C., & Nils, S. (2017). Does personal background influence a finance minister to cook the books? An investigation of creative accounting in Swiss cantons. *Applied Economics*, 49(10), 941-953. doi:10.1080/00036846.2016.1208360
- Jensen, M. and Meckling, W. (1976): "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics* 3, 305-360.
- Morris, R., & Mintz, S. (2008). Ethical Obligations and Decision Making in Accounting. <https://www.mheducation.com/>
- Muchoki, W., Mwangi, M., & Iraya, C. (2015, January). The effect of corporate governance practices on earnings management of companies listed at the nairobi securities exchange. *European Scientific Journal*, 11(1). <https://eujournal.org/index.php/esj/article/view/4945>

- Nur, D. J., Zuraidah, M. S., & Amrizah, K. (2015). Board Structure and Earnings Management in Malaysian Government Linked Companies. 7th International Conference On Financial Criminology 2015 13-14 April 2015, Wadham College. 28, pp. 235-142. Oxford, United Kingdom: Procedia Economics and Finance. <https://cyberleninka.org/article/n/1363564>
- Odek, R. & Oyugi, L. (2021). Influence of governance indicators on disclosures in performance audit reports in national government constituencies development funds. *International Journal of Economics, Commerce and Management*. Vol IX, Issue 11, Pg 172-235 <http://ijecm.co.uk/volume-ix-issue-11/>
- Outa, E., & Paul, E. (2017). The impact of corporate governance code on earnings management in listed non-financial firms: Evidence from Kenya. *Journal of Accounting in Emerging Economies*, 428-444. doi: <https://doi.org/10.1108/JAEE-09-2016-0081>.
- Phylice, J., Robert, E., & Ondiek, B. (2021). Influence Of Earnings Management On Financial Performance Of Agricultural Firms Listed In Nairobi Securities Exchange. *Journal of Economics and Finance*, 12(1), 33-39. <https://www.iosrjournals.org>
- Purwanto, A. (2004). Pengaruh Harga Saham, Volume Perdagangan, dan Varian Retrunterhadap Bid-Ask Spread pada Masa Sebelum dan Sesudah Right Issue di Bursa Efek Jakarta Periode 2000-2002. *Jurnal Akuntansi dan Auditing*, 1(1). <http://eprints.undip.ac.id>
- Ratsula, O. (2010). The Interplay Between Internal Governance Structures, Audit Fees And Earnings Management In Finnish Listed Companies. Aalto University. <http://urn.fi/URN:NBN:fi:aalto-201111181361>
- Seraina, A., & Charitini, S. (2021). Earnings management in public healthcare organizations: the case of the English NHS hospitals. *Public Money & Management*. doi:10.1080/09540962.2020.1866854
- Vekaria, J. (2019). Tribal connections and earnings quality of companies in Kenya. Auckland University of Technology. 10.21203/rs.3.rs-2301696/v1
- Wangui, M. (2017). Earnings Management And Financial Performance Of Listed Non Financial Firms In Nairobi County, Kenya. University of Nairobi. <https://ir-library.ku.ac.ke/handle/123456789/19186>
- Watts, R. L., & Zimmerman, J. L. (1990). Positive Accounting Theory: A Ten Year Perspective. *The Accounting Review*, 65(1), 131-156. <http://www.jstor.org/stable/247880>
- Waweru, M., & Riro, G. (2013). Corporate Governance, Firm Characteristics and Earnings Management in an Emerging Economy. *JAMAR*, 11(1). [https://cmaustralia.edu.au > uploads > 2021/](https://cmaustralia.edu.au/uploads/2021/)
- Wong, G., Greenhalgh, T., Westhorp, G., Buckingham, J., & Pawson, R. (2013). RAMESES publication standards: Meta-narrative reviews. *BMC Medicine*, 11(20), 1741-7015. doi:<https://doi.org/10.1186/>
- Yasa, G. (2010). Opportunist And Efficient Perspective Of Management Based On The Motivational Aspects That Based On It. *PJAE*, 18(8), 2021 <https://files.eric.ed.gov>

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence



The Effect of the Movement in 52-Week High on Momentum Profit: The Evidence from Taiwan

Li-Chuan Liao ¹, Tzu-Pu Chang ^{†2}, Ping-Huang Wang ²

¹ School of Economics and Management, Xi'an University of Technology, China

² Department of Finance, National Yunlin University of Science and Technology, Taiwan

ARTICLE INFO

Article History

Received 7 June 2023

Accepted 2 August 2023

JEL Classifications

G11, G40

ABSTRACT

Purpose:

This paper aims to examine the impact of price movements in 52-week highs on a 52-week high momentum strategy. This study refers to the upward or downward movement in 52-week highs as an updating effect and determines how this effect influences the profitability of the original 52-week high momentum strategy.

Design/methodology/approach:

This paper decomposes the ratio of stock price to 52-week high into denoted two components: price change and updating components. We construct two momentum strategies, each focusing on adjusting either the price change or the updating component. Additionally, we employ a portfolio approach and Fama-MacBeth regression analysis to investigate the profitability of each proposed momentum strategy.

Findings:

The empirical results reveal that removing the price change component (updating component) from the original 52-week high measure can increase (decrease) the momentum profit, implying that the updating component dominates the price change component. Moreover, our analysis shows that when a high ratio of stock price to 52-week high is driven by a downward updating event, the subsequent positive momentum for a winner portfolio is more substantial.

Research limitations/implications:

This paper investigates the influence of 52-week highs movement on momentum strategies, utilizing data from Taiwan stock market. The findings reveal that accounting for the updating effect of 52-week highs can enhance the profitability of the original momentum strategy. However, it is important to note that this conclusion is currently limited to relatively inefficient stock markets. The impact on relatively efficient markets remains an area that requires further research for a comprehensive understanding.

Originality/value:

The finance literature widely acknowledges the 52-week high price as a reference point that can impact investors' trading psychology. Numerous empirical studies have confirmed the profitability of the 52-week high momentum investing strategy. However, these studies have not thoroughly explored the implications and effects of price movements within the scope of a 52-week high momentum strategy. Taking behavioral perspectives into account, this paper considers that the updating of 52-week high prices can influence investors' attention and subsequently impact the profitability of the momentum strategy.

Keywords:

52-week high, Updating Effect, Momentum Profit, Investor Attention

1. Introduction

Market anomalies in financial markets denote certain phenomena that contradict the efficient market hypothesis (Enow, 2023), and as a result the patterns of return or abnormal return seem to be predictable under some situations, such as the January effect, calendar effect, size effect, and so on. Since conventional financial theories find it difficult to answer these anomalies, behavioral finance looks to explain them via investors' cognitive biases from the 1980s. Among the broad array of anomalies, the momentum effect is one of the most popular topics in recent decades. As the

[†]Corresponding Author: Tzu-Pu Chang
e-mail: tzupuchang@gmail.com

most classical study on the momentum effect, Jegadeesh & Titman (1993) propose a strategy of buying winners and selling losers that can gain abnormal returns in the short and medium terms.

One strand of the momentum effect that has grabbed researchers' attention over the last decade is the 52-week high momentum strategy proposed by George & Hwang (2004). They find that being near to the 52-week high price can improve the forecasting power for future returns. Specifically, they suggest a strategy that buys (sell) stocks whose current price is close to (far from) its past 52-week high price and provide evidence that this strategy is superior to the conventional momentum strategy. The 52-week high momentum strategy, which combines the underreaction and anchoring effect theories, has also been applied to other issues recently. Li & Yu (2012) find that, except for Germany, the 52-week high can significantly predict future returns in G7 countries. Examining the 52-week high momentum strategy in 20 countries, Liu et al. (2011) present that this strategy is generally better than the traditional momentum strategy, and it can earn abnormal returns in most countries. Bianchi et al. (2016) show that 52-week high momentum exists among a large number of commodities futures and is superior to any conventional strategy. Both Chang (2011) and Hao et al. (2016) show that the profitability of the 52-week high strategy is remarkable in the Taiwan stock market. George et al. (2018) indicate that being near the 52-week high price not only can help predict future return, but also both future profitability (measured in ROE) and future investment growth.

Based on the 52-week high, several studies construct new investing strategies that can improve the 52-week high strategy. Park (2010) combines the moving average ratio with nearness to the 52-week high and presents significant abnormal returns. Hong et al. (2015) argue that investors likely underreact to industry information rather than firm-specific information and subsequently propose an industry 52-week high strategy that buys (sells) industries whose total market capitalizations are close to (far from) their 52-week highs. This industry 52-week high strategy outperforms the original 52-week high strategy. In spite of the 52-week high, Li & Yu (2012) suggest another anchor point, i.e. the historical high, indicating that abnormal returns in the 52-week high strategy would be stronger when the 52-week high equals the historical high. Hao et al. (2018) investigate that the interaction between investor's sentiment and the profitability of the 52-week high strategy. They find that the momentum profit from 52-week high strategy will be strengthened when the level of investor's sentiment is high.

In sum, the 52-week high strategy has been commonly accepted in financial research, but there is a gap in related literature, as few studies have investigated the dynamics of the 52-week high. More specifically, the 52-week high is computed from a rolling window with 52 weeks, meaning that the 52-week high is variable over the whole period. Does the evolution of the 52-week high matter? Bhootra & Hur (2013) first consider the formation timing of the 52-week high and define a recency ratio according to the number of days since the 52-week high formed. They show that the recency of the 52-week high can increase the profitability of the original 52-week high strategy by about twice as much. Hao et al. (2016) also find both the recency bias and anchoring effect in the Taiwan stock market. Nevertheless, there is no study in the literature that looks at the movement/updating of the 52-week high.

