Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 23, No. 2, 2026

Accounting Issues Arising from the Intertemporal Trading Characteristics of Financial Derivatives

Suyang Zhang, Lihui Sui

Shanghai Dianji University, Shanghai 200000, China

Abstract: Financial derivatives are an indispensable component of the modern financial market. Their intertemporal trading characteristics have created a series of challenges and problems for accounting practice. Research on the accounting measurement of derivatives involves interdisciplinary integration and remains a relatively under-explored area. This paper analyzes the accounting problems caused by the intertemporal nature of derivatives, mainly including accounting recognition and measurement, information disclosure, and fair value valuation, and proposes corresponding countermeasures. Using bibliometric analysis, qualitative research, and case analysis, this study concludes that accounting recognition, measurement, and fair va lue estimation are all subject to subjectivity, leading to untrue, inaccurate, and incomplete accounting information disclosure. Such problems can be alleviated by unifying standardized valuation models and disclosure policies. This research helps promote the improvement of accounting standards for financial derivatives, enhances the efficiency and transparency of the financial market, and reveals the dynamic relationship between financial innovation and financial supervision from an interdisciplinary perspec tive.

Keywords: Financial Derivatives, Intertemporal Trading, Accounting Recognition and Measurement, Information Disclosure, Valuation Issues.

1. Introduction

Accounting issues related to financial derivatives have long drawn scholarly attention. Although financial derivatives emerged and developed relatively late, the formulation of supporting accounting standards has lagged. Consequently, numerous difficulties remain in current accounting treatments, triggering ongoing debates and research. With the rapid expansion of financial derivatives, the International Accounting Standards Committee (IASC) issued accounting standards covering recognition, measurement, and disclosure of financial derivatives to adapt to market developments. In July 2014, the IASB issued IFRS 9 Financial Instruments, which introduced the expected credit loss framework for impairment. Embedded derivatives are no longer separated from host contracts, simplifying accounting procedures and enhancing the applicability of hedge accounting. If an entity holds debt instruments within a business model whose objective is both to collect contractual cash flows and to sell financial assets, such instruments must be measured at fair value through other comprehensive income. Under IAS 39, impairment gains and losses are measured based on fair value, whereas under IFRS 9, impairment is measured based on expected losses using a method consistent with assets measured at amortized cost. Eligibility for classification as fair value through other comprehensive income depends on the entity's business model.

Against the current state of research, studying accounting issues arising from the intertemporal trading characteristics of financial derivatives carries significant theoretical and practical value. Theoretically, it helps refine accounting theory in recognition, measurement, disclosure, and valuation and promotes the evolution of accounting standards. As financial innovation continues, existing standards may no longer fit market realities, and in-depth research can provide a scientific basis for improving standards and policies. Practically, it enhances corporate financial transparency and strengthens the ability of investors and regulators to interpret financial statements. For enterprises using financial derivatives, proper accounting treatment is essential to present a reliable view of financial position.

2. Bibliometric Analysis of Related Research

(1) Data Sources

Research data are obtained from CNKI (China National Knowledge Infrastructure) through advanced search. Literature is retrieved for all time periods under the topic "accounting issues of derivatives", covering journals, master's theses, and doctoral dissertations. Data collection ends in 2024. A total of 380 documents are retrieved. After removing 1 duplicate and 8 irrelevant records, 371 valid documents are retained, using title, publication date, institution, abstract, and keywords as core attributes.

(2) Research Methods

Bibliometric Analysis: Statistical analysis of annual publications in the field of financial derivative accounting effectively reveals developmental trends. By counting publications by year and topic, researchers can estimate the status and future direction of the field.

Knowledge Mapping Analysis: Knowledge mapping is a data analysis technique that integrates knowledge modeling and visualization to reveal relationships, patterns, and trends. In bibliometric research, visualization software such as CiteSpace is used to generate diagrams reflecting developmental trends and research directions in financial derivative accounting.

