INTERNATIONAL ASSOCIATION OF FINANCIAL EXECUTIVES INSTITUTES
www.iafei.org

QUARTERLY

60th Issue | December 2025

THE PREMIER GLOBAL SOCIETY OF FINANCIAL EXECUTIVES

Message from the Chairman

Dear Valued IAFEI Members,

As we approach the end of the year, I would like to take a moment to reflect on the second year of my first term as Chairman of IAFEI by reviewing our main activities.

First and foremost, I would like to extend my deepest gratitude to all Board Members, ExCom Members, Advisory Committee Chair Dr. Conchita Manabat and her team, Overall Technical Committee (OTC) Chair Prof. Piergiorgio Valente and his team, and my secretariat team, Mr. Nobuki Taga and Mr. Anson Kee. Your support and dedication have been invaluable in driving IAFEI's activities throughout the year.

We have continued to promote the two main policies established in the first year of my term in 2024:

(1) **promoting collaboration**, and
(2) **enhancing professionalism**,

with the aim of further strengthening the value of IAFEI.

Webinars

In line with our second policy of enhancing professionalism, a total of five webinars and Round e-Tables were organized:

1) March 14: The Technical Working Group on Digitalization delivered a webinar on digital trends and their impact on financial executives.

2) May 8: A webinar titled "IFRS 18 Reporting in Financial Performance — Reloaded" was conducted by the Head of the Technical Working Group on Reporting.

3) July 11: A GLOBAL CFO Round e-Table on "International Tax – Critical Issues for CFOs" was organized by the OTC Chair, Prof. Valente.

4) August 1: The IAFEI Asia 2025 Webinar "Future-Forward Finance: Where ESG Meets FinTech & AI" was held under the leadership of FEI Taiwan's Mr. David Chow, serving as a milestone event for IAFEI DAY Taiwan.

5) September 29: A second GLOBAL CFO Round e-Table on "International Tax – Critical Issues for CFOs" was organized by OTC Chair, Prof. Valente.

Physical Collaboration with Other International Organizations

In line with our first policy to promote collaboration, Dr. Manabat and I made several overseas trips this year to strengthen relationships with international professional organizations, support the development of a new NPO that may potentially join IAFEI in the future, and further reinforce ties with our existing member organizations.

April 28 – We attended the IESBA Roundtable on Firm Culture and Governance held at the Securities & Exchange Commission of Malaysia. The International Ethics Standards Board for Accountants (IESBA) sets high-quality international ethics and independence standards, serving as a cornerstone of ethical behavior in business and organizations, and supporting public trust in both financial and non-financial information.

April 30 – We traveled to Singapore to meet with potential organizers of a new CFO organization in Singapore, Mr. David Ong and Mr. Peter Cheng, at the Institute of Singapore Chartered Accountants.

On July 5, we visited Shanghai to meet with CACFO President Ms. Liu Hongwei, Secretary General Mr. Chen, and Ms. Shen Junmei at the Shanghai National Institute of Accountancy. The location—beautifully designed by Ms. Hongwei—provided a calm and inspiring atmosphere, surrounded by colorful singing birds and whispering trees.

Virtual Collaboration with Other International Organizations

During the second half of the year, Dr. Manabat and I participated in the CFE Tax Advisers Europe meetings through the introduction of Prof. Valente. We were able to join the discussions and review the drafted GTAP Declarations.

I also engaged in discussions with JUSCPA (Japan-US Certified Public Accountants), which has been seeking opportunities to provide more professional webinars to its members. Since IAFEI aims to expand the audience for our high-quality webinars, this collaboration aligned well with our objectives. In late November, we successfully concluded and signed an MOU for our mutual benefit.

Publications

I am deeply grateful to Prof. Valente and Dr. Manabat for their weekly article contributions, and to Mr. Taga for his dedicated editing efforts over the weekends. Thanks to their commitment, we have been able to publish the IAFEI Weekly Update up to Issue No. 44 this year. All past issues are available on the IAFEI website. If you wish to contribute articles that may benefit our members, your participation would be greatly appreciated.

We also successfully published three editions of the IAFEI Quarterly—Issues No. 58, No. 59, and No. 60. I would like to express my sincere appreciation to CACFO and JACFO, as well as to Dr. Manabat and Prof. Valente, for their valued contributions to these Quarterly editions. All past issues are also available on the IAFEI website.

Physical Gathering – IAFEI DAY in Taipei

As you may recall, we successfully restarted our physical gatherings last year in Tokyo in the format of IAFEI DAY. This year, FEI Taiwan expanded the event into a two-day program. The first day was dedicated to academic discussions and professional learning opportunities, while the evening of the first day and the second day were designed for social exchange and fostering deeper mutual understanding among both domestic and international participants.


We greatly enjoyed the performance by Jennifer, Area President for Asia, and her friends, who sang songs from various member countries during the delightful dinner at Taiwan National University Hall. On the second day, FEI Taiwan organized a private boat cruise along the Tamsui River. All overseas participants thoroughly enjoyed the beautiful scenery and the warm, friendly atmosphere.








The Annual Board Meeting 2025

I was deeply honored to be re-elected as Chairman for a second term at the Board Meeting 2025 held on November 18. The newly elected ExCom members are:

Ms. Jennifer Wang, Vice Chairwoman
Mr. Abelardo (Billy) Cortez, Treasurer
Mr. Hideki Oba, Secretary
Ms. Huong Vu, Area President for Asia
Mr. Piergiorgio Valente, Area President for EMEA

On behalf of our new ExCom team, I would like to assure you that we will do our utmost to enhance the value of IAFEI by bringing in new members, offering professional webinars, engaging with other professional organizations, and strengthening ties with our existing member institutes.

Your continued support and active participation are essential to the success of IAFEI in 2026 and to its sustainable development in the years ahead.

Please join us in uplifting and energizing IAFEI.

Sincerely,

Tsutomu Mannari
Chairman of IAFEI (2024 - 2025)

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Risk Identification and Management Strategies in Carbon Reduction Operations:

Evidence from ESG Reports of Tsingtao Brewery, Yanjing Beer and CR Beer

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KEYWORDS

Carbon reduction risk; Carbon assets; Carbon budgeting; Carbon data; Case study

ABSTRACT

With the growing global focus on climate change and sustainability, managing risks in carbon reduction operations has become essential to the low-carbon transition of enterprises. This study examines the environmental, social, and governance (ESG) reports of Tsingtao Brewery, Yanjing Beer, and CR Beer to assess risk management strategies and mechanisms in carbon reduction operations across four dimensions: the central element of management and control, management tools, data standards, and management models. The findings provide both theoretical foundations and actionable insights to help enterprises strengthen their carbon reduction risk management and advance their sustainable development.

I. Introduction

As global focus on climate change and sustainability deepens, carbon reduction strategies have become an essential component of enterprise operational strategies. However, many still lack the necessary awareness and evaluation frameworks for carbon reduction risk management.

On September 22, 2021, the Central Committee of the Communist Party of China and the State Council released the Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy, proposing to “follow the principle of guarding against risks” and “respond appropriately to any economic, financial, and social risks that may arise during the green and low-carbon transformation to prevent any excessive response and ensure carbon emissions are reduced in a safe and secure way." In this context, eff ectively strengthening risk management and improving corporate risk management under carbon reduction goals are critical to driving green transformation and enhancing the quality of enterprise productivity.

Existing studies have demonstrated that carbon risk increases corporate fi nancing costs (Jung et al., 2018), undermines investment efficiency (Phan et al., 2022), elevates default risk among supply chain enterprises (Guo et al., 2024), and exacerbates overall fi nancial default risk. However, research on carbon reduction risk management remains limited—particularly lacking in the systematic exploration of how to develop and implement corporate carbon reduction risk management systems.

Environmental, social, and governance (ESG) reports—evaluating enterprises' sustainability performance across the three dimensions—serve as a key mechanism for addressing carbon reduction goals. Exposure to carbon reduction risk pushes companies to prioritize environmental responsibility fulfillment at the strategic level by enhancing l eadership's strategic awareness and commitment (Huang & Qi, 2024). In addition, ESG risk control has become a critical component of enterprise risk response, with strong ESG performance shown to significantly reduce corporate risk exposure (Tan et al., 2022). However, existing research has focused on how corporate ESG ratings influence corporate behavior (Fang & Hu, 2023; Hu et al., 2023), overlooking the role of corporate ESG practices in carbon reduction operations or the mechanisms of action involved.