In order to fill the gap in the literature, this paper investigates why and how updating the 52-week high is noteworthy and useful. Undoubtedly, the ratio of a stock's current price to its 52-week high (PTH, hereafter, following George et al., 2018) changes every day, week, and month. Intuitively, any change of PTH either results from the change of the current price (numerator) or from the change of the 52-week high price (denominator) mathematically. However, none of related literature distinguishes the effects of these two determinants on momentum profits. Therefore, this paper attributes the change of PTH to two components: price change effect (the latest stock return) and updating effect (the movement of the 52-week high). With respect to the conventional PTH, this paper considers two PTH measures that straightforwardly adjust the price change effect and updating effect, respectively. The empirical results reveal that the updating effect dominates the price change effect in terms of the 52-week high momentum strategy.

To our best knowledge, this paper is the first to shed light on the movement of 52-week high prices. The present study contributes to the literature in two ways. First, the related literature usually seeks external factors (e.g., business cycle, macroeconomic states, or market volatility) for explaining 52-week high momentum profits (Liu et al., 2011; Yu, 2012). Aside from these factors, based on the formula of the PTH ratio, we explore a possible determinant for the 52-week high momentum profit, i.e. the movement of the 52-week high. Second, from behavioral perspectives, this paper explains the relevance of updating the 52-week high price with respect to both upward and downward updates. Without precedent in the literature, we further conclude that downward updating plays a crucial role in the 52-week high strategies' profitability.

The remainder of this paper is organized as follows. Section 2 demonstrates why and how the updating of the 52-week high is important to investors. Section 3 interprets the data sources. Section 4 provides the empirical results including a robustness test. Finally, Section 5 concludes this paper.

2. Why does the updating of the 52-week high matter?

PTH is a well-documented momentum investing issue over the recent decades. George & Hwang (2004) consider that investors tend to use the 52-week high price as a reference point and under-evaluate related new information, even though this reference point does not contain any information about the fundamental values. Consequently, investors present an anchor-and-adjust bias, in which they underreact to news, resulting in momentum profits over a certain period. The literature also finds that the 52-week high can influence trading behaviors, such as trading volume, turnover rate, short selling, and option-implied volatility (Huddart et al., 2009; Driessen et al., 2013; Lee & Piqueira,

2017).¹ Using insider trading data, Lee & Piqueira (2019) show that insiders are inevitably influenced by this anchoring bias, though insiders own private information about the fundamentals.

Those studies echo the concept of George & Hwang (2004) in that the 52-week high serves as a salient reference point and can distort investors' psychology. However, as mentioned above, there is a lack of literature analyzing how updating the 52-week high can affect investors' trading perception. To deal with this issue, we first decompose the formula of PTH as follows:

$$PTH_{i,t} = \frac{P_{i,t}}{High_{i,t}} = \frac{P_{i,t}}{P_{i,t-1}} \times \frac{P_{i,t-1}}{High_{i,t-1}} \times \frac{High_{i,t-1}}{High_{i,t}} \quad (1)$$

Here, $PTH_{i,t}$ denotes the ratio of the price of stock i at period t ($P_{i,t}$) to its 52-week high price ($High_{i,t}$) in the same period. Equation (1) is very straightforward as $PTH_{i,t}$ consists of three components. Because $P_{i,t-1}/High_{i,t-1}$ is equal to $PTH_{i,t-1}$, equation (1) can be rewritten as:

$$\frac{PTH_{i,t}}{PTH_{i,t-1}} = \frac{P_{i,t}}{P_{i,t-1}} \times \frac{High_{i,t-1}}{High_{i,t}}$$

→ change of PTH = price change effect × updating effect (2)

From equation (2), it is obvious that the change of PTH is the product of the change of price (price change effect) and the change of the 52-week high (updating effect). Hence, an increase in PTH is driven by a positive return from period $t-1$ to t , a downward 52-week high from period $t-1$ to t , or both. We recall for the formation of the PTH portfolio that a stock is categorized into a winner portfolio at period t due to four reasons. First, a stock is originally categorized into a winner portfolio at period $t-1$ and suffers a slight price change and updating effects. Second, a stock shows a large upward movement in its price and then substantially improves its relative PTH into a winner portfolio. Third, the 52-week high price of a stock dramatically declines from period $t-1$ to t , which sequentially causes the relative PTH to go up in period t . The fourth reason is a compounding effect from the first three reasons.

This paper focuses on discussing the effects of price change and 52-week high update, because they are more easily observed and perceived by investors. As mentioned in Huddart et al. (2009), financial websites and news media usually provide a stock's price chart with a 52-week window, implying that the information coming into an investor's view will change as time passes.² Figure 1 presents an example about what information is related to a price change and 52-week high update in a chart over time. On a monthly basis, the upper panel shows a stock's price path from period $t-12$ to $t-1$ (52 weeks). The last price is the closing price at the end of period $t-1$, and the corresponding 52-week high denotes $High_{t-1}$ forming at period $t-12$. As shown in the lower panel, one month later, the stock's price path is updated, which covers from period $t-11$ to t . Additionally, the 52-week high price is replaced by $High_t$ forming at period $t-9$.

¹ Literatures also provide evidences that 52-week high prices can influence initial offer prices for initial public offerings and offer premiums for merger and acquisition. For example, Baker et al. (2012) and Lee (2022).

² Psychologists suggest that people's memory and recognition are more likely stimulated by pictures than words, it is reasonable that the proposed updating and price change effects can influence investors' decision making process. Please see McBride et al. (2002) and Whitehouse et al. (2006).

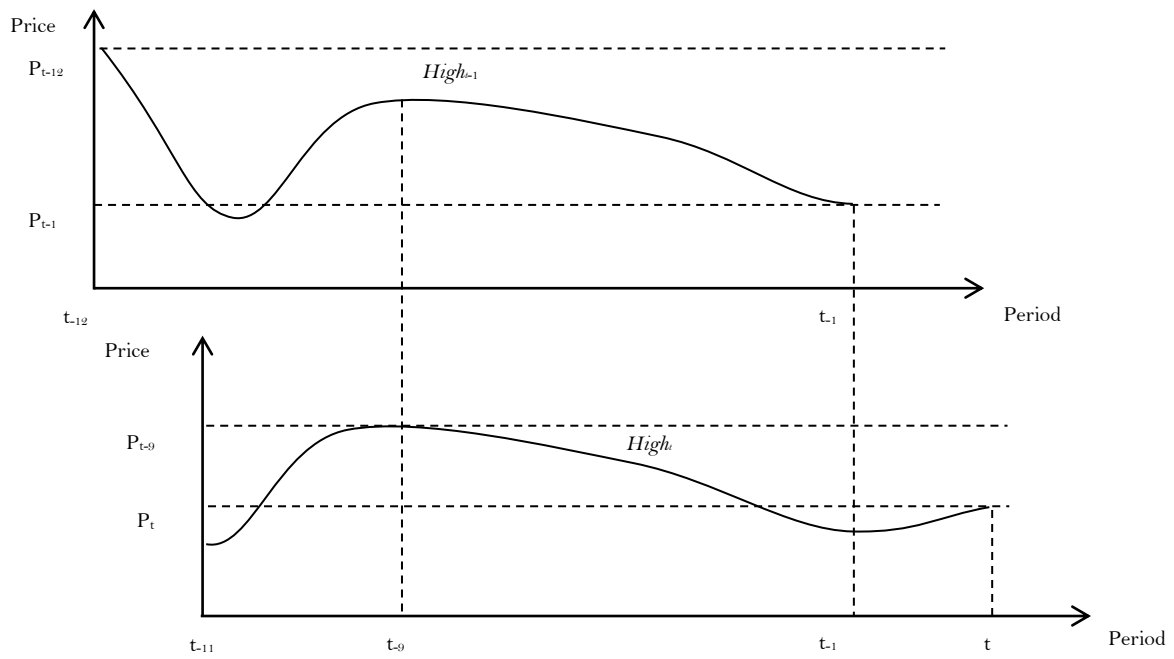
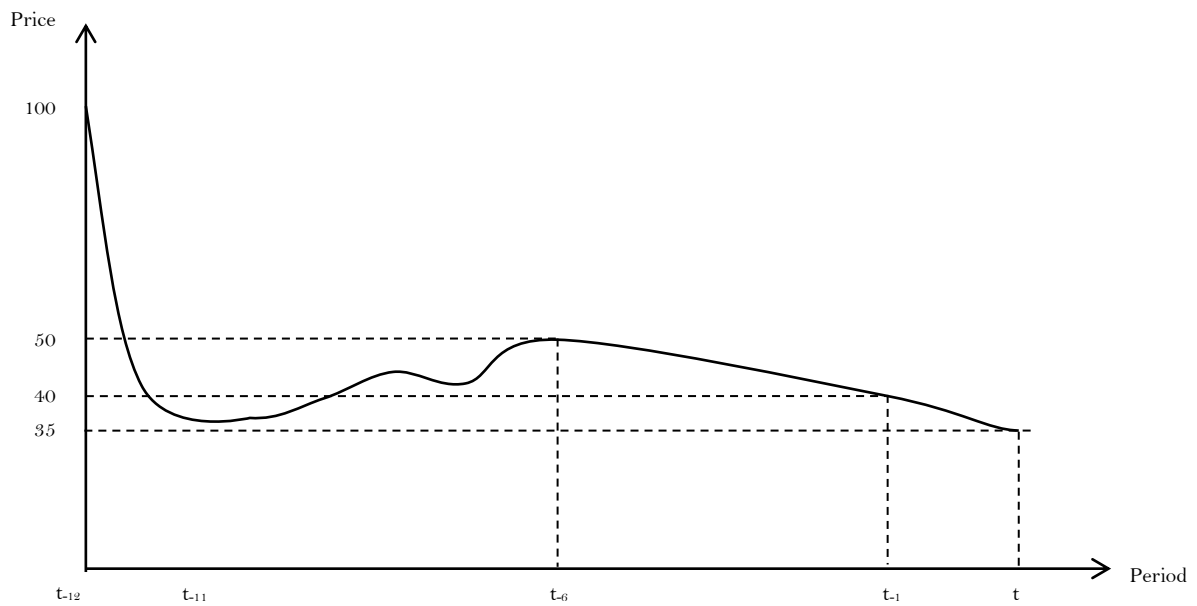