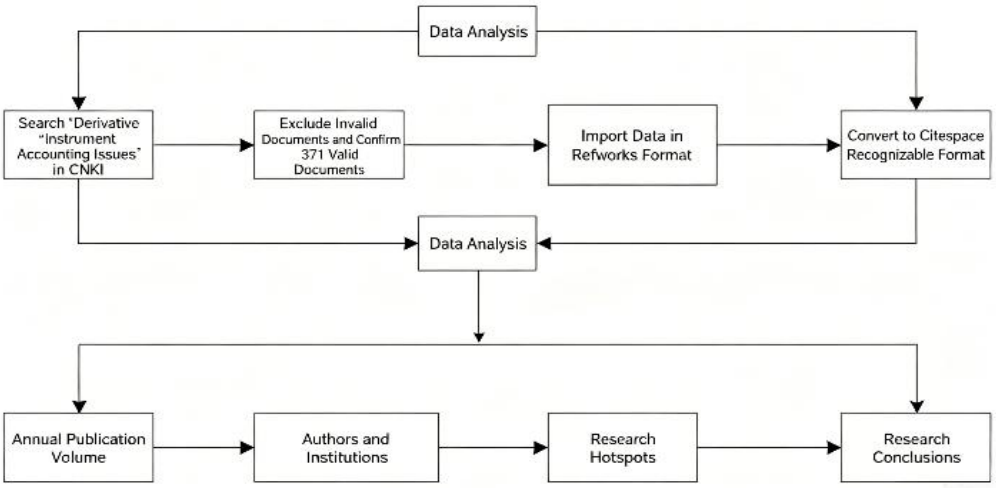

Figure 1. Visual analysis flowchart

(3) Publication Status and Prominent Words of Research Articles on Accounting Issues of Financial Derivatives

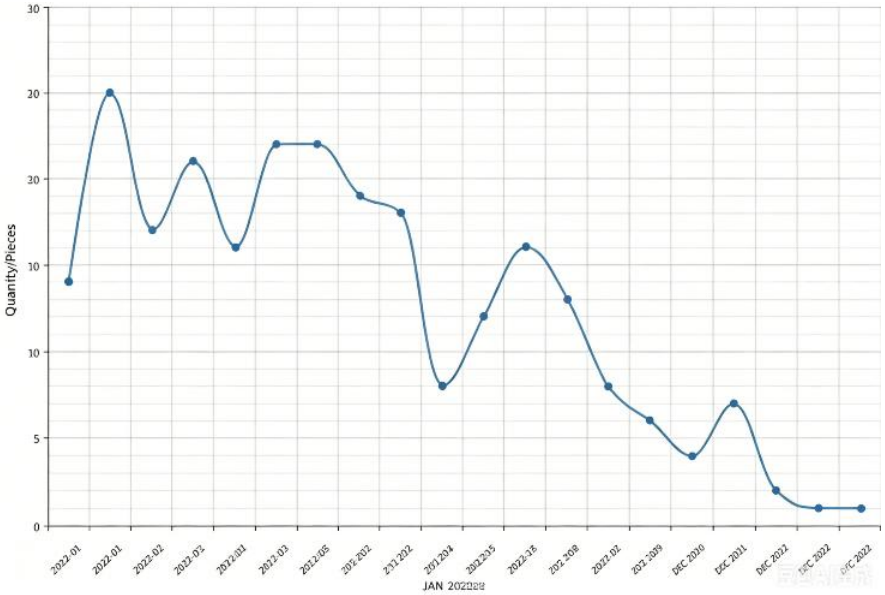

Figure 2. Trend chart of research articles on accounting issues of financial derivatives

By Figure 2. It can be seen that from 2001 Since the beginning of this year, there has been a significant downward trend in the research of Chinese scholars on accounting issues of financial derivatives. This also shows from the side that the accounting standards of my country's financial derivatives are constantly being improved, there are fewer and fewer problems, and the research on accounting issues of financial derivatives is becoming more and more in-depth.

"Emergent word" refers to a word that suddenly appears and is frequently quoted within a certain period of time, which not only reflects the research hotspots or changes in attention in a certain field, but also represents some emerging topics or concepts. Through detailed analysis of prominent words, we can see the sudden increase in the number of citations of a certain keyword at different times, thereby inferring changes in related research hotspots, and thus helping us understand the research trends and development directions in the field of accounting issues related to financial derivatives, such as table 1. The keywords shown before 2004 were mainly accounting treatment, recognition, and measurement, but in 2005 "countermeasures", this suddenly appeared, indicating that the research trend began to turn into a solution to the accounting problems of financial derivatives. At the same time, through the citespace software burst algorithm, we can also discover some emerging research areas that have recently attracted attention, and identify the temporal trends of the topics, which is of great significance for conducting cutting-edge research. The research highlights in the text show the development and evolution of research on accounting issues of financial derivatives The red area represents the age range of the keyword research hotspot. The darker the color, the more times this keyword appears within this period.

Table 1. Keyword highlighting and year sorting for accounting issues of financial derivatives

Keywords	Year	Strength	Begin	End	2004——2023
Countermeasures	2006	2.21	2012	2016	
Accounting treatment	2005	1.9	2016	2019	
Confirm	2004	1.8	2012	2013	
Question	2004	1.77	2012	2016	
Hedging	2008	1.72	2009	2015	
Listed banks	2009	1.72	2017	2018	
Accounting issues	2006	1.69	2014	2017	
Stock Index Futures	2009	1.54	2009	2011	