Increasingly, managers are recognizing that risk management—as both a theoretical foundation and a tool within management accounting—provides assurance and support for achieving carbon reduction goals and enabling green transformation under the new development paradigm (Zhao & Fang, 2022). Therefore, strengthening carbon reduction risk management from a management accounting perspective has become a crucial focus in developing corporate carbon reduction risk management systems.

To fill these gaps, this study employs a multi-case study methodology, using ESG reports from Tsingtao Brewery Co., Ltd. ("Tsingtao Brewery"), Beijing Yanjing Beer Co., Ltd. ("Yanjing Beer"), and China Resources Beer (Holdings) Company Limited ("CR Beer") as data sources to examine risk management strategies in corporate carbon reduction operations. The aim is to provide insights for other Chinese enterprises pursuing carbon reduction transformation and developing risk management systems.

II. Literature Review

1.Corporate carbon operation risk

Corporate carbon operation risk refers to the potential economic and financial uncertainties and risks associated with production and operational activities due to climate change or the rising cost of fossil fuel use. Such risks increase costs related to carbon emissions compliance, technology upgrades, and environmental litigation, thereby affecting corporate value (Görgen et al., 2017).

As carbon reduction goals and carbon emissions regulations grow increasingly strict, carbon risks have emerged as a key factor affecting corporate sustainability, drawing significant investor attention, particularly in carbon-intensive industries (Bolton & Kacperczyk, 2021).

Carbon operation risk can be further categorized into regulatory risk, transition risk, financial risk, etc. (Labatt & White, 2007). Regulatory risk stems from existing and anticipated carbon emissions policies and regulations that may significantly impact corporate financial performance through increased compliance costs or obligations under carbon credit trading schemes. Meanwhile, transition risk arises from changes in policy, shifts in market demand, advances in technology, and an enterprise's ability to adapt during the transition to a low-carbon economy, potentially leading to higher costs for emissions compliance, technological upgrades, and potential environmental litigation (Labatt & White, 2007). Financial risk, on the other hand, refers to the negative implications of carbon emissions costs on an enterprise's financial activities, market value, and longterm sustainability. For example, a high carbon footprint from greenhouse gas (GHG) emissions can diminish both corporate reputation and value (Matsumur et al., 2014).

The economic implications of carbon risk have been studied extensively. This study reviews the relevant literature primarily through five lenses: financial performance, operational activities, corporate value, capital market performance, and impacts on supply chains and stakeholders.

In terms of financial performance, firms exposed to high carbon risk often face increased uncertainty in future cash flows, higher costs of debt and equity fi nancing (Jung et al., 2018), and an elevated risk of fi nancial default—factors that collectively exacerbate fi nancial distress.

From an operational perspective, carbon risk can influence corporate investment and merger and acquisition (M&A) preferences in two ways. First, enterprises may increasingly allocate future investments to low-carbon industries (Ceccarelli et al., 2024). Second, those with high carbon emissions may turn to less developed countries with more relaxed environmental regulations, making them more likely to pursue cross-border M&As (Bose et al., 2021). That said, carbon risk generally tends to reduce overall investment efficiency (Phan et al., 2022).

Regarding the impact of carbon risk on corporate innovation, two perspectives exist. Some scholars argue that it stimulates corporate innovation—for example, Li and Xiao (2020) found that sewage charges spurred green innovation in enterprises; while others contend that it restricts corporate financing and raises financing costs, thereby discouraging innovation and reducing research and development (R&D) investment (Chen et al., 2021).

For corporate value and capital market performance, carbon risk increases compliance costs associated with carbon emissions trading schemes and strict environmental regulations, thereby reducing corporate value (Choi & Luo, 2021). Patrick and Marcin (2021) discovered that enterprises with higher carbon emissions tend to deliver higher stock returns, as investors demand greater compensation for the associated risk. For carbon-intensive firms, however, stock performance tends to decline as investor awareness of climate risks increases (Choi & Luo, 2020).

Viewed through the lens of supply and value chains, enterprises exposed to high carbon risk tend to receive negative investor evaluations (Ott & Schiemann, 2023) and heighten default risks for their supply chain partners (Guo et al., 2024). In contrast, shareholders generally hold favorable views of the carbon emissions management practices of enterprises with sound corporate governance (Choi & Luo, 2021). According to Huang and Qi (2024), carbon risk compels firms to meet ESG responsibilities by intensifying government environmental regulatory pressure, offering valuable insights 32 China Management Accounting Review into their response to carbon reduction risk.

2. Corporate carbon reduction risk management

Carbon risk has become a critical concern for enterprises, making carbon reduction risk management essential for enhancing competitive advantages and achieving sustainable development. The most widely adopted control-based risk management framework is the enterprise risk management (ERM) framework, introduced by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in 2004.

The ERM framework enables boards of directors and executive management to identify and manage risks within a defined risk appetite, while advancing organizational objectives. It also outlines key considerations for aligning risk management with both strategic planning and day-to-day operations, and on embedding risk awareness into corporate culture and performance management practices.

The 2017 update to the framework further emphasized integrating risk management with strategy and performance, reinforcing its role in creating corporate value.

There is also extensive research examining various aspects of carbon reduction risk management. Overall, it has been shown to help enterprises reduce capital costs. While carbon emissions control measures may result in short-term declines in fi nancial performance, they are associated with increased valuations by longterm investors (Delmas et al., 2015).

A moderate approach to carbon reduction risk management can help enterprises gain competitive advantages. From the perspective of carbon disclosure, voluntary carbon reporting reduces information asymmetry, lowers investors' perceived risk (Saka & Oshika, 2014), decreases financing costs (He et al., 2014), improves fi nancial performance (Wen & Zhou, 2017), and ultimately increases corporate value (Li et al., 2016). Jiang et al. (2021) noted that enterprises with more extensive carbon disclosure tend to exhibit higher valuations, particularly in developing countries where the positive correlation between voluntary disclosure and corporate value is more pronounced. Similarly, Li et al. (2016) found that through carbon information disclosure, enterprises can effectively communicate their emissions management efforts to external stakeholders and, with media amplification, cultivate a positive corporate image that contributes to increased corporate value.

Nonetheless, carbon risk differs from traditional risks in that it may affect businesses across multiple dimensions, making it inherently more difficult to predict and assess accurately (Zhang et al., 2024). As a result, it introduces new challenges and places greater demands on corporate carbon reduction risk management practices.

3. Research review

Current research on carbon reduction risk management in corporate operations reveals several theoretical shortcomings: ① How can enterprises identify and defi ne the key actors in carbon reduction risk management and develop a mechanism for managing carbon assets? ② How can modern management accounting tools be innovatively adapted to quantify carbon emissions targets more effectively, and how can carbon reduction risk management and assessment be integrated into financial functions? ③ How can enterprises establish robust, standardized systems for managing carbon emissions data, and how can they break down silos between carbon and fi nancial data? ④ How can digital technologies be leveraged to support carbon reduction risk management through the development of digital carbon emissions management platforms and real world applications?

This study seeks to address these questions as a starting point.

III. Research Methodology and Case Overview

1. Research methodology

This study employs a multi-case research methodology, selecting three representative beer producers—Tsingtao Brewery, Yanjing Beer, and CR Beer—as research subjects.

As an energy-intensive industry, beer production is characterized by high levels of water consumption, energy use, and carbon emissions, making it a notable contributor to carbon emissions. In the face of growing environmental pressures and carbon reduction targets, achieving sustainability has emerged as a pressing challenge for the industry.

2. Case overview

(1) Tsingtao Brewery

Listed in both Shanghai and Hong Kong since 1993, Tsingtao Brewery now operates 57 wholly owned and controlled brewery subsidiaries, as well as two affiliated and joint venture enterprises in China. The company places high importance on the risks and opportunities presented by climate change, actively integrating climate-related factors into its risk management system.

In line with the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD), Tsingtao Brewery has established a structured and comprehensive framework for identifying and evaluating climate risks and opportunities. This framework includes the identification of climate-related risks and opportunities, carbon scenario analysis, and the determination of key risks along with corresponding control and mitigation measures.

With respect to carbon footprint management, Tsingtao Brewery has partnered with certified third-party agencies to verify its GHG emissions on a yearly basis since 2019. It also established a quantitative GHG model and a carbon emissions inventory to gain a comprehensive understanding of its carbon emissions data and continuously identify opportunities for carbon reduction. As of 2023, the company had completed product carbon footprint verifications at over 20 production facilities and for more than 20 products.