Figure 1: A graphic illustration of the evolution of 52-week price path

(a)



(b)

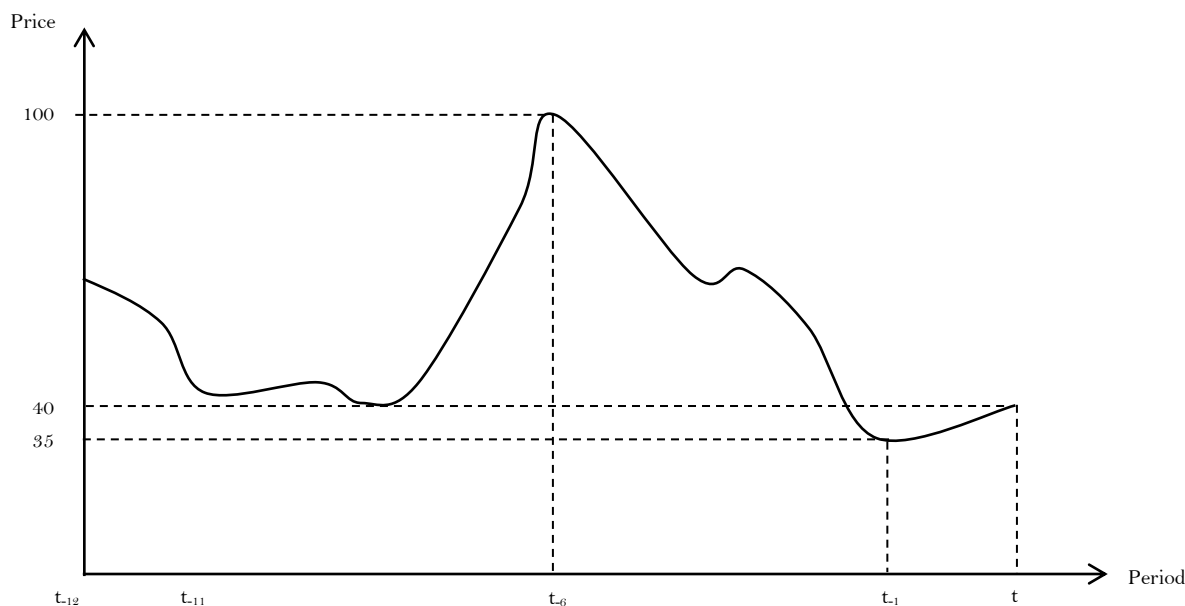


Figure 2: Two examples of rising the PTH ratios

There are two key visual differences between the two panels. First, the higher 52-week high ($High_{t-1}$) disappears and is replaced by a lower 52-week high ($High_t$). Second, the short-term trend for the end of period $t-1$ is downward, while that for the end of period t is upward. Intuitively, these two differences are equivalent to the mentioned updating effect ($High_{t-1}/High_t$) and price change effect (P_t/P_{t-1}), respectively. Figure 2 further provides two possible price patterns that show a raise of PTH ratios. In panel (a), bad news cause a decline in stock price from period $t-1$ to t , whereas the 52-week high price downward updates at the same time. In panel (b), good news push up the stock 14.3% to \$40 from period $t-1$ to t and the 52-week high price remains the same value. As the result, the PTH ratio in panel (a) sharply goes up from 0.4 to 0.7 and the stock may become a winner in terms of the PTH momentum. However, the PTH ratio in panel (b) shows an increase of 0.1 because of good news, the stock possibly stays in loser group with respect to the PTH investing. Notice that, straightforwardly, price change effect contains all new information arrival, but updating effect does not reveal any news. It is valuable to explore why updating component matter indeed, if a stock experiences a high PTH ratio due to a movement of the 52-week high price.

This paper next individually interprets price and updating effects in theory regardless of the PTH ratio. The ratio of current price to one-month lagged price (P_t/P_{t-1}) is a kind of monthly return and widely analyzed in the literature. Specifically, the literature documents a strongly negative first-order serial correlation on a monthly or weekly basis and proposes a short-term reversal (Jegadeesh, 1990; Jegadeesh & Titman, 1995).³ In terms of behavioral finance, the short-term reversal can be explained by fads and investors' overreaction to news (Da et al., 2013). Accordingly, a higher (P_t/P_{t-1}) thus implies a lower future return in the short run. However, the ratio of the last 52-week high to the current 52-week high ($High_{t-1}/High_t$) has received few researchers' attention.

This paper thus discusses the following two cases: upward and downward updating. If the ratio is less than unity, then it means that the price has broken through the previous 52-week high and the 52-week high is upwardly updated during the current period. Huddart et al. (2009) and Driessen et al. (2013) investigate the return pattern after the price crosses over its 52-week high, finding a positively sequential return and ascribing it to the anchoring effect and limited attention. On the one hand, the anchoring effect lets investors become more conservative when good news pushes the price to approach its 52-week high. If the information eventually prevails and the price crosses the anchor (its 52-week high), then it results in a continuative movement. On the other hand, a breakthrough is a remarkable event that can attract investor attentions, especially for individual investors. Hence, after the breakthrough event, buying pressure from a trade imbalance leads to a positive future return. However, the upward updating case usually (not always) accompanies a higher (P_t/P_{t-1}) at the same time, implying that the short-term reversal may weaken the effect of a breakthrough.

There is no direct evidence that discusses the intuition or implication of a downward updated 52-week high (i.e., $High_{t-1}/High_t$ is larger than unity). Our paper endeavors to illustrate this phenomenon through a mean-reverting behavior. Mean reversion denotes a tendency of the price to return to its long-run mean. Poterba and Summers (1988) find that stock returns present a negative serial correlation over a long horizon. Fama & French (1988) also indicate that negative autocorrelations are found for 2-year and 3-5 year returns. As the 52-week high is downward updated, it means that the price has not set a new high since at least one year ago (maybe longer than several years). Sequentially, the future price thus has a tendency toward mean-reverting behavior, and a higher return will be earned

³ Jegadeesh (1990) also presents a positive serial correlation at longer lags, such as twelve-month lagged serial correlation.

under this mean reversion. To sum up, this paper suggests that both upward and downward updating cases will produce positively sequential returns based on a behavioral perspective.

The last issue is how price change and updating effects influence PTH momentum profitability. This paper presumes that the PTH momentum strategy is profitable. When a high PTH ratio is pushed by a large return from period $t-1$ to t , a short-term reversal may diminish the PTH momentum profit. Moreover, if a high PTH ratio is driven by a sharp decline in the 52-week high from period $t-1$ to t , then the PTH momentum profit will improve due to the aforementioned behavioral reasons. However, the future return of a stock that presents both a high PTH ratio and an upward updated 52-week high is unclear, even when positive effects including recency bias are discussed above. The opposite view is related to the frog-in-the-pan (FIP) hypothesis proposed by Da et al. (2014). The FIP hypothesis states that investors are less attentive to a price path of continuously gradual changes versus discretely dramatic changes. Accordingly, they find that the underreaction bias in momentum is more substantial for the case of information arriving continuously in small amounts. Chen & Lu (2017) echo the FIP hypothesis and show that momentum profits are superior for stocks whose information diffuses slowly. Intuitively, an upward updated 52-week high implies that the stock price crosses its previous 52-week high and usually coincides with a large return within the current period, meaning that an upward updating event attracts more attention than either a downward updating or non-updating condition. In accordance with the literature, we suggest that the future profit for a high PTH ratio with an upward updated 52-week high is less than that for a high PTH ratio with a downward updated 52-week high.

3. Data and Methods

This section describes the empirical data and introduces how to deal with price and updating effects on the PTH momentum strategy. We also provide a preliminary analysis of price change and 52-week high updating in the last subsection.

3.1 Data

This paper collects monthly data from the Taiwan Economic Journal (TEJ), which is a leading data vendor in Taiwan. One important feature of the Taiwan stock market is that individual investor trading accounts for a large proportion of its trading volume (e.g., 86.10% and 59.37% in 2000 and 2017, respectively). Barber et al. (2009) document that individual investors' trading behavior is highly subjected to behavioral biases. Moreover, the 52-week high momentum is induced by an anchor-and-adjust bias and an underreaction behavior. Hence, we consider that the proposed issue will be more pronounced in the Taiwan stock market, thus benefitting the related literature (Chang, 2021).

To avoid possible survivorship bias and delisting bias, the sample comprises all common stocks listed and delisted in the Taiwan Stock Exchange over the period from January 1987 to December 2017. The data before 1987 are excluded due to the following two reasons. First, the number of listed stocks before 1987 is relatively small, implying we may face a small-sample bias. Second, Taiwan's stock market experienced an extreme bull market from the 1970s, with the first bubble bursting in 1987. Specifically, the total market capitalization at year end rapidly grew from NT\$17 million in 1970 to NT\$1.386 billion in 1987. The Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) increased by around 400% from 1039.11 at the end of 1986 to 4,673.14 by October 1987. However, the TAIEX then sharply fell by 50% from October to December 1987. Accordingly, there are rare downward updating observations before 1987, and therefore it is preferable to investigate the role of price change and updating effects using the research period after 1987.