By analyzing and studying the prominent word list The issue of measuring financial derivatives has gone through several development periods in the past two decades. Since China's economic system reform in 1987, with changes in the domestic and foreign market environment, corporate needs and the support of government policies, China's financial field has gradually recognized the value of this new product, paid widespread attention to it, and actively carried out related research and exploration work. At this stage, the important contributions of well-known scholars in the domestic accounting community such as Ge Jiashu and Chen Jianshen in journals such as "Accounting Research" are particularly prominent. Their articles such as "A Brief Discussion on Financial Instrument Innovation and Its Impact on Financial Accounting" reveal its profound impact on traditional accounting theory. However, they did not delve into or propose specific solutions for addressing these challenges [4] Liu Feng's "Financial Innovation and the Reconstruction of Financial Accounting Theory" [5] Lu Demin's research, including "The Development of Financial Derivatives and the Accounting Issues They Bring," mainly explores how emerging financial instruments have impacted the principles of defining and recognizing traditional assets, and questions the internationally accepted risk-reward assessment method [6]. These early contributions laid the theoretical foundation for the construction of accounting for financial derivatives in my country. In the late 1990s, with the increasing attention and deepening of financial derivatives in the accounting academic community, the discussion on their accounting recognition also entered a new stage. The most influential one is Xu Jingchang's "Research on Accounting Management of Financial Derivatives" published by China Political Economy Press [7] and Zhu Hailin's "Accounting for Financial Instruments" [8], "Commodity Futures and Financial Derivative Accounting" edited by Geng Jianxin, published by China Renmin University Press [9] etc, All three works have made important contributions to our country's understanding of this field and have also provided a solid foundation for the development of this industry in our country. However, despite this, we will still find when we talk about this issue, Although relevant regulations existed as early as the early 1990s, However, it did not cover all relevant information or provide sufficient details to resolve all potential related questions, Therefore, more efforts are needed to improve it to make it more complete and practical.

The initial recommendations on financial derivatives and hedge accounting issued by International Accounting Standards in July 2004 raised the urgent need for discussion and construction of accounting rules for financial derivatives. To meet this challenge, the Ministry of Finance issued a series of financial instrument accounting standards in 2006, such as "Recognition and Measurement of Financial Instruments", "Transfer of Financial Assets", "Hedge Valuation" and "Financial Instruments Reporting". These works mainly focus on how to record financial derivatives in financial statements and value them at fair value. Changes in fair value are directly reflected in changes in current earnings or owners' equity. In addition, the standard stipulates that companies engaged in hedging activities may choose to use hedging accounting methods.

2017 The revised and released new accounting standards for financial instruments by my country's Ministry of Finance in 2016 can be called the Chinese version of IFRS 9.

(3) Interdisciplinary Analysis of Accounting Research on Financial Derivatives

Accounting recognition and measurement affect the results of financial derivatives in financial statements and are the basis for ensuring the authenticity and fairness of financial reporting. Therefore, many scholars in my country are committed to studying the accounting recognition and measurement of derivatives. Estimating fair value is one of the core issues in the accounting treatment of financial derivatives. The value of financial derivatives often fluctuates with changes in market conditions, so how to accurately estimate their fair value is crucial for investors, regulators and other stakeholders. Because the estimation of fair value affects the accuracy of information disclosure of financial derivatives, the completeness and standardization of information disclosure have also become a research focus.

Table 2. Keyword frequency table

Serial number	Quantity	Strength	Year	Keywords
1	46	0.08	2004	Fair value
2	40	0.23	2004	Accounting recognition
3	38	0.09	2004	Accounting Measurement
4	18	0.11	2004	Information Disclosure
5	16	0.05	2004	Disclosure
6	16	0.07	2004	Confirm
7	16	0.1	2004	Measurement
8	13	0.03	2004	Accounting
9	13	0.16	2006	Accounting issues
10	11	0.07	2005	Accounting Information

In recent years, there have been many articles focusing on the accounting treatment of financial derivatives, but each author has a different view on it, such as a journal published by the research team of the Shanghai Headquarters of the People's Bank of China in 2023——"Research on Accounting Treatment Issues Related to Derivatives". This article examines three main points of contention in the current accounting practices of banking institutions regarding derivatives, This includes the off-balance-sheet registration of notional principal, the accounting treatment of option fees, and the accounting treatment of physical delivery at maturity. The study concluded that, regarding the three accounting processing steps that are controversial throughout the entire lifecycle of derivatives, while off-balance-sheet nominal principal registration methods vary, banks can choose one and maintain stability as long as they meet internal and external management needs. Accounting treatment of option fees, It is recommended to start from the essence of the option premium, regardless of whether the option premium is paid or not, to recognize the derivative financial assets or liabilities on the trading day, and carry them forward to investment profit or loss when the option contract is terminated, reflecting the change in fair value profit or loss during the survival period. For due delivery using full physical delivery method, To clearly define realized and unrealized gains and losses, and to clearly distinguish between derivatives and spot, it is recommended to recognize relevant investment assets or currency positions using market prices [10]. In his article "Research on Accounting Treatment of Financial Derivatives", Shen Zhiqiang pointed out that companies must calculate the fair value when recognizing financial assets or financial debts. Therefore, all related transaction costs arising from financial debts and assets that are considered fair value and result in losses in the current period need to be immediately recorded in the losses in the current period, and financial derivatives must also follow this rule [11]. Sun Zhaodang in Analysis of Accounting Treatment Issues Related to Financial Derivatives The initial stage of accounting processing is accounting recognition. At this stage, the accrual basis is the core view of traditional accounting theory. The accrual basis uses past transactions or matters of the enterprise as the basis for accounting. In other words, transactions or matters that may occur in the future will not be reflected and recognized [12]. Their research on the accounting treatment of financial derivatives mainly focuses on the recognition and measurement of financial derivatives.