In the area of production transformation, Tsingtao Brewery is continuously optimizing production processes and expanding the use of clean energy to further reduce carbon emissions. To reduce energy consumption, tailored improvements and key control measures have been introduced by the company based on the technological, procedural, and equipment-specific aspects of beer production, distilling 58 core initiatives—ranging from standard refinement and operational improvements to equipment upgrades—and implementing them across operations.

In terms of resource management, Tsingtao Brewery has introduced the pioneering Wastewater Value Sharing Project, repurposing brewery wastewater as a biomass carbon source for the cotreatment of municipal sewage. This approach reduces not only production costs but also sludge generation and carbon emissions, delivering both economic and environmental benefits. Notably, the project was selected for inclusion in the United Nations Framework Convention on Climate Change (UNFCCC) case collection and has received several technology awards.

In 2023, Tsingtao Brewery saw a 6.44% year-on-year reduction in comprehensive energy consumption per 1,000 liters of beer, along with a 10% decrease in total GHG emissions. Air emissions in 2023 also improved, with a 20% year-on-year reduction in nitrogen oxide emissions, along with a 10% decrease in flue dust and other air pollutants. In terms of water resources and drainage management, the company recorded in 2023 year-on-year reductions of 8% in water consumption per unit of beer production, 61% in chemical oxygen demand (COD) discharged into natural water bodies, and 88% in total ammonia nitrogen emissions discharged into natural water bodies. For product packaging, combined carbon emissions from packaging materials in 2023 were reduced by 1,136 metric tons, a 4% decrease from 2022.

(2) Yanjing Beer

Listed on the Shenzhen Stock Exchange in 1997, Yanjing Beer primarily engages in the production and sale of beer, bottled water, brewing ingredients, and various beverage products, holding direct or indirect ownership of over 60 subsidiaries. It issues semi-annual and annual risk management reports that evaluate the effectiveness of its risk management practices and monitor the implementation of the risk control measures, analyze shifts in the business environment and their associated risks, and develop risk management work plans for effective major risk mitigation.

Yanjing Beer has implemented a comprehensive, process-driven, closed-loop system for managing environmental risks. Each year, it compiles a risk register by identifying and assessing medium-to-high and significant risks, then works with the risk prevention and control department to formulate corresponding mitigation measures. The company has also established a dedicated risk management office responsible for collecting risk data from both headquarters and its subsidiaries, which supports the development of a centralized risk database and a case repository. Additionally, Yanjing Beer conducts internal risk (hazard) self-inspections, circulates notices, gathers cross-departmental inputs, and maintains risk (hazard) self-inspection ledgers, informing the subsequent formulation of risk prevention measures.

Regarding carbon footprint management, Yanjing Beer actively tracks and reduces its corporate carbon footprint through annual reduction goals and a full-chain decarbonization strategy. This includes ongoing identification of carbon emissions sources, allocation of carbon reduction goals across departments, phased implementation of carbon reduction measures, and continuous progress monitoring. In addition, inspired by the energy performance of benchmark enterprises in the industry, Yanjing Beer has set three-year consumption targets for key resources such as water, electricity, steam, and carbon dioxide. To achieve these targets, the company conducts systematic reviews of carbon emissions data and maintains ongoing monitoring of its GHG emissions.

In terms of production transformation, Yanjing Beer has progressively established a green, low-carbon production chain by accelerating the adoption of clean energy, upgrading or replacing outdated equipment, and adopting electricity-powered production technologies. In 2023, the company enhanced its formulation processes and optimized structural designs, achieving a 0.01mm reduction in heat shrink film thickness and a 1.03% reduction in corrugated cardboard usage per carton.

To drive reductions in energy consumption, Yanjing Beer has integrated energy fluid assessments into performance evaluations across all organizational levels. Assessment metrics encompass water, electricity, steam, and carbon dioxide consumption, with clearly defined targets applicable to executives of headquarters and production facilities, as well as other relevant personnel.

The company has also implemented a three-tier daily energy consumption reporting system at each production facility to ensure ongoing monitoring of energy consumption across all production facilities, supporting compliance with daily energy data management requirements.

In 2023, Yanjing Beer achieved a 25.47% year-on-year reduction in total energy consumption. Specifically, water consumption decreased by 14.15%, electricity by 7.22%, steam by 13.04%, and carbon dioxide by 27.76%. In terms of air emissions, the company experienced in 2023 a 10.72% year-on-year reduction in GHG emissions, including an absolute reduction of 80,845 metric tons of carbon dioxide equivalent, while GHG emission intensity declined to 0.47 metric tons of carbon dioxide equivalent per RMB10,000, and nitrogen oxide emissions fell by 7.65% year-on-year. For water resources and drainage management, total water consumption, total drainage, and wastewater discharge dropped by 16.35%, 6.05%, and 4.05% year-on-year, respectively.

(3) CR Beer

CR Beer is a publicly listed alcoholic beverage company under China Resources (Holdings) Co., Ltd., specializing in the production, sales, and distribution of alcoholic beverage products. Each year, the company evaluates the impact and associated risks of ESG-related topics across the organization. To manage these risks, it has implemented a "three lines of defense" risk management framework that oversees ESG risk governance and the implementation of relevant initiatives.

In 2023, CR Beer established an Environmental, Health, and Safety (EHS) Risk Management and Governance Team to guide the planning and implementation of its EHS risk management. As part of the team's EHS management and governance efforts, it regularly reviews, monitors, and provides guidance on the assessment of, changes in, and response measures for all signifi cant risks of the company, including climate-related risks.

Regarding carbon emissions management, CR Beer introduced the CRSB Measures for Carbon Emissions Management in 2023, setting out clear requirements for carbon emissions management roles and responsibilities, carbon emissions data management, and carbon asset trading, with the aim of strengthening its carbon emissions management framework. In terms of the organizational structure for carbon emissions management, the company recruited both Chinese and international specialists in carbon emissions management, created full-time carbon emissions management roles, and designated dedicated personnel for carbon emissions management within the EHS departments of nine production facilities, each with carbon emissions of over 26,000 metric tons.

In the area of business transformation, CR Beer has continued to streamline production capacity, accelerate the phase-out of high-carbon operations, and reduce carbon emissions during production processes. Notably, in 2023, the company shut down 90% of its production facilities and phased out high-emission equipment. It also upgraded data collection and analysis systems with smart technologies and developed centralized monitoring systems, which has promoted the integration of automation and digitalization in its operations to further reduce carbon emissions.

Since 2022, CR Beer has adopted an internal carbon pricing mechanism, incorporating "carbon emissions per RMB10,000 of output value" as an indicator in the annual performance evaluations of all subsidiaries, with progress monitored monthly. The company has also promoted supply chain integration and collaborative carbon reduction by mapping carbon emissions across the upstream and downstream segments of its beer and Baijiu (Chinese liquor) value chains, and further quantified carbon emissions within key value chains to help upstream and downstream partners establish carbon emissions management systems.

In 2023, CR Beer reduced its consolidated energy consumption intensity per unit by 0.6% year-on-year. Total GHG emissions amounted to 806 metric tons of carbon dioxide equivalent in 2023, down by 5.2% year on year, while emissions of sulfur dioxide and nitrogen oxides decreased by 8.6% and 10.2% year on year, respectively. Water conservation efforts also progressed in 2023, with new water intake and groundwater withdrawal reduced by 1.9% and 27.8% year on year, respectively, and groundwater consumption intensity per unit down 24.1% from 2022.

IV. Case Discussion

According to Busch and Hoffmann (2007), carbon reduction risk management should be embedded within the broader corporate risk management framework to develop a carbon reduction risk management system. Drawing on case studies and established risk management theory, this study examines how traditional risk management systems can be upgraded to incorporate carbon reduction considerations in the context of carbon reduction.

1. Central element of management and control

As the carbon market continues to mature, managing carbon resources as corporate assets has become a key approach to mitigating and controlling carbon risks. Carbon assets—such as emission allowances, certified emission reductions, and associated activities—are defined as resources that directly or indirectly impact an organization's GHG emissions under both mandatory and voluntary carbon emissions trading schemes (Wu & Tang, 2024). It is a new asset class delivering economic benefits and value to enterprises.

Only by integrating carbon footprint analysis based on the value chain into management decisions can enterprises eff ectively optimize the allocation of carbon assets. This not only grounds business decisions in an asset-based foundation but also mitigates the resource constraints imposed by carbon risks.