3.2 Empirical Approach

This subsection describes the measures of price change and updating components for empirical analysis. Each stock-month observation can be categorized into different groups according to price change or updating criterion. Specifically, based on price change criterion, we classify each observation into a positive, negative, or zero return group if $\ln(P_t/P_{t-1})$ is larger than, less than, or equal to zero, respectively. Moreover, based on the updating criterion, each observation is classed into an upward, downward, or non-change group if $High_{t-1}/High_t$ is less than, larger than, or equal to unity, respectively. Practically, no matter under what classification criterion, the number of observations among each group is quite imbalanced and not appropriate for the commonly-used portfolio approach. The aforementioned classification also does not clearly present the character that both price change and updating components are embedded in PTH. Consequently, we further construct two adjusted PTH ratios to capture price change and updating effects as follows:

$$PTH_nonP_{i,t} = \frac{PTH_{i,t}}{P_{i,t}/P_{i,t-1}} \quad (3)$$

$$PTH_nonU_{i,t} = \frac{PTH_{i,t}}{High_{i,t-1}/High_{i,t}} \quad (4)$$

The adjustments are straightforward and intuitive. PTH_nonP denotes that the original PTH ratio adjusts to the price change component, indicating that the original PTH ratio will decrease (increase) when the concurrent return is positive (negative). PTH_nonU denotes that the original PTH ratio adjusts to the updating component, showing that the PTH ratio will decrease (increase) when the 52-week high is upward (downward) updated. As described in section 2, if upward updating is less profitable than downward updating, then we expect that the profitability of the winner-

loser portfolio derived from PTH_{nonP} is positive and more beneficial than that from the original PTH ratio. Moreover, if a large return may harm the PTH momentum profit, then we expect that the profitability of the winner-loser portfolio derived from PTH_{nonU} is still positive but less favorable than that from the original PTH ratio.

With respect to the momentum profits of different strategies, this paper calculates the equally-weighted portfolio returns by way of the well-accepted overlapping period approach. Taking the original PTH momentum as an example, in each month t , stocks ranked in the top (bottom) 30% of the PTH ratio are assigned to the winner (loser) portfolio. Accordingly, this momentum strategy buys the winner portfolio and sells the loser portfolio to establish a self-financing portfolio in each month t . All portfolios are held for six months from months $t+2$ to $t+7$, implying that there is one-month gap between the formation and holding periods in order to avoid a bid-ask bounce or lead-lag effect. In each month t , the monthly return for the winner (loser) portfolio is the equally weighted average of six separate winner portfolios formed in six previous months $t-7$ to $t-2$.⁴ As a result, the monthly strategy return is the difference between the winner and loser portfolios.

The methods of portfolio formation and return computation for PTH_{nonP} and PTH_{nonU} momentum strategies are done in the same way. For the sake of convenience, these two strategies are called non-price PTH (excludes the price change effect) and non-updating PTH (excludes the updating effect), respectively. Aside from the three PTH-based strategies mentioned above, this paper also employs the conventional momentum strategy denoted as the JT strategy proposed by Jegadeesh & Titman (1993). With respect to this strategy, stocks are ranked by their individual past performance. In accordance with George & Hwang (2004), for the JT strategy, both the formation and holding periods are six months with a one-month skipped gap. Therefore, this paper compares the performances of two famous strategies (PTH and JT) with two proposed strategies (non-price and non-updating PTH) using the portfolio analysis approach.

3.3 First Look at Monthly Price Change and 52-week High Updating

Table 1 provides the basic information about monthly price change and 52-week high updating, which are the foundations of this study. The total number of stock-month observations is 206,024, while the distributions of price change and updating observations are extremely imbalanced. For instance, the proportions of both positive and negative observations are close to half, respectively. However, in regards to the updating case, only 15% of observations present upward updating and 18% of observations are downward updating. Figure 3 shows the numbers of stocks whose 52-week highs are upward or downward updated in each month, respectively. It is obvious that the numbers of upward and downward updated stocks are negatively related. Additionally, the occurrences of upward and downward updating highly depend on the market condition (bull or bear market), implying that it is difficult to form a self-financing portfolio via simple price change and updating classification criteria. For example, during the periods of the dot-com bubble and global financial crisis, the number of downward updated stocks is excessively larger than that of upward updated stocks.

Table 1: Average monthly returns for price change and updating observations

	Price change			Updating		
	Positive	Zero	Negative	Upward	No	Downward
N	101,357	3,422	101,245	29,156	131,150	35,093
Proportion	0.49	0.02	0.49	0.15	0.67	0.18
Raw return (%)						
1	1.02 (23.52)	0.51 (2.39)	-0.72 (-16.60)	0.53 (6.46)	0.21 (5.82)	-0.25 (-3.22)
3	0.50 (19.64)	0.48 (3.70)	-0.17 (-6.53)	0.54 (11.82)	0.23 (10.08)	-0.25 (-5.36)
6	0.32 (17.56)	0.23 (2.40)	0.03 (1.46)	0.45 (13.14)	0.09 (5.94)	0.34 (10.42)
12	0.29 (22.75)	0.26 (3.91)	0.05 (3.59)	0.17 (6.85)	0.04 (3.32)	0.76 (35.97)
Market-adjusted return (%)						
1	0.57 (15.58)	-0.04 (-0.19)	-0.58 (-16.23)	0.46 (6.63)	-0.03 (-1.04)	-0.35 (-5.29)
3	0.17 (8.07)	0.11 (1.02)	-0.17 (-8.03)	0.41 (10.39)	-0.01 (-0.54)	-0.30 (-7.90)
6	0.11 (7.58)	0.08 (1.03)	-0.08 (-5.27)	0.27 (9.77)	-0.03 (-2.34)	-0.03 (-1.15)
12	0.12 (11.42)	0.08 (1.52)	-0.04 (-3.71)	0.11 (5.74)	-0.04 (-4.27)	0.28 (15.72)

Notes: N is the number of observations for each category during 1987/1 to 2017/12. Positive, Zero and Negative denote the sign of return over $t-1$ to t , respectively. Upward, No, and Downward denote the direction of the 52-week high updating over $t-1$ to t .

⁴ George & Hwang (2004) construct each portfolio in month t based on the PTH rank on the last day of month $t-1$. Thus, the monthly portfolio returns are the average of six portfolios formed in six consecutive prior months $t-6$ to $t-1$. Thus, the methodology is totally the same, although the time indicators of the present paper differ from George & Hwang (2004). Moreover, the present setting is identical to the setting of the Fama-MacBeth regression used in George & Hwang (2004).

respectively. Market-adjusted return defines the excess return adjusted to the market return; t-statistics are shown in parentheses. Here, 1, 3, 6, and 12 mean the average monthly return for forward one-, three-, six- and twelve-month periods.

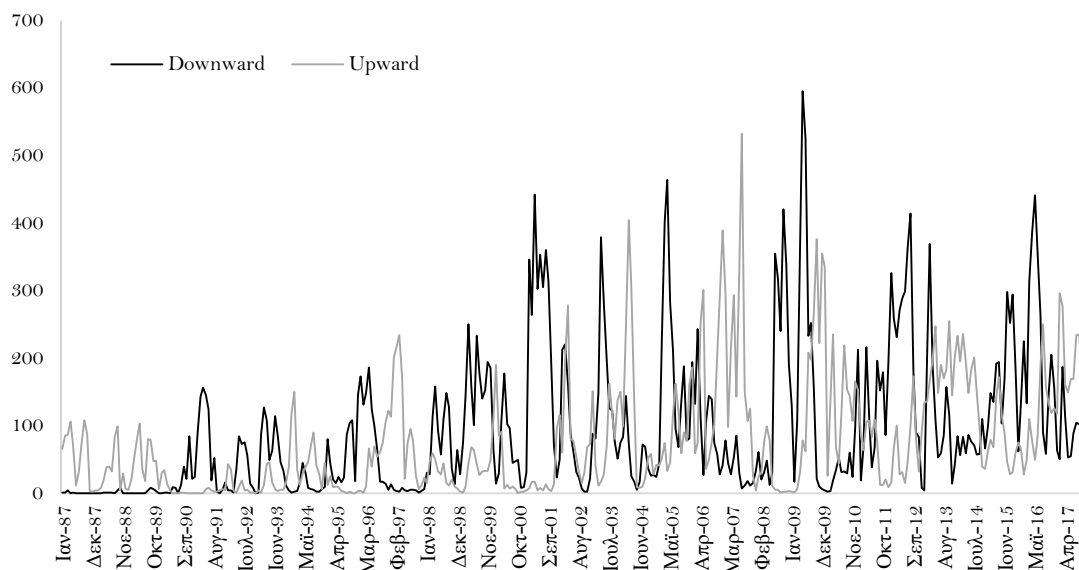


Figure 3: The numbers of 52-week high downward- and upward-updated

Table 1 also shows the follow-up average monthly return of each category. For the price change case, no matter whether the return measured is raw or market-adjusted, the return seems to present a positive first-order autocorrelation if the current return is either positive or negative. For the updating case, it is not surprising that the future returns are positive when the 52-week high is upward updated, because of the breakthrough effect mentioned by Huddart et al. (2009) and Driessen et al. (2013). The future return pattern of downward updating observations is more interesting. The average monthly return over the short term (one month and three months) is negative, whereas the long-term (twelve months) average turns into a positive value. It appears to support my explanation (long-term mean reversion) for downward updating. Nevertheless, the effects of price change and updating on momentum profits are unknown herein.