After reading relevant literature, I found that most of the literature on accounting information disclosure and valuation issues of financial derivatives is based on case analysis of a financial derivative. For example, Kan Wenyuan's master's thesis published in 2016, "Research on Issues and Countermeasures of Accounting Recognition and Information Disclosure of Futures Transactions of YD Company", this paper mainly studies several accounting issues in futures trading. Using YD Company as a real research case, it studies the accounting development issues in the company's futures trading. This paper finds that YD Company has deficiencies in accounting recognition of futures transactions, mainly reflected in inaccurate recognition timing of futures transaction gains and losses, resulting in distorted accounting information. In addition, YD Company's information disclosure is incomplete, especially in the risk management and fair value changes of futures transactions, which lack sufficient transparency, making it difficult for investors and stakeholders to fully assess the company's financial situation [13]. Yang Ming's A Brief Analysis of my country's Measures to Improve Accounting Information Disclosure of Financial Derivatives Believes that my country should establish the concept of scientific supervision, Unified Information Disclosure Rules, Improve disclosure process management to address the issue of inaccurate and incomplete disclosure of accounting information [14]. Both scholars offered practical suggestions on accounting information disclosure issues and solutions from a practical perspective.

3. Theoretical Analysis of Intertemporal Transaction Accounting

In the initial stage, due to the lack of corresponding regulatory guidance, financial derivatives, as a contract to prevent risks, were not recognized in the table. Moreover, my country's original accounting standards system does not include standards for financial instruments. However, during China's rapid economic growth, accompanied by the continuous trend of financial innovation around the world and China's fiscal system gradually entering the world stage, the formulation of relevant financial instrument accounting standards came into being. my country's newly implemented "Corporate Accounting Standard No. 22 —— Recognition and Measurement of Financial Instruments" includes financial derivatives in the core accounting scope and puts forward detailed provisions on their recognition process. Regarding the recognition of financial derivatives, not only are the recognition criteria stipulated, but the initial recognition and derecognition are also detailed. The new guidelines explicitly state that initial confirmation should be made at the time of contract signing, not at the time of transaction. Derecognition means that when a company realizes the various rights stated in the contract or the contractual right to receive cash flows from financial assets, recognition of the financial assets should cease; when a company's current obligations for financial liabilities have been fully or partially discharged, recognition of the financial liability or a portion thereof should be terminated. These changes have changed my country's long-standing practice of only disclosing information off-balance sheet [15].

(1) Accounting recognition and measurement issues of financial derivatives.

The difficulties in analyzing financial derivatives accounting from an accounting perspective are usually

reflected in the three links of accounting recognition, measurement and reporting.

First, how should derivatives be recognized and reconfirmed? A derivatives contract is an agreement between a company and its counterparty on a future transaction. At the time the contract is signed, the derivatives themselves cannot be determined to be assets or liabilities. This naturally raises the question of how to record the accounts. One problem brought about by derivatives is how to identify transactions or matters that may occur in the future. Traditional accounting reflects economic matters or transactions that have occurred in the past, which requires breaking through the original financial accounting conceptual framework. Thanks to the continuous introduction and promotion of fair value by the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB), the issue of accounting recognition of financial derivatives is now largely eliminated.

Second, how are derivatives measured? Confirmation only solves the problems of whether to record and when to record, but what the recorded amount should be is the problem that derivatives accounting measurement needs to solve. Currently, internationally, fair value is used to solve the measurement problem of derivatives accounting, first considering the current or recent market price, and if not, considering the price of the substitute market. If not, a cash flow discount model or option pricing model is used.

Third, how should derivatives be included in the financial statements? How are changes in the value of derivatives reflected in the financial statements through fair value measurement and remeasurement? Is derivatives profit or loss comprehensive income (international or US standards) or capital reserves (China standards) under the equity item on the balance sheet, or does it enter the profit or loss statement? This is a very important question. Under International Accounting Standards or U.S. Accounting Standards, we have the trichotomy of financial assets, which is held to maturity, available for sale, and held transactions.