All enterprises studied view carbon asset development and management as a core strategy for addressing carbon reduction risks, with carbon footprint management previously discussed serving as a primary method for building carbon assets. Tsingtao Brewery established a dedicated carbon asset management team alongside an internal GHG inventory system. By conducting annual GHG inventories across all facilities and securing verification from certified third parties, the company ensures robust carbon data to support its carbon neutrality goals and value chain carbon emissions reduction efforts. Yanjing Beer considers carbon risk a major climate-related risk warranting attention and implements carbon asset development and management as important measures for carbon emissions reduction and risk management. CR Beer is adopting a combined approach of onsite assessment and theoretical calculation to comprehensively account for total carbon emissions and carbon emissions intensity. It is progressively enhancing its carbon data collection systems, conducting internal assessments of carbon assets, analyzing relevant economic policies on carbon asset trading, and continuously refining its carbon asset management systems and measures.

The case study reveals that carbon reduction risk management is, in essence, a process of managing carbon assets. Drawing on State Grid Yingda's practice in advancing low-carbon development across its supply chain, Song et al. (2023) identified three interrelated stages in an enterprise's low-carbon transition: consolidating low-carbon assets, building low-carbon capabilities, and creating ecological value. Among these, identifying and managing low-carbon assets serves as an important basis for value creation.

Therefore, enterprises should develop carbon reduction risk management systems, with carbon assets serving as the central element of management and control. Based on this understanding, this paper proposes:

Proposition 1: To manage risks associated with carbon reduction efforts, enterprises should incorporate carbon assets into their risk management systems and develop management mechanisms for transforming carbon resources into carbon assets.

2. Management tools

Carbon emissions reduction can be categorized into structural, technological, and management approaches. Among these, management emission reduction involves the planning and control of carbon emissions reduction and carbon emissions trading through microeconomic management tools and systems, such as financial accounting and management accounting (Tu et al., 2016). Research has proven that management accounting tools facilitate carbon emissions management. For example, budgeting and decision-making tools enable enterprises to plan for carbon emissions, carbon emissions reduction targets, and carbon emissions trading activities (Tu et al., 2016). In the power generation sector, Tu et al. (2016) reported the designing and development of a suite of carbon budgeting frameworks, comprising sub-budgets for carbon emissions, carbon emissions reduction and costs, carbon emissions reduction revenues, and carbon emissions trading. The study by Zhou and Ma (2022) on the steel industry further highlights the value of management accounting tools such as carbon finance, sector-based carbon budgeting, transfer pricing, and benchmarking management in supporting enterprises' carbon reduction efforts.

All enterprises studied have set quantifiable carbon emissions management targets. Tsingtao Brewery announced in its 2023 ESG report a goal to reduce Scope 1 and 2 carbon emissions intensity in 2024 by 23% and nitrogen oxide emissions per unit of product by 71%, relative to 2019 levels. To support this, the company has replaced traditional energy consumption targets with a standardized energy consumption measurement model, enabling carbon goalsetting that quantitatively drives both energy consumption management and carbon emissions reduction. Yanjing Beer set annual carbon reduction targets and implemented quantitative energy consumption management practices. These include maintaining reliable energy consumption data, establishing consumption quotas across production processes and products, and defining clear standards for energy performance evaluations. CR Beer, in its 2023 ESG report, set 2025 carbon emissions targets for consolidated energy consumption intensity per unit, water consumption intensity per unit, GHG emissions, and nitrogen oxide emissions. It also introduced “carbon emissions per RMB10,000 of output value” as an indicator for performance evaluations.

The case study positions carbon budgeting as the foundation for carbon reduction risk management, and carbon assessment as a key mechanism for verifying the alignment between carbon emissions reduction targets and outcomes. As carbon risks cut across all facets of production and operations, enterprises that adopt management accounting tools for risk response must innovatively adapt these tools in a timely manner to reflect evolving risk conditions, thereby supporting the dual pursuit of economic performance and carbon reduction, while improving overall carbon reduction risk management capabilities (Wu & Tang, 2024).

To this end, enterprises should quantify and embed carbon emissions data into their core management processes, ensuring that planning, control, and evaluation activities are conducted in tandem with traditional business functions. Such integration allows carbon budgeting to be effectively aligned with the broader budgeting systems. Therefore, this paper proposes:

Proposition 2: To manage risks associated with carbon reduction efforts, enterprises should innovate their management tools, quantify the evaluations of carbon reduction risk management targets and outcomes, and incorporate carbon budgeting within their broader budgeting systems.

3. Data standards

Research has shown that corporate carbon disclosures can reduce fi nancing costs, improve financial performance, and increase corporate value (He et al., 2014; Pan & Yuan, 2023). Standardized carbon data is the cornerstone of such disclosures. While enterprises generate significant volumes of carbon data during production and operations, inconsistent standards often impede such data’s effective use in carbon reduction risk management, and maximizing the synergy value of carbon data requires unified processing across disparate standards.

Among the enterprises studied, Tsingtao Brewery developed *the Emission Standards for Air Pollutants in Boilers*, revised two management standards—*the Regulations on the Administration for the Prevention and Control of Water Pollution and the Regulations on the Administration for Pollutant Online Monitoring Facilities*—and updated 23 technical standards, unifying standards for carbon emissions data. It also implemented a company-wide hazardous waste standardization system and launched a pilot program for electronic labeling, further advancing carbon data standardization. Meanwhile, Yanjing Beer pursued automation and digital upgrades in the collection of energy fluid data. It also established a dedicated team responsible for refining the overall logical structure and plans for energy fluids management and introduced energy network metering diagrams and baseline consumption standards for individual points of use in the production process.

Based on the case study, standardized carbon data management proves to be a key component in carbon reduction risk management. During the process, standardized carbon data ensures both data comparability and reliability across departments, forming a robust foundation for both horizontal and vertical risk monitoring and control. It also facilitates the alignment of carbon data with financial data, supporting the development of a management accounting system that integrates operations, finance, and carbon performance (Wu & Tang, 2024).

Accordingly, this paper proposes: Proposition 3: To manage risks associated with carbon reduction eff orts, enterprises should develop a standardized carbon data system that enables integration and sharing between carbon and fi nancial data.

4. Management models

Digital transformation can promote innovation in fi nancial management and control, enabling enterprises to realize their value creation goals (Zhu et al., 2024). In today’s digital economy, enterprises should modernize their management control systems across organizational structures, control frameworks, management tools, and management platforms through the application of digital technologies (Lang & Zhang, 2023).

A carbon reduction risk management system is designed to identify and mitigate carbon risks across operations. On the one hand, the adoption of digital technologies drives digital transformation of control frameworks to enhance the risk management system's digitization and intelligence, ultimately elevating the system's operational efficiency and effectiveness. On the other hand, the deep integration of digital technologies within carbon emissions scenarios fosters transformative changes in business operations and innovations in management philosophies, enabling carbon emissions reduction at the sources and supporting the broader green transformation of the industry.

Among the enterprises studied, Tsingtao Brewery implemented a digital energy consumption management system that provides real-time monitoring of key control points on major energy-consuming equipment. By linking operational parameters with energy consumption data, the system enables coordinated control, ensures a stable energy supply-demand balance, improves equipment stability, and allows for more granular management of energy consumption processes. Yanjing Beer developed key performance indicator (KPI)-based reporting for pollutants and waste, allowing for the tracking and monitoring of waste generation and disposal. CR Beer integrated its water metering systems with a digital information platform for water consumption monitoring and management. It also improved its online sewage monitoring and alert system by upgrading the information infrastructure and succeeded in designing and developing a prototype mobile application of sewage. This App enables real-time monitoring of sewage discharge and supports automatic alerts and handling of abnormal or non-compliant discharges.

The digital economy and digital technologies have demonstrated significant potential in reducing carbon emissions (Yang et al., 2023). This case study illustrates that digital transformation can improve the effectiveness of carbon reduction risk management within enterprises. Therefore, enterprises should fully leverage digital transformation by building cloud-based carbon emissions management platforms and digitally intelligent platforms for low-carbon operations risk management, while deeply integrating digital technologies into carbon emissions management scenarios to enable dynamic, end-to-end management across operations.

As such, this paper proposes:

Proposition 4: To manage risks associated with carbon reduction eff orts, enterprises should incorporate digital technologies into their carbon reduction risk management systems, fully harness the power of digital tools, and establish a model for digital carbon reduction risk management.