4. Results

4.1 Profits from PTH-based Strategies

To understand and to deal with how PTH momentum profits are driven by price change or updating effect, this paper implements the portfolio approach. Table 2 reports the average monthly returns of PTH, non-price PTH, and non-updating PTH strategies, respectively.⁵ For raw returns, the PTH strategy generates a significant return of 0.63% (0.93%) per month (outside of January). The non-price PTH strategy presents a like result, which earns 0.64% (0.92%) per month (outside of January). The non-updating PTH strategy also produces a slightly lower return of 0.59% (0.90%) per month (outside of January). Moreover, in terms of risk-adjusted returns using the Fama & French (2015) five-factor model, the non-price PTH strategy earns a statistically significant return of 0.49% (0.69%) per month (outside of January), which is the highest among the three PTH-based strategies, followed by the PTH strategy and non-updating PTH strategy. If we exclude January data, then the monthly profits from all strategies identically increase by 0.3% and 0.2% in raw and adjusted returns, respectively. This finding is in accordance with the literature, arguing that loser stocks tend to rebound in January (e.g., George & Hwang, 2004).

Table 2: Average monthly returns of the three strategies

	Raw returns		Adjusted returns by FF5	
	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.
<i>PTH strategy</i>				
Winner	0.62%	0.48%	0.29%	0.36%
Loser	-0.01%	-0.45%	-0.15%	-0.29%
Winner – Loser	0.63%*** (2.68)	0.93%*** (3.51)	0.44%* (1.90)	0.65%*** (2.71)

⁵ George & Hwang (2004) and Hao et al. (2016) point out a strong January effect in momentum-related strategies. Thus, we report both average monthly returns with and without January data.

<i>Non-price PTH strategy (PTH_nonP)</i>				
Winner	0.62%	0.47%	0.32%	0.38%
Loser	-0.02%	-0.45%	-0.17%	-0.31%
Winner – Loser	0.64%***	0.92%***	0.49%**	0.69%***
	(2.93)	(3.75)	(2.43)	(3.40)
<i>Non-updating PTH strategy (PTH_nonU)</i>				
Winner	0.58%	0.45%	0.26%	0.33%
Loser	-0.01%	-0.45%	-0.13%	-0.28%
Winner – Loser	0.59%**	0.90%***	0.39%*	0.61%**
	(2.51)	(3.39)	(1.66)	(2.47)

Notes: The three strategies sort stocks into 3 portfolios (with top and bottom classes using 30% cutoffs) based on the PTH, PTH_nonP, and PTH_nonU ratios, respectively. The raw returns and adjusted returns by Fama & French's (2015) five-factor model are reported; t-statistics in parentheses are adjusted for autocorrelation using the Newey & West (1987) method. *, **, and *** denote the significant levels at 0.1, 0.05, and 0.01, respectively.

According to Table 2, all three PTH-based strategies are profitable in raw and adjusted returns, no matter whether January data are included or excluded, indicating that the original PTH and two adjustment PTH measures have forecasting abilities about future returns. In general, Table 2 reveals that the non-price PTH strategy is more profitable than the other two strategies, implying that the price change component (P_t/P_{t-1}) seems to be redundant in constructing PTH portfolios. Oppositely, the non-updating PTH strategy is less profitable than the other two strategies, meaning that the information of the updating component ($High_{t-1}/High_t$) is valuable. Hence, this finding basically supports our consideration that the updating component is more dominant than the price change component.

This paper further divides the whole data into sub-samples to examine the robustness of PTH-based strategies. The first test is the state of the business cycle, in which Yu (2012) and Hao et al. (2016) show that the profits from PTH momentum depend on the stages of the business cycle. Therefore, this present paper examines the performances of the three PTH-based strategies in expansion and contraction periods, respectively. The dating of each business cycle over the research period is obtained from Taiwan's National Development Council. The corresponding results are shown in Table 3.

During expansion periods, three PTH-based strategies generate positive returns, ranging from 0.35% (0.69%) to 0.41% (0.77%) per month (outside of January) in raw returns. All strategies gain statistically significant adjusted returns, ranging from 0.35% (0.53%) to 0.43% (0.61%) per month (outside of January). We note that although the profits from the original PTH strategy are the best, the differences in the profitability among the three strategies are indeed small in terms of raw and adjusted returns, but the results during contraction periods do show a distinct pattern. For raw returns, the performances of the three strategies are more pronounced, ranging from 1.16% (1.35%) to 1.39% (1.52%) per month (outside of January). Specifically, the raw return of the non-price PTH strategy increases by four times from 0.35% during expansions to 1.39% during contractions, while profits from the other two strategies increase about three times.

Table 3: Average monthly returns in different stages of the business cycle

	Expansion periods				Contraction periods			
	Raw returns		Adjusted by FF5		Raw returns		Adjusted by FF5	
	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.
<i>PTH strategy</i>								
Winner	1.89	1.87	0.38	0.46	-2.81	-3.29	0.27	0.26
Loser	1.48	1.10	-0.05	-0.15	-4.02	-4.66	-0.07	-0.29
W – L	0.41	0.77**	0.43**	0.61***	1.21**	1.36***	0.34	0.55
	(1.46)	(2.41)	(2.08)	(2.99)	(2.59)	(2.82)	(0.61)	(1.04)
<i>Non-price PTH strategy</i>								
Winner	1.84	1.80	0.36	0.45	-2.67	-3.16	0.48	0.45
Loser	1.48	1.11	-0.0%	-0.16	-4.06	-4.68	-0.18	-0.41
W – L	0.35	0.69**	0.42**	0.61***	1.39***	1.52***	0.65	0.85*
	(1.39)	(2.36)	(2.58)	(3.57)	(2.93)	(3.08)	(1.23)	(1.67)
<i>Non-updating PTH strategy</i>								
Winner	1.86	1.84	0.33	0.41	-2.85	-3.31	0.24	0.25
Loser	1.49	1.10	-0.02	-0.13	-4.01	-4.65	-0.05	-0.27
W – L	0.38	0.74**	0.35*	0.53**	1.16**	1.35***	0.28	0.52
	(1.34)	(2.32)	(1.67)	(2.53)	(2.48)	(2.75)	(0.50)	(0.95)

Notes: The three strategies sort stocks into 3 portfolios (with top and bottom classes using 30% cutoffs) based on the PTH, PTH_nonP, and PTH_nonU ratios, respectively. The dating of economic expansions and contractions is from Taiwan's National Development Council. The raw returns and adjusted returns by Fama and French's (2015) five-factor model are reported; t-statistics in parentheses are adjusted for autocorrelation using the Newey & West (1987) method. *, **, and *** denote the significant levels at 0.1, 0.05, and 0.01, respectively.

After taking the five risk factors proposed by Fama & French (2015) into account, the three strategies still earn positive returns, ranging from 0.28% to 0.65% per month. The gap between the three strategies' performances is more

substantial in that profit from the non-price PTH strategy is double that of the other two strategies. Outside of January, the non-price PTH strategy generates a statistically positive return of 0.85% per month during contraction periods. However, the profits from other two strategies are still insignificant.

Table 4 presents the profits from the three strategies in the pre- and post-2000 periods, respectively. During the pre-2000 period, all strategies produce significantly positive raw returns using non-January data. However, in other model specifications, only the non-price PTH strategy can earn statistically significant returns in the pre-2000 period. The return patterns in the post-2000 period are consistent with those in the pre-2000 period, and the reported numbers are more pronounced in the post-2000 period. Moreover, the result is robust, whereby the non-price PTH strategy is the best performer, while the non-updating PTH strategy is the worst in both the pre- and post-2000 periods.

Table 4: Average monthly returns in pre- and post-2000 periods

	Pre-2000 period (1987-2000)				Post-2000 period (2001-2017)			
	Raw returns		Adjusted by FF5		Raw returns		Adjusted by FF5	
	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.	Jan. incl.	Jan. excl.
<i>PTH strategy</i>								
Winner	0.47	0.23	0.25	0.33	0.73	0.68	0.40	0.46
Loser	-0.08	-0.75	-0.09	-0.32	0.05	-0.21	-0.09	-0.22
W - L	0.55	0.98**	0.34	0.65	0.69**	0.89***	0.49**	0.68***
	(1.51)	(2.22)	(0.87)	(1.51)	(2.17)	(2.74)	(2.27)	(3.09)
<i>Non-price PTH strategy</i>								
Winner	0.48	0.22	0.30	0.39	0.73	0.67	0.43	0.47
Loser	-0.07	-0.74	-0.11	-0.35	0.02	-0.21	-0.14	-0.25
W - L	0.55*	0.97**	0.41	0.74**	0.71**	0.88***	0.56***	0.72***
	(1.72)	(2.57)	(1.27)	(2.16)	(2.31)	(2.69)	(2.92)	(3.55)
<i>Non-updating PTH strategy</i>								
Winner	0.44	0.20	0.22	0.30	0.70	0.66	0.35	0.42
Loser	-0.08	-0.75	-0.09	-0.31	0.05	-0.20	-0.08	-0.21
W - L	0.52	0.95**	0.31	0.62	0.62**	0.86***	0.43*	0.63***
	(1.42)	(2.15)	(0.78)	(1.40)	(2.05)	(2.66)	(1.95)	(2.87)

Notes: The three strategies sort stocks into 3 portfolios (with top and bottom classes using 30% cutoffs) based on the PTH, PTH_nonP, and PTH_nonU ratios, respectively. The raw returns and adjusted returns by Fama & French's (2015) five-factor model are reported; t-statistics in parentheses are adjusted for autocorrelation using the Newey & West (1987) method. *, **, and *** denote the significant levels at 0.1, 0.05, and 0.01, respectively.