According to International Accounting Standard 39, the key to whether we can recognize medium options embedded in composite financial products such as convertible bonds separately from the main contract lies in the fulfillment of several conditions .First, what is not directly related to the main contract is the economic characteristics and risks of the embedded derivative; second, the derivative meets the basic definition of an independent derivative; and finally, if the hybrid financial product is not measured at fair value, or its value changes are not reflected in the income statement. If none of these premises hold, then the embedded derivative should be merged with the main contract [1].

(2) Accounting Information Disclosure Issues of Financial Derivatives

According to the requirements of "Corporate Accounting Standard No. 37 —— Presentation of Financial Instruments", when preparing financial statements, enterprises should disclose relevant information such as the important accounting policies, measurement basis, and fair value recognition methods used in financial instruments, and require full disclosure of descriptive and quantitative information related to the risks of financial instruments [16]. The main reasons for Enron's bankruptcy in 2001 were financial fraud and low transparency in information disclosure, which affected investors' judgment and led to serious losses for a large number of investors. Therefore, the accounting information published by companies regarding financial derivatives is an important basis for investors to assess its potential impact on the company's financial condition and operating results.

Compared to international standards, the Basel Committee has the strictest regulations on risk information disclosure, emphasizing the disclosure of internal risk management processes and methods within enterprises. In contrast, the U.S. Financial Accounting Standards Board has developed detailed accounting disclosure standards specifically for financial derivatives, with meticulous content requirements. However, the general standards issued by the International Accounting Standards Board and our Ministry of Finance cover all financial instruments, which may make the specific requirements for disclosure of information on financial derivatives unclear. Each institution discloses information about financial derivatives to demonstrate their impact on the entity's financial condition, earnings, and cash flows, and to reveal the risks undertaken by the entity [17].

(3) Valuation Issues of Financial Derivatives

Because the value of financial derivatives fluctuates over time and under changing market conditions, accountants need to determine appropriate valuation models and parameters to conduct valuations, thus leading to controversy over the estimation of their fair value. Intertemporal transactions of financial derivatives raise a series of valuation issues in accounting, including the following aspects:

Difference between market value and book value: Because intertemporal trading of financial derivatives can cause changes in market value, but these changes are not necessarily reflected in accounting statements, This results in a difference between market value and book value This in turn affects the authenticity and reliability of the company's financial reports.

Selection of valuation model: Estimating the fair value of financial derivatives often requires relying on complex mathematical models such as option pricing models and futures pricing models. However, using different valuation models will lead to different valuation results This choice will affect the company's profit and loss in its financial statements, which requires us to select an appropriate valuation model to estimate the fair value of financial derivatives.

Determination of valuation parameters: Valuation models for financial derivatives usually need to rely on some parameters such as volatility, risk-free interest rate, etc. However, these parameters are often difficult to estimate accurately ,Especially in the case of intertemporal trading, the determination of parameters is affected by many factors, such as derivative price differences This will also affect the valuation results of financial derivatives.

Choice of accounting policy: When accounting for intertemporal transactions of financial derivatives, companies may face multiple accounting policy choices, such as historical cost method and fair value method. Different accounting policy choices will lead to different accounting treatment results, thereby affecting the company's financial reporting and financial indicators.

Meeting of disclosure requirements: Intertemporal transactions of financial derivatives are generally complex and wind-risk, which can have a significant impact on the financial condition and performance of the company. Therefore, accounting standards require companies to fully disclose their accounting information on financial derivatives so that investors and stakeholders can understand the company's risk exposure and true financial condition.

In summary, the issue of fair value estimation has a significant impact on ensuring the authenticity of a company's financial statement disclosures, Therefore, companies need to carefully evaluate and take appropriate measures to address these valuation issues.

4. Accounting Practice Analysis of Intertemporal Transactions

Many of the transactions Enron had made were related to derivatives, such as energy futures contracts, and were not illegal according to the accounting standards at the time. However, it was eventually ruled to have committed financial fraud, which showed that there were loopholes in the accounting standards and other laws and regulations at the time. Subsequently, a series of bills continued to regulate derivatives transactions. In recent years, more and more domestic companies have used derivatives, and various asset management products (structured products) designed by financial institutions also involve derivative products. In order to standardize market transactions, the new asset management regulations issued in 2018 supplemented the application of derivatives. Research in this field still needs to be deepened.

(1) Introduction to Enron

Enron officially declared bankruptcy on December 2, 2001. It was once a large company that held an important position in the US energy market. Its stock was recommended by many securities rating agencies and sought after by many investors. In August 2000, Enron's stock climbed to an all-time high of $90.56 per share. It is notorious for its complex financial structure and misuse of financial derivatives, and its serious exaggeration of its profitability and asset value in financial reports has led to a series of accounting problems. Using complex financial instruments such as energy swap contracts and credit default swaps, along with special purpose entities (SPEs) and unique accounting strategies such as so-called "off-balance sheet financing methods," Enron successfully concealed its debt problems and losses. However, this operation did not result in substantial capital flows. Instead, it resulted in a large amount of fictitious gains being recorded on the books, which made it impossible for Enron's financial statements to accurately reveal its actual economic status and operational performance.