V. Conclusion and Implications

This study examines the carbon reduction risk identification and management strategies of Tsingtao Brewery, Yanjing Beer and CR Beer, offering insights for enterprises seeking to establish a carbon reduction risk management system.

First, enterprises should incorporate carbon assets into their risk management systems and develop management mechanisms for transforming carbon resources into carbon assets. Second, they should innovate their management accounting tools, quantify the evaluations of carbon reduction risk management targets and outcomes, and incorporate carbon budgeting within their broader budgeting systems. Third, enterprises should develop a standardized carbon data system that enables integration and sharing between carbon and financial data. Last but not least, enterprises should incorporate digital technologies into their carbon reduction risk management systems, fully harness the power of digital tools, and establish a model of digital carbon reduction risk management.

Corporate carbon reduction risk management is a comprehensive, multidimensional process encompassing carbon asset management, carbon budgeting, reduction targets evaluation, carbon data integration, and digital empowerment. This study, in particular, emphasizes the need for enterprises to establish a carbon asset management system and adopt unified standards for carbon data sharing. To manage carbon assets, track carbon footprints, and monitor as well as generate carbon credits in real time, enterprises should develop a digital management platform integrated with a carbon reduction risk management module, forming the foundation for a digital carbon reduction risk management framework and facilitating the seamless application of digital technologies across practical carbon reduction scenarios.

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This article was originally published in *China Management Accounting Review*, Vol. 12, Issue 1 (2025), and is reprinted here with permission.

LOAN-TO-VALUE RATIOS AND ARM'S LENGTH PRICING IN INTRA-GROUP FINANCING

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Abstract

The pricing of intra-group financial transactions in the real estate sector is heavily influenced by the interplay between credit risk and collateral value.

This paper explores the quantitative adjustment of intercompany loan spreads based on the Loan-to-Value (LTV) ratio, a key determinant of creditworthiness and loss exposure.

Drawing on theoretical models of credit risk and recent empirical studies, it demonstrates how LTV can serve as a measurable variable to refine comparability under the Comparable Uncontrolled Price (CUP) method.

The analysis provides a structured framework for quantifying credit risk differentials, aligning transfer pricing outcomes with observable market behavior and the OECD Transfer Pricing Guidelines.

Keywords

Transfer Pricing; Intra-group Financing; Loan-to-Value (LTV) Ratio; Credit Risk Adjustment; Comparable Uncontrolled Price (CUP); Collateralization; OECD Guidelines; Real Estate Finance.

Introduction

Intra-group financing in the real estate sector presents unique challenges for transfer pricing analysis, primarily due to the dual influence of credit risk and collateral quality on loan pricing.

While the arm's length interest rate is conceptually determined by reference to comparable uncontrolled transactions (CUP method), the practical reliability of such benchmarking depends on the ability to quantify and adjust for risk differentials between the tested loan and market data.

Among the quantitative variables used in debt pricing, the Loan-to-Value (LTV) ratio is one of the most influential. It measures the relationship between the loan amount and the appraised value of the underlying property, thereby indicating the lender's exposure to potential loss in the event of default. The higher the LTV, the thinner the collateral cushion, and the greater the expected credit spread required by independent lenders.

As discussed in the OECD Transfer Pricing Guidelines 2022 [OECD (2022), OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations 2022, OECD Publishing, Paris], collateralization and credit protection mechanisms must be explicitly considered when assessing comparability (§§10.77–10.80). A purely qualitative comparison of loan terms is therefore insufficient unless accompanied by quantitative adjustments that reflect measurable differences in credit risk.

Theoretical Foundation: LTV, Credit Risk and Spread Formation

The lending cap rate [Stokes, J. R. and Cox, A. T. (2021). Commercial real estate finance and the lending cap rate. Journal of Property Investment & Finance, 41(1), 2-10]. provides a conceptual and quantitative bridge between property valuation, loan structure, and credit risk. By combining the capitalization rate with the loan-to-value (LTV) ratio, this framework links the maximum sustainable loan amount directly to the risk profile of the transaction. In doing so, it ensures that lending margins reflect not only property-level fundamentals but also the leverage-dependent risk borne by the lender. The approach effectively embeds into valuation practice the fundamental relationship between LTV and the pricing of credit risk.

The positive association between the LTV ratio and credit spreads is well established in both theoretical and empirical literature. Under the structural model of credit risk [Merton, R. C. (1974). On the Pricing of Corporate Debt: The Risk Structure of Interest Rates. Journal of Finance, 29(2), 449-470], a borrower's equity can be viewed as a call option on the value of the underlying assets. A higher LTV, reflecting greater leverage, reduces the distance to default by narrowing the gap between the asset value and the debt obligation, thereby increasing the probability of default (PD). From a loss-given-default (LGD) perspective, a higher LTV means that the collateral's recovery value covers a smaller fraction of the loan in default, which raises the lender's expected loss.

Empirical research confirms that lenders price this additional risk into loan spreads. Studies on commercial real estate (CRE) lending documents a statistically significant positive relationship between LTV and loan spreads, after controlling other underwriting variables such as the debt service coverage ratio (DSCR) and loan term [Tsolacos, S. & Lux, N. (2022). Modelling credit spreads on commercial mortgage loans. Journal of European Real Estate Research, 15(3), pp. 332-350].

Market and supervisory reports also indicate that, in many jurisdictions, mortgage spreads tend to widen as LTV levels increase, consistent with thinner collateral cushions being priced as higher risk.
Consistent with this evidence, the relationship between LTV and credit spreads can be interpreted as reflecting both components of expected loss, probability of default and loss given default, indicating that higher leverage simultaneously increases the likelihood of borrower distress and reduces potential recovery values, both of which are priced into lending margins [Ciocchetta F., Pico R., Quaglia I. (2025). Commercial real estate loans in Europe: does loan-to-value at origination predict default risk? Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers)].

Taken together, these findings support the rationale for integrating LTV-based risk metrics into pricing frameworks such as the lending cap rate. By jointly considering asset value, leverage, and expected loss components, the lending cap rate provides a coherent analytical bridge between credit risk theory and lending practice, allowing lenders to calibrate margins that are consistent with both market evidence and prudential risk assessment.

The Role of LTV in Arm's Length Pricing

Within the framework of the arm's length principle, the LTV ratio acts as a quantitative determinant of credit risk that directly influences the pricing of both related-party and third-party loans. Its role is twofold: it provides a risk-based metric of comparability between financing transactions, and it allows the analyst to quantify economic differences when comparable uncontrolled transactions differ in leverage or collateralisation.

From an economic standpoint, the relationship between LTV and the credit spread can be approximated through a sensitivity coefficient, β_LTV, derived from market or empirical data. Empirical credit-risk models typically specify loan spreads as a linear function of LTV within the relevant range of leverage observed in market data, implying a positive and statistically significant β_LTV. The adjustment to the observed market spread can therefore be expressed as:

$$\Delta Spread = \beta\_LTV \times (LTV\_tested - LTV\_benchmark)$$

where:

• ΔSpread is the adjustment (in basis points) applied to the benchmark spread;

• β_LTV represents the slope coefficient capturing the incremental spread per percentage-point change in LTV;

• LTV_tested and LTV_benchmark are the respective leverage ratios of the tested loan and the comparables.

This formulation provides a transparent, data-driven mechanism for adjusting the arm's length spread in line with observed market pricing of credit risk. The β_LTV coefficient can be estimated empirically through regression analyses of market loan data or inferred from published studies and rating-agency data on credit spread-LTV elasticity.

Quantitative Adjustment Mechanism

Assume that an intra-group loan for a logistics property has an LTV of 70%, while the average LTV of comparable third-party loans is 60%. If empirical evidence suggests a sensitivity of approximately 6 basis points per percentage point of LTV (β_LTV = 0.06%), the 10-point differential implies an upward adjustment of 60 basis points to the benchmark spread.

If the comparables' average spread is 250 bps, the adjusted arm's length spread for the tested loan becomes 310 bps (250 + 60). This adjustment quantifies the incremental credit risk borne by the lender due to higher leverage, translating observable market relationships into a transparent, quantitative adjustment consistent with the CUP framework.

Consider a second case of a commercial real estate (CRE) loan granted to a related entity owning an office building, with an LTV of 75% compared to a benchmark average of 55% for third-party loans. Supervisory data and market studies suggest an average β_LTV coefficient of approximately 7 bps per percentage point for CRE portfolios in Europe, reflecting the higher sensitivity of credit spreads to leverage in this segment.