This paper next examines whether the PTH-based strategies are robust across firm size groups. In each month t , the stocks ranked in the top (bottom) 30% of the market-capitalization are assigned to the large (small) group. The remaining 40% denotes the medium group. Within each size group, stocks are then classified into winner and loser portfolios according to the corresponding PTH ratios. The results are reported in Table 5.

Table 5: Momentum profits across different firm size groups

Panel A						
Size Group	Portfolios classified by PTH	All months	Exclude January			
			Raw	FF5	Raw	FF5
Large	Winner	0.40%	-0.01%	0.28%	0.06%	
	Loser	0.20%	-0.12%	-0.15%	-0.24%	
	Winner - Loser	0.21% (0.88)	0.12% (0.45)	0.43% (1.65)	0.28% (0.97)	
Medium	Winner	0.51%	0.23%	0.38%	0.30%	
	Loser	-0.05%	-0.15%	-0.35%	-0.28%	
	Winner - Loser	0.46% (2.07)	0.38% (1.66)	0.73% (2.84)	0.58% (2.37)	
Small	Winner	1.10%	0.92%	0.90%	0.95%	
	Loser	-0.28%	-0.25%	-0.84%	-0.46%	
	Winner - Loser	1.39% (4.94)	1.18% (5.41)	1.74% (5.14)	1.41% (5.84)	
Panel B						
Size Group	Portfolios classified by PTH_nonP	All months	Exclude January			
			Raw	FF5	Raw	FF5
Large	Winner	0.40%	0.04%	0.27%	0.11%	
	Loser	0.14%	-0.21%	-0.19%	-0.32%	
	Winner - Loser	0.26% (1.15)	0.25% (1.22)	0.46% (2.00)	0.43% (2.02)	
Medium	Winner	0.52%	0.25%	0.37%	0.31%	
	Loser	0.03%	-0.17%	-0.35%	-0.28%	
	Winner - Loser	0.49% (2.41)	0.42% (2.12)	0.72% (3.16)	0.60% (2.87)	
Small	Winner	1.14%	0.96%	0.93%	0.99%	
	Loser	-0.29%	-0.27%	-0.86%	-0.49%	
	Winner - Loser	1.44% (5.00)	1.23% (5.56)	1.80% (5.82)	1.49% (6.24)	

Panel C						
Size Group	Portfolios classified by PTH_nonU	All months		Exclude January		
		Raw	FF5	Raw	FF5	
Large	Winner	0.38%	-0.04%	0.25%	0.02%	
	Loser	0.20%	-0.11%	-0.15%	-0.22%	
	Winner - Loser	0.18% (0.76)	0.07% (0.27)	0.39% (1.49)	0.23% (0.84)	
Medium	Winner	0.51%	0.22%	0.38%	0.30%	
	Loser	0.05%	-0.14%	-0.36%	-0.27%	
	Winner - Loser	0.46% (2.05)	0.36% (1.56)	0.74% (2.93)	0.58% (2.32)	
Small	Winner	1.04%	0.86%	0.83%	0.88%	
	Loser	-0.26%	-0.22%	-0.82%	-0.43%	
	Winner - Loser	1.30% (4.18)	1.08% (4.44)	1.64% (5.29)	1.32% (5.29)	

Notes: In each month from January 1987 to December 2017, stocks are first assigned to one of three size groups according to their market capitalizations (with top and bottom classes using 30% cutoffs). In each size group, the three strategies sort stocks into 3 portfolios (with top and bottom classes using 30% cutoffs) based on the PTH, PTH_nonP, and PTH_nonU ratios, respectively. The raw returns and adjusted returns by Fama & French's (2015) five-factor model are reported; t-statistics in parentheses are adjusted for autocorrelation using the Newey & West (1987) method. *, **, and *** denote the significant levels at 0.1, 0.05, and 0.01, respectively.

Panel A of Table 5 shows the profits from the conventional PTH strategy across the three size groups. Within the large size group, the PTH strategy presents positive returns ranging from 0.12% to 0.43%, but these numbers are statistically insignificant in terms of raw and adjusted return measures. The PTH momentum is obviously stronger in the small size group, and the PTH strategy produces a monthly return of 1.39% (1.18%) and 1.74% (1.41%) for raw (adjusted) returns using all months and non-January data, respectively. This finding is reasonable as information about small firms is relatively opaque compared to large firms. Thus, investors typically severely underreact to information on small firms, resulting in a more serious anchor-and-adjust bias as well as higher momentum in future.

Panels B and C illustrate the momentum profits from non-price and non-updating PTH strategies among the three size groups, respectively. In general, the patterns of Panels B and C are quite similar to that of Panel A, in which momentum is more pronounced in the small size group than in the other two size groups. Moreover, it is noteworthy that only the non-price PTH strategy can generate a statistically significant return of 0.46% (0.43%) per month in raw (adjusted) measures in the large size group using non-January data.

With respect to Tables 3-5, in summary, these robust examinations are consistent with the main result from Table 2. They suggest that the profitability of the non-price PTH strategy based on the PTH_nonP ratio is more substantial and pronounced than for the other two strategies. Specifically, when the price change component (P_t/P_{t-1}) is removed from the original PTH ratio, the corresponding strategy (non-price PTH) outperforms the conventional PTH strategy. Therefore, this paper considers that the price change component is unnecessary and dominated by the updating component. However, the results listed in this subsection are based on univariate analysis, meaning that a more careful test is needed to prove the dominance of the updating component in PTH momentum. This paper deals with this issue in the next subsection.

4.2 Comparison Between the Three PTH-based Momentum Strategies

George & Hwang (2004) implement two approaches to test the dominance of PTH momentum. One is an independent double-sorts method on pairwise momentum comparisons; the other one is the Fama-MacBeth (1973) cross-sectional regression. Since the latter approach is more careful and powerful, this paper uses the Fama-MacBeth cross-sectional regression to confirm the dominance of the updating component in PTH momentum.

As mentioned above, the holding period for each winner and loser portfolio is six months, and a one-month gap between formation and holding periods is set. Therefore, we estimate six cross-sectional regressions (for $j=2$ to 7) of the following form:⁶

$$\begin{aligned}
R_{i,t} = & b_{0jt} + b_{1jt}R_{i,t-1} + b_{2jt}Size_{i,t-1} + b_{3jt}JTH_{i,t-j} + b_{4jt}JTL_{i,t-j} + b_{5jt}MGH_{i,t-j} + b_{6jt}MGL_{i,t-j} \\
& + b_{7jt}PTHH_{i,t-j} + b_{8jt}PTHL_{i,t-j} + b_{9jt}PTH_{adjP}H_{i,t-j} + b_{10jt}PTH_{adjP}L_{i,t-j} \\
& + b_{11jt}PTH_{adjU}H_{i,t-j} + b_{12jt}PTH_{adjU}L_{i,t-j} + e_{i,t} \quad (5)
\end{aligned}$$

Here, $R_{i,t-1}$ and $Size_{i,t-1}$ are the return and the logged market capitalization of stock i in month $t-1$ in order to control the effects of bid-ask bounce and firm size. JTH (JTL) is a dummy variable that equals one if stock i is ranked in the top (bottom) 30% based on its past six cumulative returns at the end of months $t-j$ and is zero otherwise. MGH (MGL) is a dummy variable that equals one if stock i is ranked in the top (bottom) 30% based on the past six cumulative returns of the industry in which stock i belongs at the end of months $t-j$ and is zero otherwise. $PTHH$ ($PTHL$) is a dummy variable that equals one if stock i 's PTH ratio is ranked in the top (bottom) 30% at the end of

⁶ Consistent with George & Hwang (2004), this paper also examines the well-known JT momentum (Jegadeesh & Titman, 1993) and MG momentum (Moskowitz & Grinblatt, 1999) in the Fama-MacBeth cross-sectional regression.

months $t-j$ and is zero otherwise. $PTH_{nonP}H(PTH_{nonP}L)$ and $PTH_{nonU}H(PTH_{nonU}L)$ are defined by the same way, but are ranked by the PTH_{nonP} and PTH_{nonU} ratios, respectively.⁷

Coefficients $b_{3jt} - b_{12jt}$ represent the monthly returns of the corresponding winner and loser portfolios. Since individual coefficients are computed from six separate cross-sectional regressions, each reported coefficient in Table 6 is the time-series average of the estimated coefficients in each month t . Moreover, the difference in b_{3jt} and b_{4jt} is the monthly return of JT momentum. MG momentum and three PTH-based momentum profits are obtained by the same way.

For raw returns, the coefficients of both winner and loser portfolios based on JT momentum are significantly negative, and the coefficient of JT momentum is -0.08 (-0.03) using all months (non-January) data. The coefficients of the winner and loser portfolios based on MG momentum are near zero, and the difference between the two portfolios is positive, but insignificant. In addition, the winner portfolio based on the PTH ratio earns a positive return of 0.17% (0.19%) and the loser portfolio produces a significantly negative return of -0.28% (-0.31), using all months (non-January) data. As a result, the profitability from the PTH strategy is statistically positive with a return of 0.44% (0.50%) per month (outside of January). The aforementioned results are in accordance with Hao et al. (2016).

The coefficient of the winner (loser) portfolio based on the PTH_{nonP} ratio is statistically positive (negative) no matter with or without January returns. Thus, the non-price PTH momentum strategy generates returns of 0.51% and 0.61% using all months and non-January data, respectively. However, the non-updating PTH momentum strategy is unprofitable with near-zero returns of -0.04% and 0.03% using all months and non-January data, respectively. The results represent that the profit from the non-updating PTH strategy is totally diluted by other momentum strategies, while the profitability of the non-price PTH strategy is robust, even after controlling other momentum strategies.