(2) Enron's Accounting Handling Issues

In the appendix to its 2000 annual report, Enron used different accounting methods for derivative agreements (including futures, exchanges, options, etc.) that were used for trading purposes and for agreements established to preserve value (such as energy transportation contracts). The former uses a daily market-based accounting approach, with pricing determined based on daily market prices. It is displayed on the consolidated balance sheet in the "Assets and Debts for Price Risk Management" section, and unrealized profits and losses are recorded in the "Other Income" column. As for the latter, the value-preserving accounting method is generally applicable. This method can be used to calculate the value of these value-preserving agreements as long as they achieve their intended goals; however, if it is found that they fail to meet the standards in actual operation, this method will be terminated immediately, and then the corresponding profit or loss will be established based on the price changes of the agreement. In other words, decision-makers can use their subjective judgment to determine whether a derivative product should be used for value preservation, trading, or other non-trading purposes.

(3) Enron Information Disclosure Issues

Note 1 to Enron's consolidated financial statements on page 36 of its 2000 annual report states that “in order for the preparation of financial statements to comply with GAAP (Generally Accepted Accounting Principles), management must make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities, and the amounts of income and expenses during the reporting period. Actual results may differ from these estimates” [18]. This statement is actually an indirect reminder to readers that this financial report may have certain risks, but because it is 56 pages long and contains a lot of detailed information, it is difficult to attract the attention of mass investors and may even cause them to misunderstand. Under the then-current U.S. accounting standards, companies should include earnings expected to be realized in future periods but affected by market changes in current profits. However, Enron failed to adequately explain its consideration of market uncertainties and assumptions in its handling of the situation. Instead, they label potential revenue from these financial derivatives as ‘other revenue’ and list it as the last revenue item at the end of the consolidated income statement, thus masking the actual impact of these instruments on the company's actual earnings. By studying the appendix to the 2000 financial report, we were able to conclude that “other income” actually reveals the profit (or loss) of financial derivatives. Therefore, we reorganized Enron's profit statement for the three years before its collapse intoto emphasize the core issues that this article will explore.

Table 3. Consolidated Income Statement, 1998-2000

	2000Year	1999Year	1998Year
Non-financial derivative income	93557	34774	27215
Non-financial derivative costs	94517	34761	26381
Gross profit of non-financial derivatives	-960	13	834
Gains (or losses) from financial derivatives	7232	5338	4045
Other expenses	4319	4549	3501
Operating profit	1953	802	1378
Net profit	979	893	703

Observing the tabular data, we can see that the returns of non-financial derivatives continued to rise from 1998 to 2000, but the growth rate exceeded the increase in costs; at the same time, the profitability of Enron's non-financial derivatives showed a downward trend until it fell into negative value in 2000 and continued to decline; In addition, the table reveals that Enron's main source of revenue was the revenue from financial derivatives. Excluding this portion of the earnings, we find that Enron's operating profits have been loss-making over the past three years, which also shows that the earnings generated by financial derivatives have a significant impact on financial reporting.

Enron's net assets were $1.088 billion at the end of 2000 and $300 million at the end of 1999. Because Enron included changes in its market capitalization in the "Other Income" section, we have no way of knowing the exact amount of revenue the company earned from the changes in its market capitalization. However, based on the additional notes in their financial statements, we can infer that their working capital on the last day of 2000 and 1999 was approximately US$763 million and US$395 million, respectively. Because Enron energy contracts generated receipts and payments in different

accounting periods, the intertemporal nature of transactions requires accountants to estimate and forecast future cash flows of the contracts. However, such estimates and forecasts may be subject to uncertainty, which not only affects the accuracy of accounting recognition and measurement but also the authenticity of accounting information disclosure.

"Special Purpose Entity" (SPE) is a business established by a company for a special purpose rather than for the purpose of operating. The U.S. Financial Accounting Standards Board stipulates that SPEs must meet the following two conditions to be excluded from corporate reporting: First, the asset must be sold to the SPE, meaning that the asset seller (the sponsoring company or other party) no longer owns the asset and relinquishes its future gains and losses; second, 3% of the total SPE assets have already been invested The above-mentioned independent third party must control the SPE to simultaneously assume the risks and returns of the assets it owns [19]. However, Enron deliberately ignored the requirement for consolidated representation of the three "special purpose entities", which resulted in an overestimation of approximately $499 million in profits and an underestimation of actual liabilities between 1997 and 2000. Furthermore, Enron rejected Arthur Andersen's audit amendments, arguing that these adjustments were not "significant", a decision that inflated net profits by approximately $92 million from 1997 to 2000. The following is a detailed overview of each year:

Table 4. Financial impact of Enron's re-merger of three SPEs
Unit: US$:

Project Name	1997	1998	1999	2000	Total
Before and after net profit adjustment					
Net profit before adjustment	1.05	7.03	8.:93	9.79	26.8
Profit deducted from SPE by reduction and re-consolidation	0.45	1.07	2.48	0.99	4.99
Profit adjusted and reduced	0.51	0.06	0.02	0.33	0.92
Adjusted net profit	0.09	5.9	6.43	8.47	20.89
After adjustment/before adjustment	8.57%	83.93%	72.00%	86.52%	77.95%
Before and after adjustment of total debt					
Total debt before adjustment	62.54	73.57	81.52	100.23	NA
Add-re-merge SPE's increased debt	7.11	5.61	6.85	6.28	NA
Adjusted total debt	69.65	79.18	88.37	106.51	NA
After adjustment/before adjustment	111.37%	107.63%	108.40%	106.27%	NA

Source: Enron Corporation's 8-K filing with the SEC on November 8 2001.

After 1990, Enron built a large and complex corporate structure through its capital restructuring strategy, with numerous subsidiaries and cooperative entities, totaling more than 3,000. These companies are interwoven into an intricate network, forming a unique 'pyramid' type of related corporate group. Enron skillfully employed this multi-tiered holding model, controlling the largest number of companies with a small initial capital. Enron was able to maintain this cyclical model by using the method of establishing related companies to raise large amounts of funds: raising funds while simultaneously creating new related companies. This cyclical approach leads to an increase in the number of related companies year by year, while also expanding opportunities for related-party transactions, thereby increasing the scale and effectiveness of financing. As those companies at the bottom of the chain become increasingly distant from their parent companies, their debts cannot even be reflected in the parent company's financial statements [20].

In 2000, Enron established four "special purpose entities" to hedge the market risks of Enron's investments. To address SPE's capital problems, Enron in the first quarter of 2000 Degree SPE issued $172 million worth of common stock. Even without receiving payment of the recognized share capital from SPE, Enron recorded it as an increase in paid-in share capital and correspondingly increased notes receivable, thereby inflating assets and shareholders' equity by $172 million. In accordance with generally accepted accounting principles, this transaction is also considered as a reduction of the East Equity debt as a shareholder equity. In addition, in the first quarter of 2001, Enron signed several forward contracts with SPE, which required Enron to issue $828 million in common stock to SPE in exchange for notes payable issued by SPE. Enron recorded these forward contracts as increases in paid-in share capital and notes receivable in the manner described above, which in tum inflated assets and shareholders' equity by US$828 million. Together, the two items mentioned above inflated Enron's assets and shareholders' equity by a total of $1 billion. In the third quarter of 2001, Enron had to make a major accounting error and reduce $1.2 billion in assets and shareholder equity, of which $200 million was the difference between the fair value of the forward contracts that Enron was required to perform and the recorded notes receivable.

Table 5. Enron's inflated assets have shareholders' equity

Time	2000	2001
Inflated projects	Paid-in share capital and notes receivable	Paid-in share capital and notes receivable
Amount	$172 million	$828 million

Enron used its complex corporate organizational structure and "special purpose entities" and financial derivatives to make its accounting information disclosure untrue and incomplete. These actions, which were intended to hide corporate debt and reduce taxes, became the trigger for Enron's bankruptcy.

(4) Enron's Valuation Issues

Although GAAP has a set of general principles, fair value is equivalent to the amount of cash that a contract can exchange for a fully voluntary trading partner in a non-mandatory liquidation environment. However, this undoubtedly provides management with potential room for manipulation when assessing fair value. Of particular note is that Enron's derivative transactions were widely involved in the metal, paper, credit derivatives and commercial contracts sectors, with most transactions completed on online platforms, which allowed Enron to influence trading activities in these markets. Enron often sets its own prices in these markets to determine the fair value of transactions, Such transactions may be the only truly profitable part of all Enron's business.

In its financial disclosures, Enron stated that it uses market prices to measure the value of its energy trade agreements, based on optimal estimates that take into account various impacts, including the price of standardized contracts, quotes for non-public transactions, the value of time, and uncertainty regarding safeguard terms. However, when liquidity and rules are lacking in financial markets, calculating the fair value based solely on the reporting date can only reveal market prices that differ from the equilibrium value. Such results are unreliable and "unfair." Furthermore, determining whether an energy trade agreement is for commercial use and determining its fair value still requires subjective decisions from managers, making it difficult for shareholders to

accurately understand the company's true operating conditions from financial statements.

(5) Revelation

Fair value is a double-edged sword In order to follow the principle of public accounting, we cannot selectively use or discard. All those who use fair value accounting should exercise caution and thoroughly assess the risks that may lead to fluctuations in corporate earnings. Furthermore, fair value accounting is merely a method of measurement; excessive reliance on and misuse of it to support the development of financial derivatives is the crux of the problem. Although our country has only been adopting fair value accounting for a relatively short time, the case of Enron in the United States provides us with a warning. This is an important reference for our government agencies and regulatory authorities, helping to mitigate or eliminate the harm to the rights of small and medium-sized investors caused by the abuse of fair value accounting This ensures that fair value accounting can be more widely used in China.

5. Conclusion

This paper focuses on the accounting issues caused by the intertemporal trading characteristics of financial derivatives. Through bibliometric analysis, theoretical analysis and the case study of Enron, it finds that the intertemporal nature of derivatives leads to prominent problems in accounting recognition and measurement, fair value valuation, and information disclosure, which are mainly reflected in the strong subjectivity of accounting confirmation and measurement, the unstable selection of valuation models and parameters, and the inaccuracy and incompleteness of information disclosure. To solve these problems, enterprises should apply fair value measurement in a standardized manner, unify valuation models and parameter calibration, strengthen the validity and timeliness of information disclosure, and improve the transparency and authenticity of financial reports. The conclusions of this paper can provide references for the improvement of accounting standards for financial derivatives, the optimization of corporate accounting practices and the enhancement of financial supervision, and help promote the standardized development of financial derivatives markets.

References

[1] Shao Yan and Zhu Xiaoyang, International Financial Reporting Standard 19Fair value assessment under No. —Financial Instruments. China Asset Valuation, 2020(03): No65-69Page.

[2] Lin Jin, Corporate Accounting Standards No22Changes and impacts on financial assets in Financial Instruments Recognition and Measurement ——No. 1. Investment and Cooperation, 2022(02): No54-56Page.

[3] Shi Yuguang, Interpretation of Corporate Accounting Standards23No. ——Transfer of Financial Assets. Financial Accounting, 2007(03): No10-16Page.

[4] Ge Jiashu and Chen Jianshen, A brief discussion on financial instrument innovation and its impact on financial accounting. Accounting Research, 1995(08): No1-8Page.

[5] Liu Feng, Financial Innovation and the Reconstruction of Financial Accounting Theory. Contemporary Finance, 1996(02).

[6] Lu Demin, The development of financial derivatives and the accounting problems they bring. Accounting Research, 1996(07): No1-5Page.

[7] Wang Hua, Research on Accounting Management of Financial Derivatives, 2002, Wuhan University of Technology. No 58Page.

[8] Zhu Hailin, Accounting Theory of Financial Instruments. 2000, Beijing: China Financial and Economic Publishing House.

[9] Geng Jianxin and Xu Jingchang, New Theory of Accounting for Financial Derivatives. 2002, Beijing: Renmin University of China Press.

[10] Research Group of the Shanghai Headquarters of the People's Bank of China, Research on Accounting Treatment Issues Related to Derivative Instruments. Financial Accounting, 2023(03): No24-27Page.

[11] Shen Zhiqiang, Research on the Accounting Treatment of Financial Derivatives ——Analysis Based on the Framework of New Accounting Standards. Modern Business, 2019(23): No149-150Page.

[12] Sun Zhaodang, Analysis of Accounting Treatment Issues Related to Financial Derivatives. Business, 2015(18): No129-130Page.

[13] Kan Wenyuan, Research on Issues and Countermeasures of YD Company's Futures Trading Accounting Recognition and Information Disclosure, 2016, Tianjin University of Finance and Economics. No 43Page.

[14] Yang Ming, A Brief Analysis of my country's Measures to Improve Accounting Information Disclosure of Financial Derivatives. Economic Research Guide, 2016(08): No149-150Page.

[15] Lin Jin, Corporate Accounting Standards No22Changes and impacts on financial assets in Financial Instruments Recognition and Measurement ——No. 1. Investment and Cooperation, 2022(02): No54-56Page.

[16] Tang Jianzhi, Research on Accounting Information Disclosure of Financial Derivatives of Listed Banks, 2016, Xiangtan University. No 48Page.

[17] Wu Jing, Research on Accounting Information Disclosure of Financial Derivatives of Listed Banks, 2015, Harbin University of Commerce. No 60Page.

[18] Shi Huanhuan, Lu Zhi, and Zhang Wenxian, Accounting treatment of financial derivatives through the lens of the Enron bankruptcy case. Securities Market Herald, 2002(05): No54-58Page.

[19] Chopinwe, Accomplishments Even if you fail, you will still be counted——Analysis and inspiration of US accounting fraud cases. Guangxi Accounting, 2002(10): No2-3Page.

[20] Jiang Bin, The US Corporate Legal Risk Prevention System and Its Implications for my country, 2010, Ocean University of China. No 80Page.