If the average spread observed in comparable CRE loans is 280 bps, the adjusted arm's length spread for the related-party loan would rise to approximately 420 bps (280 + 140). This reflects the higher risk premium associated with reduced collateral coverage and higher expected loss. From a transfer pricing perspective, incorporating this type of adjustment within the CUP method ensures that the intra-group loan reflects market-consistent risk–return conditions and provides quantitative support in the event of a tax audit, as the adjustment is traceable to observable leverage differentials and empirically validated sensitivity parameters.

Integrating Collateral and Borrower Quality

The LTV ratio captures the extent of collateralization, but not necessarily its quality or liquidity.

For a comprehensive risk adjustment, it can be integrated with other quantitative indicators such as:

- DSCR (Debt Service Coverage Ratio): proxy for repayment capacity and cash flow resilience;
- Collateral Liquidity Index (CLI): marketability of the underlying property;
- Loan maturity and amortization profile: exposure to refinancing risk;
- Property class and geographic market: affecting volatility and recovery rates.

A multivariate regression incorporating these variables typically enhances explanatory power (R^2) and allows offsetting effects to be quantified.

For instance, a one-standard-deviation improvement in DSCR (e.g., from 1.3x to 1.8x) may offset 30–40 bps of LTV-related risk, reducing the need for further spread adjustment.

Application within the CUP Method

The Comparable Uncontrolled Price (CUP) method remains the most direct approach to pricing intra-group loans, provided that reliable market data exists.
However, real estate loans often exhibit heterogeneity in LTV ratios, collateral structures, and borrower risk profiles, requiring careful adjustments to achieve comparability.
An LTV-based adjustment is particularly appropriate when:

- The comparables and the tested loan share similar loan structures (maturity, currency, collateral type), but differ primarily in leverage levels;
- Collateral is the primary risk mitigant, as in real estate or asset-backed lending;
- Empirical or market-derived β_{ltv} coefficients are available, ensuring that the adjustment is statistically grounded;
- Qualitative differences (e.g., covenant strength or property quality) are immaterial or separately adjusted.

When applied correctly, the LTV-adjusted CUP represents a quantitative refinement of the standard CUP method, improving the precision of benchmarking while remaining consistent with the arm's length principle.

Policy and Compliance Implications

The use of quantitative credit risk adjustments aligns transfer pricing outcomes more closely with economic substance and market behavior.

For taxpayers, it provides a defensible analytical bridge between internal financing policies and third-party lending standards.

For tax administrations, it offers an objective, data-based criterion to assess whether a related-party loan reflects market risk-return conditions.

MEAN OR MEDIAN? RETHINKING CENTRAL TENDENCY IN TRANSFER PRICING BENCHMARKING

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Abstract

The median has become the most used indicator in strategic transfer pricing benchmarking, primarily because it offers stability and clarity in administrative application for multinationals.

However, this practice often overlooks the statistical and economic implications arising from the underlying distribution of comparable margins. In many industries, profit indicators are not normally distributed, they are skewed, leptokurtic, or affected by outliers, which means that the mean and median convey different information about central tendency and risk.

This article explores the conceptual and statistical differences between mean and median in transfer pricing analyses, examining when each measure may better reflect arm's length conditions. It also reviews the practical and policy implications of this choice, highlighting how many tax administrations continue to rely almost exclusively on the median despite OECD guidance suggesting flexibility.

Keywords: Transfer pricing, benchmarking, mean, median, arm's length range, statistical robustness, OECD Guidelines.

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Transfer pricing, benchmarking, mean, median, arm's length range, statistical robustness, OECD Guidelines.

Introduction

In transfer pricing benchmarking, the median has become the dominant measure of central tendency used to determine whether the tested party's profitability is consistent with the arm's length principle. This convention, though not mandated by international standards, has been institutionalized through administrative practice and litigation across jurisdictions. It is often justified on the grounds of stability, and administrative convenience.

As this article argues, this orthodoxy obscures the deeper statistical and economic differences between the median and the mean. In many industries, profit indicators are not symmetrically distributed. Instead, they exhibit skewness, kurtosis, and outlier sensitivity, meaning that the median and mean capture distinct aspects of the underlying economic reality.

A purely "mechanical" reliance on the median may thus produce benchmarks that are not truly representative of market outcomes, particularly when a few highly efficient or intangible-driven comparables drive the profitability frontier. This article explores why the choice of measure matters, when each may be justified, and how current administrative practice, which still overwhelmingly favours the median, might evolve towards a more analytically grounded approach.

Conceptual Framework: Mean and Median in the Arm's Length Context

The arithmetic mean is the sum of all observations divided by their count. It captures the expected value of a distribution, the profitability that one would expect a randomly selected independent firm to earn. The median, in contrast, identifies the middle observation: half of the comparables earn less, half earn more. In a normal (symmetric) distribution, the two coincide [Hogg, R.V., McKean, J.W., & Craig, A.T. (2019) – Introduction to Mathematical Statistics (8th ed., Pearson)]. However, transfer pricing data rarely follow such distributions. Financial ratios such as operating margins or return on total costs are typically positively skewed, as a small number of comparables achieve disproportionately high returns. These skewed outcomes may result from structural market advantages, brand ownership, or temporary shocks. Hence, the choice between mean and median carries implicit assumptions:

- The median reflects a *"typical"* or "*representative*" performer, largely insulated from outliers.
- The mean integrates the performance of all comparables, including efficient outliers, reflecting the market-weighted economic reality.

While OECD Guidelines (§3.62–3.64, 2022 edition) recognize that "*any point within the range that satisfies the arm's length principle may be appropriate*", in practice, the median has emerged as a default point. This article challenges that default by analysing the statistical and policy rationale behind both measures.

Statistical and economic interpretation

(1) Robustness and Efficiency

Statistically, the median is robust, unaffected by extreme values, but less efficient in representing overall central tendency. The mean, conversely, uses all available data and is therefore more efficient, but also more sensitive to outliers. In small samples, both measures can diverge significantly.

When data quality is moderate and trimming procedures (e.g., excluding the top and bottom deciles) are applied, the mean may offer a more informative summary of central tendency without being unduly distorted by extremes.

(2) Economic Meaning

Economically, the mean reflects expected profitability, whereas the median captures the typical outcome. If the policy objective is to approximate the performance that would be expected in a competitive market, the mean aligns better with economic theory. If the objective is risk mitigation or administrative conservatism, the median may be more appealing.

However, an uncritical reliance on the median can introduce a downward bias in industries where high-profit firms are legitimate comparables. Such bias may penalize efficient taxpayers and distort the arm's length range away from genuine market expectations.

Empirical Illustration – A Multi-Year perspective

To align with OECD recommendations, the empirical illustration adopts a three-year perspective (2021–2023) to mitigate the effects of short-term volatility and year-specific fluctuations. According to the OECD Transfer Pricing Guidelines (§§3.75–3.79), multi-year data enhance the reliability of the comparability analysis by capturing long-term profitability patterns.

In practice, however, the statistical interpretation of benchmarking results depends heavily on how extreme values (outliers) are handled. The OECD Guidelines (§§3.59–3.61) explicitly recognize that outlier exclusion may be appropriate when certain comparables materially distort the arm's length range. The following analysis compares the results before and after excluding a high-profit outlier from the sample.

Full Dataset (including outlier)

The initial dataset includes twelve comparable companies, with their operating margins (OM) for the years 2021-2023 and corresponding three-year averages:

Company	OM (2021)	OM (2022)	OM (2023)	3-Year Average
A	1.54%	4.53%	3.04%	3.04%
B	5.07%	4.84%	5.05%	4.99%
C	15.29%	12.55%	30.78%	19.54%
D	6.22%	7.58%	3.38%	5.73%
E	0.68%	1.31%	1.23%	1.07%
F	1.78%	1.97%	2.42%	2.06%
G	6.09%	14.23%	13.96%	11.43%
H	1.85%	5.17%	2.46%	3.16%
I	7.57%	4.94%	3.50%	5.34%
J	1.77%	1.86%	1.99%	1.87%
K	12.15%	12.82%	21.02%	15.33%
L	10.84%	10.91%	10.98%	10.91%

Based on the three-year averages, the mean operating margin (OM) equals 7.04%, while the median OM equals 5.16%.

The difference of nearly two percentage points shows a clear right-skewed distribution driven by one or two highly profitable firms.

To illustrate the fiscal relevance, suppose the tested party reports an OM of 5.0% on revenues of €100 million:

- Under the median benchmark (5.16%), the taxpayer would fall within the arm's length range.
- Under the mean benchmark (7.04%), the same result would be below the expected return, implying a potential adjustment of €2.04 million.

At a 25% corporate tax rate, this translates into an additional tax liability of approximately €0.51 million, potentially subject to penalties and interest in the event of a tax audit.

Adjusted Dataset (excluding outlier)

To assess the impact of outlier exclusions, the most extreme comparable (Company C, with an average margin of 19.54% and Company K with an average margin of 15.33%) are removed. The adjusted dataset now comprises ten comparables:

Company	OM (2021)	OM (2022)	OM (2023)	3-Year Average
A	1.54%	4.53%	3.04%	3.04%
B	5.07%	4.84%	5.05%	4.99%
C	6.22%	7.58%	3.38%	5.73%
D	0.68%	1.31%	1.23%	1.07%
E	1.78%	1.97%	2.42%	2.06%
F	6.09%	14.23%	13.96%	11.43%
G	1.85%	5,17%	2.46%	3.16%
H	7.57%	4,94%	3.50%	5.34%
I	1.77%	1,86%	1.99%	1.87%
J	10.84%	10,91%	10.98%	10.91%

Based on the three-year averages, the mean operating margin (OM) equals 5.46%, while the median OM equals 4.08%.

The difference between mean and median, around 1.4 percentage points, indicates a moderate right-skewed distribution that remains asymmetrical but considerably more balanced once extreme values are removed.

To illustrate the potential fiscal implications, assume the tested party reports an operating margin of 4.0% on revenues of €100 million:

- Under a median-based benchmark (4.08%), the taxpayer would fall within the arm's length range.
- Under a mean-based benchmark (5.46%), the same result would fall slightly below the central tendency, implying a potential transfer pricing adjustment of €1.46 million.

At a 25% corporate tax rate, this corresponds to an incremental tax liability of approximately €0.37 million, potentially increased by penalties and interest in the event of a tax audit.

This refined example highlights how outlier exclusion materially improves the reliability of statistical benchmarking, without altering the fundamental insight that the mean and median convey distinct economic interpretations of central tendency.

Even after adjusting for extreme observations, the dataset remains asymmetrical, a reflection of structural market features rather than statistical noise.

Accordingly, the selection of the most appropriate point in the range should consider not only the statistical distribution but also the specific functional and risk profile of the taxpayer, consistent with the arm's length principle.

Practical and Policy Implications

(1) For Taxpayers

Taxpayers often adopt the median defensively, viewing it as the most "*audit-proof*" option. However, an analytical understanding of the dataset can justify alternative choices. When data dispersion is limited and comparables are homogeneous, the mean or trimmed mean may be defended as more representative of market performance.

Taxpayers can strengthen their position by documenting statistical diagnostics, histograms, skewness coefficients, and normality tests, and by explaining why the selected measure aligns with the economic substance of their business. A transparent narrative helps establish that the chosen point in the range is not arbitrary but analytically grounded.

(2) For Tax Administrations

Tax administrations favour the median for reasons of neutrality and consistency. By anchoring adjustments to a single, easily identifiable point, the median minimizes interpretive discretion.

However, this convenience risks systematic distortions, especially in skewed industries [Fama, E.F. (1965) – The Behavior of Stock-Market Prices, Journal of Business, 38(1), 34–105].

Authorities could instead promote context-sensitive benchmarking, where the choice of point estimate reflects the distribution of comparables. The OECD Guidelines support this flexibility by emphasizing that "*any point within the range may be appropriate, provided it satisfies the arm's length principle*".

(3) Administrative Practice: The Hegemony of the Median

Despite this flexibility in theory, most tax administrations continue to rely almost exclusively on the median as a matter of practice. In jurisdictions such as Italy, France, Spain, Germany, Portugal and India, the median is routinely treated as the "preferred" or "*default*" arm's length indicator, sometimes even codified in administrative guidance.

For example, the Italian *Provvedimento* of 2020 on transfer pricing documentation explicitly refers to the median as the point to be used "*in the absence of specific justifications to adopt another measure*." [Provvedimento del Direttore dell'Agenzia delle Entrate 23 November 2020, "*Modalità di redazione della documentazione idonea ai fini del transfer pricing*," §3.2.] Similarly, the Indian Income Tax Rules (Rule 10CA) mandate the use of the median as the arm's length result within the interquartile range.

This widespread adherence stems from two main factors:

1. **Administrative simplicity**: the median avoids debates on outlier treatment and offers a clear reference point for audits.

2. **Perceived neutrality**: it conveys an appearance of fairness, as it sits midway within the arm's length range.

However, this practice can generate structural bias. In industries where profit indicators are systematically skewed upward, the median consistently yields benchmarks below the economic mean. The result is a latent asymmetry between tax administrations (who benefit from conservative benchmarks) and taxpayers (who bear the economic cost of underrepresentation of high-profit comparables).

Recognizing this asymmetry does not require rejecting the median altogether. Rather, it calls for conditional use, where the choice of measure must be justified by reference to empirical distributional features. In other words, the median should be a reasoned outcome, not an automatic assumption.

(4) For Policy Development

From a policy standpoint, the challenge is to reconcile administrative certainty with economic accuracy. Reforms might include:

- Requiring benchmarking reports to disclose the distribution characteristics (skewness, kurtosis, outlier diagnostics);

- Allowing taxpayers to adopt alternative measures (e.g., trimmed or weighted means) where such choice is supported by statistical analysis and consistent with the economic circumstances of the taxpayer, as required by the OECD Guidelines;

- Encouraging statistical training for auditors and policymakers to interpret profit distributions properly;

- Aligning local practice with the OECD's principle of analytical flexibility rather than mechanical uniformity.

Ultimately, the choice of central tendency measure should serve the fundamental objective of transfer pricing: approximating the results that independent parties would achieve under comparable conditions, not merely simplifying administration.

Conclusions

The predominance of the median in transfer pricing benchmarking reflects a pragmatic but intellectually narrow tradition. It provides simplicity and reduces audit controversy, but often at the expense of economic realism.

The mean and median embody distinct conceptions of "*arm's length*." The mean reflects the expected market return, while the median reflects the typical or conservative return. Neither is universally superior; their appropriateness depends on the empirical distribution of comparables, the industry context, and the analytical purpose of the benchmark.

A mature transfer pricing discipline should move beyond automatic reliance on the median. By integrating statistical reasoning, transparency, and empirical justification, both taxpayers and tax administrations can achieve outcomes that are more consistent with real market behaviour, and thus more faithful to the arm's length principle in both form and substance.

FINEX Celebrates a Successful IAFEI Day 2025 in Taipei

EJ A. Qua Hiansen, Chief Financial Officer,
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EJ A. Qua Hiansen is the Senior Vice President, Chief Financial Officer (CFO) of PHINMA Corporation. He is also a Director of PHINMA Property Holdings Corp., PHINMA Community Housing Corp., PHINMA Insurance Brokers Inc., and PHINMA Solar Energy Corp.

He is the President of the Financial Executives Institute of the Philippines (FINEX) and is the Vice Chairman of the FINEX Foundation. He is concurrently the CFO of Song Lam Cement Joint Stock Company in Vietnam. Mr. Qua Hiansen is also an Independent Director of First Metro Asset Management Inc.; a member of the Board of Advisors of the PHINMA-DLSU Center for Business and Society; and a Trustee of the FINEX Academy, Capital Markets Development Foundation Inc., Mariposa Foundation Inc., and Assumption College, Inc.

Mr. Qua Hiansen holds a Bachelor of Science degree in Finance from Butler University in Indianapolis, Indiana, USA where he was recognized as one of the Top 100 Outstanding Students in 2005 and a Master's degree in Global Finance from HKUST-NYU Stern.

The Financial Executives Institute of the Philippines (FINEX) proudly joined the global finance community at IAFEI Day 2025, held on October 17, 2025 at the National Chengchi University Public Administration and Business Center in Taipei. The event brought together leaders in finance from across Asia, highlighting shared commitments to innovation, transparency, and responsible growth.

This year's IAFEI Day was especially meaningful for FINEX. Nearly 20 delegates from the Philippines attended, making it the largest Philippine contingent in recent years. For many of our members, it was their first hands-on experience with IAFEI, offering a valuable chance to learn about the Federation's international efforts and to build relationships with peers from other member countries. The enthusiasm was strong throughout the day as every participant remarked that the exchanges were enriching, insightful, and highly energizing. The itinerary showcased a strong blend of thought leadership, technical insights, and cross-border collaboration.

The day began with welcome remarks from

- Tsutomu Mannari, IAFEI Chairman, and
- Richard Chang, FEI Chinese Taiwan Chairman.

This set the tone for a highly interactive program that emphasized digital transformation, sustainable finance, and the evolving responsibilities of financial leaders in an era of disruption.

Two keynote speeches framed the global context:

1. Prof. Jennifer Wang, former FSC Chair, spoke on "Rethinking Digital Transformation and ESG Impact in the Net-Zero Era."
2. Jaclyn Tsai, Chair of the Asian Fintech Alliance, delivered a forward-looking session on "How FinTech Helps Enterprises Navigate Supply Chain Instability."

Both topics deeply resonated with the FINEX delegation, especially as Philippine companies accelerate digital adoption while managing regulatory, environmental, and geopolitical challenges.

A strong highlight of the event was the panel discussion on Digital Finance in Asia, featuring experts from venture capital, digital procurement, and enterprise solutions. Delegates appreciated the practical examples of how technology is reshaping risk management, procurement, and customer engagement across markets.

The thematic block on Green Finance and ESG reinforced the growing alignment between financial excellence and sustainability stewardship. The emphasis on compliance, disclosure, and strategic ESG integration was particularly relevant given the Philippines' own progress on sustainability reporting and investment-grade governance.

Beyond the learning sessions, Filipino delegates enjoyed a warm welcome from FEI Chinese Taiwan. The gala dinner at MD Ming – Da Hall, complete with live music and regional cuisine, created an atmosphere of friendship and open dialogue.

For many of the first-time Filipino attendees, this was a memorable introduction to the IAFEI community, one marked by laughter, inclusivity, professional respect, and genuine curiosity about each other's perspectives.

FINEX's active presence at IAFEI Day 2025 highlights our dedication to increasing our global engagement and keeping Philippine financial leaders aligned with international standards, trends, and best practices. The insights gained from Taipei, covering digital finance to ESG compliance, will enhance our local discussions at FINEX events, academies, and industry dialogues.

Most of all, this year's event reminded us that the challenges we face — such as economic volatility, climate risks, and digital disruption — are shared across borders. The solutions, therefore, must also be developed together.

FINEX extends its deepest thanks to IAFEI, FEI Chinese Taiwan, the organizers, and all speakers for an exceptional program. We look forward to continuing the collaboration and sending an even stronger delegation in future IAFEI activities.

Reflections on Participating in the Panel Discussion at IAFEI DAY in Taipei

Hideki Oba, IAFEI Secretary

With over 20 years of experience working in legal, compliance, and corporate planning departments in Japanese companies, Mr. Hideki Oba has now assumed the role of Secretary of IAFEI.

Seventeen years ago, Mr. Oba had the pleasure of working with our Chairman, Mr. Mannari, at SANYO Electric Co., Ltd. SANYO was a prominent Japanese electronics manufacturer, producing one-third of the TVs in the U.S. market before eventually merging with Panasonic. Just before the merger, he joined Marubeni Corporation, a global trading and investment company, in 2008. Over 13 years, he primarily focused on the energy, power, renewables, and natural resources sectors, including project finance and acquisition finance for M&A. His assignments took him to Tokyo, and Dubai.

Since 2021, Mr. Oba has been leading the legal, compliance, risk management, and general affairs departments, including the sustainability team, at Sunstar Inc., a Japanese healthcare company.

Additionally, he is a member of the Japan Association of Chief Financial Officers and a management member of the Association of Corporate Legal Departments of Japan (ACLD). Within ACLD, he leads a sustainability research group discussing human rights and environmental due diligence, including Scope 3 emissions.

He strongly believes that any company that operates without proper care for its stakeholders and without harmonizing with sustainability principles cannot and should not survive.

Mr. Oba is excited to leverage his experience, knowledge, and networks to contribute to the member associations of IAFEI and to engage in discussions with members on various topics to expand their activities.

"We do not have an ESG strategy, only a long-term strategy." With this powerful statement from EJ A. Qua Hiansen, President of FINEX, the final panel discussion at IAFEI DAY @ National Chengchi University (NCCU) in Taipei opened.

IAFEI DAY, held on October 17 at NCCU, brought together more than 50 experts from Taiwan, the Philippines, Vietnam, and Japan. The event began with opening remarks delivered by Chairman Tsutomu Mannari, followed by a full program of keynote speeches and panel discussions covering FinTech and new payment systems, Digital Finance, Green Finance, and ESG practices—topics that are increasingly central to today's corporate leaders and CFOs.

During the keynote session, Professor Jennifer Wang—Chair of IAFEI Asia and a leading scholar at NCCU—raised a crucial question:

"As companies worldwide continue to advance ESG initiatives, some governments, most notably the U.S. under the Trump administration, are pushing Anti-ESG agendas. In such an environment, what direction should companies take? Personally, I believe the long-term direction remains unchanged, but I expect today's discussions to address these issues."

In the afternoon session, Brian Lin of Ernst & Young Taiwan and Daniel Hsiao of CRIF provided insights into current trends in ESG disclosure and third-party assessments. As Daniel Hsiao's presentation title —**"From Fragmented Regulations to Integrated Action"**—suggested, ESG is no longer a loose collection of guidelines or isolated regulatory requirements. With IFRS sustainability disclosure standards and the growing use of third-party evaluation reports requested by business partners, ESG has evolved into an integrated part of corporate activity. Our panel discussion was held against this backdrop.

The Panel Discussion

The panel was moderated by Jeff Hou of KPMG Taiwan and joined by Nguyen Que An of PwC Vietnam, EJ A. Qua Hiansen—CFO of a major Philippine conglomerate and current FINEX President—and myself, in my role as Secretary General of IAFEI and a corporate officer responsible for business planning, sustainability, legal affairs, and risk management.

The discussion began with Jeff's opening question on the state of ESG initiatives. EJ responded with the impactful line quoted above. For PHINMA Group and other major Philippine conglomerates, considerations for the environment and society are already embedded in the organization's long-term strategy. ESG is no longer a separate agenda.

Building on his point, Mr. An and I explained that listed companies in Japan and Vietnam are already preparing for IFRS-based sustainability disclosures. Moreover, even small and medium-sized enterprises—when part of large corporate supply chains—are increasingly required to measure GHG emissions (including Scope 3) and undergo evaluations by third-party ESG assessors. ESG-related tasks have effectively become indispensable components of supply-chain management.
We emphasized that regardless of the political momentum behind Anti-ESG movements, fundamental challenges remain: global population growth and resource shortages leading to rising resource costs, alongside the declining working population in advanced economies due to aging. Efficient resource use and attracting diverse talent are now inseparable elements of corporate strategy, supply-chain strategy, and HR strategy.

Interestingly, none of the keynote speakers or panelists had coordinated our messages in advance—yet our views aligned naturally.

パネリストたちと。右からJeff Hou, Nguyen Que An, EJ A. Qua Hiansen, Hideki Oba

Discussions Beyond the Panel

Following the panel, networking events were held that evening and the following day. Participants actively challenged and questioned us:

- "You said what you said, but many SMEs are truly struggling to keep up with the excessive ESG requirements."

- “Your ideas were impressive, but the percentage of female managers in Japan is surprisingly low. How can companies remain competitive like that?”

The questions regarding DEI were particularly striking. Experts from the Philippines (where women make up about 60% of managerial positions) and Vietnam (36%) openly questioned Japan’s current rate of just 10.9%. It prompted me to reflect once again on one of the underlying causes of Japan’s economic stagnation.

Additionally, former IAFEI Chairman Peter Hsu of Taiwan (Chairman in 1995) shared inspiring words during his address to the participants:

“When I first spoke about governance and business ethics 30 years ago, almost no one was interested. Today, young speakers talk about these topics as if they are the norm.” It reminded me that what we now take for granted was built through the efforts of earlier generations.

Looking Ahead

Next year’s IAFEI DAY is planned to be held in either the Philippines or Vietnam. This year’s event was highly stimulating, offering opportunities to share insights with international experts and deepen relationships while discussing the very issues we work on within our own organizations.

I sincerely hope that more participants from Japan will join us next year, and IAFEI will continue working to make that happen.

(A Personal Message, November 21, 2025)
The original article was published in the “IAFEI Weekly Update” Issue # 44 Vol. 2025

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