In the case of adjusted returns (the last two columns of Table 6), the conclusion is generally the same as that in the raw returns case, but the reported numbers become more significant. The coefficients of $R_{i,t-1}$ and $Size_{i,t-1}$ are statistically negative, indicating that short-term reversal and small size effects do exist in Taiwan. It is notable that all winner portfolios of the five momentum strategies experience negative returns after adjusting Fama-French's five risk factors. Moreover, among the five momentum strategies, non-price PTH momentum is the strongest followed by PTH momentum, whereas the other three momentum strategies are unprofitable.

To sum up, the Fama-MacBeth cross-sectional regression confirms that the non-price PTH strategy dominates not only the conventional PTH and non-updating PTH strategies, but also the well-known JT and MG momentum strategies. Once again, the empirical results reveal that removing the price change component (updating component) from the original PTH measure increases (decreases) the momentum profit, implying that the updating component dominates the price change component in PTH momentum.

5. Robust Checks

5.1 Other Reward-risk Measures of Self-financing Portfolios

Sections 4.1 and 4.2 focus on the returns of PTH-based strategies, as some investors tend to place emphasis on the risks behind a trading strategy. Therefore, this subsection follows Bianchi et al. (2016) and provides more evidence about the reward-risk structure behind the three PTH-based strategies in Table 7.

On a basic reward/risk indicator (i.e. Sharpe ratio), the non-price PTH strategy (0.48) presents the highest Sharpe ratio, followed by the PTH strategy (0.45) and non-updating PTH strategy (0.42). Considering downside risk, the non-price PTH strategy has the highest Sortino ratio of 0.81, while the non-updating PTH strategy is still the worst (0.67). These sortings based on Sharpe and Sortino ratios remain unchanged even if January returns are excluded. These measures show that the non-price PTH strategy is the best in terms of risk-adjusted returns.

Table 6: Fama-MacBeth regression for comparing PTH-based strategies

	Raw returns		Adjusted returns by FF5	
	January incl.	January excl.	January incl.	January excl.
(1) Intercept	1.58 (1.46)	1.14 (1.00)	1.81*** (3.37)	1.70*** (2.92)
(2) $R_{i,t-1}$	-0.00 (-0.51)	0.01 (0.69)	-0.34*** (-9.00)	-0.33*** (-8.39)
(3) $Size_{i,t-1}$	-0.12 (-1.34)	-0.09 (-0.93)	-0.51*** (-9.58)	-0.49*** (-8.61)
(4) JTH	-0.25** (-2.38)	-0.25** (-2.34)	-0.60*** (-6.28)	-0.59*** (-5.94)
(5) JTL	-0.17** (-2.25)	-0.23*** (-3.05)	-0.48*** (-5.97)	-0.52*** (-6.54)
(6) MGH	0.04 (0.45)	0.03 (0.35)	-0.34*** (-4.27)	-0.35*** (-4.32)
(7) MGL	-0.08 (-1.18)	-0.10 (-1.35)	-0.42*** (-5.01)	-0.43*** (-4.96)

⁷ $PTH_{nonP}H(PTH_{nonP}L)$, $PTH_{nonU}H(PTH_{nonU}L)$ and $PTH_{nonU}H(PTH_{nonU}L)$ may be correlated to each other. However, we do not find any serious multicollinearity problem in this analysis.

(8) PTHH	0.17 (1.59)	0.19* (1.72)	-0.19* (-1.86)	-0.19* (-1.69)
(9) PTHL	-0.28** (-3.42)	-0.31*** (-3.37)	-0.61*** (7.26)	-0.64*** (-6.74)
(10) PTH _{nonP} H	0.12* (1.94)	0.15** (2.16)	-0.20*** (-3.21)	-0.18*** (-2.79)
(11) PTH _{nonP} L	-0.38*** (-5.11)	-0.47*** (-6.15)	-0.67*** (-9.75)	-0.73*** (-10.04)
(12) PTH _{nonU} H	-0.01 (-0.10)	0.01 (0.12)	-0.32*** (-3.52)	-0.30*** (-3.18)
(13) PTH _{nonU} L	0.03 (0.40)	-0.02 (-0.23)	-0.24*** (-2.81)	-0.26*** (-2.90)
JT momentum: (4) – (5)	-0.08 (-0.56)	-0.03 (-0.19)	-0.12 (-0.97)	-0.07 (-0.57)
MG momentum: (6) – (7)	0.12 (1.42)	0.13 (1.46)	0.08 (0.95)	0.08 (0.90)
PTH momentum: (8) – (9)	0.44*** (3.00)	0.50*** (3.22)	0.42*** (3.11)	0.45*** (3.18)
Non-price PTH momentum: (10) – (11)	0.51*** (4.75)	0.61*** (5.39)	0.47*** (4.70)	0.55*** (5.53)
Non-updating PTH momentum: (12) – (13)	-0.04 (-0.30)	0.03 (0.22)	-0.08 (-0.60)	-0.04 (-0.29)

Notes: Here, R_{it} and $Size_{it}$ are respectively the return and the logged market capitalization of stock i in month t . $PTHH$ ($PTHL$) is a dummy variable that equals 1 if stock i is ranked in the top (bottom) 30% based on the ratio of price to the 52-week high ranking criterion and 0 otherwise. All other variables are dummy variables constructed via the corresponding ranking measures. The coefficients are the average of the month-by-month estimates. The raw returns and adjusted returns by Fama & French's (2015) five-factor model are reported herein; t-statistics in parentheses are adjusted for autocorrelation using the Newey & West (1987) method. *, **, and *** denote the significant levels at 0.1, 0.05, and 0.01, respectively.

This paper further reports the value-at-risk (VaR) with a 99% level of confidence to estimate any extreme downside risk using the Cornish-Fisher expansion method. The 99% VaR of the non-price PTH strategy is -13.24%, indicating that its extreme downside risk is smaller than those of the other two strategies. Another measure for extreme downside risk is the maximum drawdown, defined as the maximum loss from a peak to a trough of a portfolio's equity. The non-price PTH strategy experiences the smallest maximum drawdown of -44.08%, but the non-updating PTH strategy has the largest maximum drawdown of -50.33%. Thus, these measures consistently point out that the non-price PTH strategy is the best in terms of downside risks.

The last two rows of Table 7 list the maximum and minimum rolling returns with continuous twelve months, respectively. These two measures separately illustrate the best and worst performances of a trading strategy in successive twelve months, implying that they can capture the stability of a strategy. The non-price PTH strategy presents both the highest maximum and minimum rolling returns with 50.87% and -34.39%, respectively. In addition, the non-updating PTH strategy shows the lowest maximum rolling return with 47.11%, while the conventional PTH strategy is the worst one in regards to minimum rolling return with -35.15%.

In conclusion, Table 7 echoes the findings shown in sections 4.1 and 4.2. Here, the non-price PTH strategy reports the most substantial risk-adjusted return among three PTH-based strategies. Furthermore, Table 7 confirms that the non-price PTH strategy has the lowest investment risk, meaning that removing the price change component from the PTH measure is useful.

Table 7: Some reward-risk measures for the three strategies

	PTH strategy	Non-price PTH strategy	Non-updating PTH strategy
Annualized return (%)	7.53	7.63	7.08
Annualized standard deviation	16.88	15.84	17.05
Sharpe ratio	0.45	0.48	0.42
Sharpe ratio – January excluded	0.47	0.51	0.44
Sortino ratio	0.72	0.81	0.67
Sortino ratio – January excluded	0.85	0.97	0.79
99%VaR (%)	-14.62	-13.24	-14.61
99%VaR – January excluded (%)	-13.21	-11.63	-13.37
% of positive months	57.53	59.41	58.33
Maximum drawdown (%)	-48.64	-44.08	-50.33
Top 3 drawdown in average (%)	-43.22	-38.09	-44.44
Max 12-month rolling return (%)	49.27	50.87	47.11
Min 12-month rolling return (%)	-35.15	-34.39	-35.03

Note: The three strategies sort stocks into 3 portfolios (with top and bottom classes using 30% cutoffs) based on the PTH, PTH_{nonP}, and PTH_{nonU} ratios, respectively. The Sortino ratio measures the risk-adjusted return of a portfolio using downside

deviation. Here, 99%VaR is calculated by the Cornish-Fisher expansion method. Maximum drawdown denotes the maximum loss from a peak to a trough of a portfolio's equity.

5.2 Mean Reversion and Updating of the 52-week High

As we note beforehand, a downward updating of the 52-week high implies that the stock price has not set a higher 52-week high for a long period. This paper supposes that the longer period a stock has undergone in which its price has not set a higher 52-week high, the higher the stock's sequential return will generate. Thus, this paper proposes a measure s defined by the last upward updating of the 52-week high being formed s months ago. Moreover, s can denote the duration between two consecutive upward updating events. This measure is straightforward, i.e. finding the minimum value of s that satisfies the following conditional for each month t :

$$High_{t-s-1} < High_{t-s} \leq High_t, \quad s \geq 0. \quad (6)$$

Table 8: Mean-reverting and updating effect

	(1) January incl.	(2) January excl.	(3) January incl.	(4) January excl.
Intercept	1.34 (1.22)	0.94 (0.81)	1.30 (1.18)	0.88 (0.76)
$R_{i,t-1}$	-0.01 (-0.99)	0.00 (0.33)	-0.01 (-0.85)	0.00 (0.29)
$Size_{i,t-1}$	-0.09 (-1.04)	-0.06 (-0.67)	-0.09 (-1.04)	-0.06 (-0.68)
JTH	-0.30*** (-2.70)	-0.33*** (-2.85)	-0.30*** (-2.71)	-0.32*** (-2.80)
JTL	-0.20** (-2.55)	-0.24*** (-3.14)	-0.19** (-2.47)	-0.23*** (-3.06)
MGH	0.01 (0.09)	-0.00 (-0.04)	0.01 (0.09)	-0.00 (-0.06)
MGL	-0.05 (-0.70)	-0.07 (-0.90)	-0.06 (-0.81)	-0.08 (-1.02)
PTHH	0.18* (1.88)	0.24** (2.44)	0.19* (1.67)	0.26** (2.05)
PTHL	-0.49*** (-4.82)	-0.61*** (-5.11)	-0.38*** (2.71)	-0.44*** (-3.00)
s	-0.00 (-0.35)	-0.01 (-1.06)	-0.01 (-0.75)	-0.02 (-1.18)
$PTHH \times s$			0.05* (1.89)	0.05* (1.85)
$PTHL \times s$			-0.00 (-0.21)	-0.00 (-0.22)

Notes: Here, s denotes the duration between two consecutive upward updating events, while $R_{i,t}$ and $Size_{i,t}$ are respectively the return and the logged market capitalization of stock i in month t . $PTHH$ ($PTHL$) is a dummy variable that equals 1 if stock i is ranked in the top (bottom) 30% based on the ratio of price to the 52-week high ranking criterion and 0 otherwise. All other variables are dummy variables constructed via the corresponding ranking measures. Lastly, t-statistics in parentheses are adjusted for autocorrelation using the Newey & West (1987) method. *, **, and *** denote the significant levels at 0.1, 0.05, and 0.01, respectively.

Here, $High_t$ is the corresponding 52-week high at the end of month t , and s is equal to zero if the price breaks through its previous 52-week high in current month t . The descriptive statistics show that the mean (median) of s is 11.10 (7) and the maximum value is 132, meaning that a certain stock price does not experience an upward updating of its 52-week high for 11 years. This paper further applies the Fama-MacBeth cross-sectional regression to discuss the effect of s .

Table 8 reports the estimation results. Models (1) and (2) set s as an independent variable, and Models (3) and (4) further add two interaction terms to examine the effects of s on the winner and loser portfolios based on the PTH ratio. The coefficients of s in all models are near zero and insignificant, indicating that the duration between two consecutive upward updating events would not directly affect stock returns. However, the coefficients of ($PTHH \times s$) are positively significant at the 10% significance level, meaning that when a stock is classified into a winner portfolio, the longer the duration is between two consecutive upward updating events, the higher a stock's future return will be. This finding also implies that the profits from winner portfolios can be enhanced if we further choose stocks with a larger s from winners to construct a new winner portfolio. Nevertheless, the coefficients of ($PTHL \times s$) are statistically insignificant. According to Table 8, this test verifies that the updating effect can be explained by a mean reversion assumption. Specifically, a stock with a downward updated 52-week high should have a larger s than that with an upward updated 52-week high.

6. Conclusions

The finance literature has commonly accepted the 52-week high stock price as a reference or anchoring point that can

influence investors' trading psychology. The profitability of the 52-week high momentum investing strategy is also verified by a large number of empirical studies, but they lack any discussion on the implications and effects from movement in 52-week high prices within the scope of a 52-week high momentum strategy. Based on behavioral perspectives, this paper considers that the updating of 52-week high prices can influence investors' attention and further affect the corresponding momentum profitability. This paper thus decomposes the ratio of price to 52-week high and investigates the internal engine of 52-week high momentum profits. More specifically, this paper denotes two components of the ratio of stock price to 52-week high: one is the price change component (return within the current period) and the other is the updating component (52-week high price updating). The literature on behavioral finance considers that the updating component would dominate the price change component in terms of 52-week high momentum profits. Accordingly, this paper presents consistent evidence that the price change component is redundant after we utilize a portfolio approach and Fama-MacBeth regression. Moreover, we find that if a high ratio of stock price to 52-week high is driven by a downward updating event, then the subsequent positive momentum for a winner portfolio is more substantial.

References

- Baker, M., Pan, X., & Wurgler, J. (2012). The Effect of Reference Point Prices on Mergers and Acquisitions. *Journal of Financial Economics*, 106(1), 49–71.
- Barber, B. M., Odean, T., & Zhu, N. (2009). Do Retail Trades Move Markets? *Review of Financial Studies*, 22(1), 151–186.
- Bhootra, A., & Hur, J. (2013). The Timing of 52-week High Price and Momentum. *Journal of Banking & Finance*, 37(10), 3773–3782.
- Bianchi, R. J., Drew, M. E., & Fan, J. H. (2016). Commodities Momentum: A Behavioral Perspective. *Journal of Banking & Finance*, 7, 133–150.
- Chang, C. Y. (2011). The Relationship Between the 52-week High of an Individual Stock and Stock Market Index Level: Evidence from Taiwan. *Journal of International Financial Markets, Institutions and Money*, 21(1), 14–27.
- Chang, T. P. (2021). Buy Low and Sell High: The 52-week Price Range and Predictability of Returns. *International Review of Finance*, 21(1), 336–344.
- Chen, Z., & Lu, A. (2017). Slow Diffusion of Information and Price Momentum in Stocks: Evidence from Options Markets. *Journal of Banking & Finance*, 75, 98–108.
- Da, Z., Gurun, U. G., & Warachka, M. (2014). Frog in the Pan: Continuous Information and Momentum. *Review of Financial Studies*, 27(7), 2171–2218.
- Da, Z., Liu, Q., & Schaumburg, E. (2013). A Closer Look at the Short-term Return Reversal. *Management Science*, 60(3), 658–674.
- Driessen, J., Lin, T. C., & Van Hemert, O. (2013). How the 52-week High and Low Affect Option-implied Volatilities and Stock Return Moments. *Review of Finance*, 17(1), 369–401.
- Enow, S. T. (2022). Modelling Stock Market Prices Using the Open, High and Closes Prices. Evidence from International Financial Markets. *International Journal of Business and Economic Sciences Applied Research*, 15(3), 52–59.
- Fama, E. F., & French, K. R. (1988). Permanent and Temporary Components of Stock Prices. *Journal of Political Economy*, 96(2), 246–273.
- Fama, E. F., & French, K. R. (2015). A Five-factor Asset Pricing Model. *Journal of Financial Economics*, 116(1), 1–22.
- George, T. J., & Hwang, C. Y. (2004). The 52-week High and Momentum Investing. *Journal of Finance*, 59(5), 2145–2176.
- George, T. J., Hwang, C. Y., & Li, Y. (2018). The 52-week High, Q-theory, and the Cross Section of Stock Returns. *Journal of Financial Economics*, 128(1), 148–163.
- Hao, Y., Chu, H. H., Ho, K. Y., & Ko, K. C. (2016). The 52-week High and Momentum in the Taiwan Stock Market: Anchoring or Recency Biases. *International Review of Economics & Finance*, 43, 121–138.
- Hao, Y., Chou, R. K., Ko, K. C., & Yang, N. T. (2018). The 52-week High, Momentum, and Investor Sentiment. *International Review of Financial Analysis*, 57, 167–183.
- Hong, X., Jordan, B. D., & Liu, M. H. (2015). Industry Information and the 52-week High Effect. *Pacific-Basin Finance Journal*, 32, 111–130.
- Huddart, S., Lang, M., & Yetman, M. H. (2009). Volume and Price Patterns around a stock's 52-week Highs and Lows: Theory and Evidence. *Management Science*, 55(1), 16–31.
- Jegadeesh, N. (1990). Evidence of Predictable Behavior of Security Returns. *Journal of Finance*, 45(3), 881–898.
- Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance*, 48(1), 65–91.
- Jegadeesh, N., & Titman, S. (1995). Short-horizon Return Reversals and the Bid-ask Spread. *Journal of Financial Intermediation*, 4(2), 116–132.
- Lee, E., & Piqueira, N. (2017). Short Selling around the 52-week and Historical Highs. *Journal of Financial Markets*, 3, 75–101.
- Lee, E., & Piqueira, N. (2019). Behavioral Biases of Informed Traders: Evidence from Insider Trading on the 52-week High. *Journal of Empirical Finance*, 52, 56–75.
- Lee S. (2022). Target Shareholder Gains, Peer Firm Values, and Merger and Acquisition Announcements. *International Journal of Finance & Economics*, 27(3), 3550–3563.
- Li, J., & Yu, J. (2012). Investor Attention, Psychological Anchors, and Stock Return Predictability. *Journal of Financial Economics*, 104(2), 401–419.
- Liu, M., Liu, Q., & Ma, T. (2011). The 52-week High Momentum Strategy in International Stock Markets. *Journal of International Money and Finance*, 30(1), 180–204.
- McBride, D. M., & Doshier, B. A. (2002). A Comparison of Conscious and Automatic Memory Processes for Picture and Word Stimuli: A Process Dissociation Analysis. *Consciousness and Cognition*, 11(3), 423–460.
- Moskowitz, T. J., & Grinblatt, M. (1999). Do Industries Explain Momentum? *Journal of Finance*, 54(4), 1249–1290.
- Newey, W. K., & West, K. D. (1987). A Simple, Positive Semi-definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica*, 55(3), 703–708.

- Park, S. C. (2010). The Moving Average Ratio and Momentum. *Financial Review*, 45(2), 415–447.
- Poterba, J. M., & Summers, L. H. (1988). Mean Reversion in Stock Prices: Evidence and Implications. *Journal of Financial Economics*, 22(1), 27–59.
- Whitehouse, A. J., Maybery, M. T., & Durkin, K. (2006). The Development of the Picture-superiority Effect. *British Journal of Developmental Psychology*, 24(4), 767–773.
- Yu, S. (2012). New Empirical Evidence on the Investment Success of Momentum Strategies Based on Relative Stock Prices. *Review of Quantitative Finance and Accounting*, 39, 105–121.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence

