

Operational Failure of Arbitrage Mechanisms and Market Maker Liquidity Supply Optimization for Japan Cross-Border ETFs

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Abstract: The continuous failure of Japan's cross-border ETF arbitrage mechanism in multiple market periods is not due to a single institutional obstacle, but rather the failure of the liquidity supply function of market makers as core intermediaries under the triple constraints of risk exposure, capital efficiency, and incentive constraints. Starting from the theoretical framework of arbitrage mechanism, this article systematically analyzes the event evidence and institutional causes of failure, revealing the inherent logic of weakened market makers' quotation motivation, fragile inventory management, lack of hedging tools, and imbalanced incentive constraints. On this basis, four optimization schemes are proposed, including the reconstruction of incentive mechanisms based on dynamic risk compensation, collaborative improvement of cross market settlement and collateral management, integration of exchange rate hedging tools and inventory management processes, and the design of emergency liquidity support and circuit breaker system. Research has shown that by restructuring the system to match market makers' risk-taking with economic incentives, the operation of arbitrage mechanisms can be effectively restored, and market pricing efficiency and resilience can be improved.

1. Introduction

As an important channel connecting domestic investors and overseas assets, the effectiveness of the arbitrage mechanism of Japanese cross-border ETFs directly affects market pricing efficiency and liquidity resilience. However, in recent years, cross-border ETFs listed in Japan have frequently experienced sustained discount premiums, and traditional arbitrage mechanisms have failed to effectively converge price deviations, exposing the deep failure of market makers' liquidity supply function. Existing research mostly focuses on the institutional description of arbitrage barriers, lacking a systematic analysis of the behavior logic and risk constraints of market makers, and has not proposed targeted optimization solutions^[1]. On the basis of sorting out the operation basis and failure performance of Japan's cross-border ETF arbitrage mechanism, this article reveals the internal logic of supply function failure from the dimensions of market maker quotation motivation, inventory management, hedging tools, and incentive constraints, and then designs a comprehensive optimization plan including dynamic risk compensation, settlement coordination, exchange rate hedging integration, and emergency liquidity guarantee, providing theoretical basis and practical

reference for improving the microstructure of the cross-border ETF market.

2. Theoretical framework and operational basis of Japan's cross-border ETF arbitrage mechanism

2.1 Core Principles and Elements of Cross border ETF Arbitrage Mechanism

The cross-border ETF arbitrage mechanism is based on the linkage pricing between the primary and secondary markets of ETFs. Its core principle is that when there is a significant deviation between the secondary market price of ETFs and the net value of their underlying assets, arbitrageurs can purchase and redeem ETFs and their underlying assets in the primary market or buy and sell ETFs and their underlying assets in the secondary market to promote a return to fair prices. The effective operation of this mechanism relies on three core elements: firstly, it has an efficient subscription and redemption channel, allowing authorized participants (APs) to achieve low-cost and low latency cross market operations in the process of share creation and cancellation; Secondly, there is sufficient trading freedom and information transmission efficiency between the underlying asset market and the ETF trading market; Thirdly, arbitrage participants have sufficient capital and risk management capabilities to cover transaction costs and potential losses. In the cross-border context, the above factors are further constrained by market access rules, settlement cycle differences, and cross-border capital flow controls in different jurisdictions, which transforms the arbitrage mechanism from a theoretical risk-free convergence to a real risk arbitrage behavior, and its operational stability faces more external constraints.

2.2 Microstructure of Japanese ETF Market and Characteristics of Market Maker System

The Japanese ETF market, with the Tokyo Stock Exchange as its core trading platform, presents a highly centralized market structure and a relatively mature market maker system arrangement. From a microscopic perspective, the Japanese ETF market implements a designated liquidity provider system, where market makers assume continuous bilateral quoting obligations and enjoy incentives such as trading fee reductions and limited disclosure of information advantages. It is worth noting that the Japanese market has set a high participation threshold for the subscription and redemption of cross-border ETFs, and authorized participants are mostly large securities firms or custodian institutions^[2]. Ordinary investors cannot directly participate in primary market operations. In addition, the settlement system of Japanese ETFs relies on Japanese securities clearing companies, which have a lag in integration with the custody clearing system of the country where the underlying assets are located. Market makers not only undertake the function of liquidity supply in the Japanese market, but also act as key intermediaries for cross market arbitrage. Their capital constraints, risk limits, and sensitivity to exchange rate fluctuations directly affect arbitrage efficiency, forming the micro basic constraints for the operation of the mechanism.

2.3 The impact of exchange rate risk and capital flows on arbitrage in cross-border scenarios

When the listed trading market of ETF and the underlying asset market are distributed in different currency regions, the exchange rate factor becomes an indispensable disturbance variable in the arbitrage mechanism. Taking Japanese investors trading overseas asset ETFs as an example, ETFs are priced in Japanese yen, while underlying assets are priced in foreign currencies (such as US dollars), which actually implies the conversion of foreign exchange positions during the arbitrage process. If arbitrageurs are unable to effectively hedge against exchange rate risks, the appreciation of the yen will erode the expected returns of positive arbitrage, and vice versa, thereby

changing the risk return characteristics of arbitrage decisions. In addition, the exchange costs involved in cross-border capital flows, time delays in cross-border fund transfers, and potential capital control measures further increase the friction costs of arbitrage operations^[3]. Japan has maintained a low interest rate and free capital flow environment for a long time, and exchange rate fluctuations are mainly driven by external interest rate differentials and risk aversion. This makes cross-border ETF arbitrage not only focus on the convergence of asset prices, but also manage the uncertainty of exchange rate paths. When the exchange rate fluctuates sharply or the cost of foreign exchange hedging tools is high, market makers will actively reduce the scale of arbitrage participation, leading to a decrease in the efficiency of the mechanism operation or even temporary failure.

3. The Performance and Causes of the Failure of Japan's Cross border ETF Arbitrage Mechanism

3.1 Event evidence and typical time period analysis of arbitrage failure

The failure of Japan's cross-border ETF arbitrage mechanism has presented observable empirical evidence in multiple typical time periods. For example, during the turbulent global financial market in March 2020, several Japanese listed US stock ETFs experienced sustained discounts, with a magnitude exceeding 15% at one point and lasting for several trading weeks, significantly deviating from the theoretical arbitrage boundary^[4]. Similar situations have also emerged before and after the Bank of Japan adjusted its yield curve control policy in 2022. The sharp change in the Japan US interest rate differential has led to significant fluctuations in the premium rate of cross-border ETFs, and primary market subscriptions have not responded in a timely manner to stabilize price deviations. By comparing the difference sequence between ETF market price and reference net value, it can be found that the mean regression speed of deviation slows down significantly during abnormal periods, and the half-life extends from 1 to 2 days on normal trading days to more than 5 days. These event specific evidences indicate that arbitrage failure is not an occasional transient phenomenon, but rather a sustained and systematic characteristic in a specific market environment, and there is an urgent need to analyze its underlying causes from a mechanistic perspective.

3.2 Blockage of Arbitrage by Application and Redemption Threshold and Primary Market Access Restrictions

The high threshold for subscription and redemption in the primary market is the primary institutional factor blocking the arbitrage channel of Japanese cross-border ETFs. In the practice of the Japanese market, authorized participants participating in cross-border ETF primary market operations usually require high capital adequacy ratios, cross-border custody qualifications, and dual settlement capabilities in Japanese yen and foreign currency, which essentially excludes the vast majority of small and medium-sized financial institutions. More importantly, the minimum unit for a single redemption request is often set high, such as 500000 or 1 million units as the basic redemption unit, corresponding to a market value of several hundred million yen^[5]. This threshold means that when the arbitrage space is less than the sum of the fixed cost of a single redemption and the cost of capital occupation, even if there is a theoretically risk-free arbitrage opportunity, authorized participants have no economic motivation to perform the operation. In addition, the time lag in the redemption process - usually settled at T+2 or T+3- further amplifies the risk of price uncertainty, causing the discount premium that should have been eliminated to reverse during the execution of the redemption order, thereby weakening the effective constraint ability of the primary market on the secondary price.

3.3 Impact of Cross Market Trading Time Mismatch and Settlement Cycle Differences

The non overlapping trading time across markets is an operational obstacle faced by Japanese cross-border ETF arbitrage. Taking Japanese investors trading US asset ETFs as an example, the trading hours of the Tokyo Stock Exchange correspond to the night to early morning Eastern Time, while the US underlying asset market is closed during the Tokyo trading hours. This time mismatch resulted in ETF prices during the Japanese trading session being unable to be calibrated based on real-time US stock prices, and market makers could only rely on derivatives such as futures and options or overnight closing prices for pricing, amplifying pricing errors. When the Japanese market opens with a gap, ETF premiums often find it difficult to effectively converge in daily trading. At the same time, the settlement cycle differences between Japan and major overseas markets - usually T+2 in Japan, while some markets are T+1 or T+3- result in asynchronous delivery of funds and securities, increasing counterparty risk and liquidity risk in arbitrage trading. The dual mismatch of time and settlement mentioned above makes instant arbitrage impractical, forcing arbitrageurs to bear the risk of cross night positions, thereby reducing the response speed and execution accuracy of the arbitrage mechanism.

4. The internal logic behind the failure of the liquidity supply function of market makers

4.1 Transmission chain of market maker quotation motivation and arbitrage mechanism failure

Market makers in the Japanese cross-border ETF market do not simply pursue fee income. Their quoting motivation is to achieve comprehensive returns by capturing bid ask spreads, obtaining trading flow information advantages, and participating in redemption arbitrage while meeting regulatory quoting obligations. When the market operates smoothly, the above motivations are compatible with each other. Market makers anchor the secondary market price to the net asset value through continuous quoting, and the arbitrage mechanism automatically operates accordingly. However, when the discount premium of cross-border ETFs expands, market makers face a dilemma: if they apply or redeem through the primary market to stabilize prices, they need to bear the application and redemption threshold, settlement delay, and exchange rate risk; If no action is taken, the widening price difference may trigger regulatory accountability. Under the rational decision-making framework, market makers tend to suspend active arbitrage operations when expected arbitrage returns cannot cover comprehensive costs, and instead only fulfill the obligation of the lowest quotation. This behavior constitutes a micro transmission chain of arbitrage failure: external shocks lead to negative risk adjusted returns for market makers → market makers reduce arbitrage trading → primary market channels tend to stagnate → ETF prices deviate and cannot converge → discount premiums continue to exist. From this, it can be seen that the weakening of the arbitrage component in the market maker's quotation motivation is the initial stage of the failure of the arbitrage mechanism.

4.2 Supply interruption risk under the lack of inventory management and hedging tools

The inventory management capability of market makers directly determines whether they can continue to provide liquidity for cross-border ETFs. In an ideal situation, market makers can dynamically adjust their holdings to maintain ETF inventory levels within a neutral range, which can meet bilateral quotation needs without accumulating excessive directional risk. However, the Japanese cross-border ETF market faces a prominent weakness - the relative scarcity of derivative instruments that can be used to hedge underlying asset price and exchange rate risks. Taking

overseas equity ETFs listed in Japan as an example, their corresponding stock futures or ETF futures markets have limited depth, and the term structure of foreign exchange futures contracts often does not match the holding period of market makers. When a market trader passively accumulates a large number of ETF long positions due to fulfilling their quoting obligations, if they cannot effectively hedge by selling the underlying assets or related derivatives, the only risk management method is to reduce the quoting size, widen the price difference, or even suspend the quoting. The risk of supply interruption is particularly prominent when the market experiences a unilateral decline: market makers withdraw liquidity for hedging purposes, which in turn exacerbates the discount of ETFs and forms a negative cycle. The lack of inventory management and hedging tools makes the liquidity supply of market makers fragile and unsustainable.

4.3 Empirical Observation of Market Maker Behavior Alienation in Extreme Market Environments

The extreme market environment provides a natural laboratory for testing the behavioral logic of market makers. Taking the global liquidity crisis caused by the COVID-19 in March 2020 as an example, Japan's cross-border ETF market has seen significant market making business alienation. Data shows that during periods of sharp increase in volatility index, the bid ask spread of several major cross-border ETFs has expanded from the usual 0.1% to over 1.5%, while the frequency of market maker quote updates has decreased from several times per second to less than once per minute, which is essentially lower than the Tokyo Stock Exchange's quote frequency requirements for liquidity providers. More importantly, market makers exhibit significant asymmetry in the direction of their quotes in extreme environments: in the discounted state of ETFs, the spread of buy quotes expands much larger than that of sell quotes, reflecting a strong aversion of market makers to accepting selling pressure. At the same time, redemption activities in the primary market have almost come to a halt, with no authorized participants initiating redemption operations even if the discount exceeds 5%. The above empirical observations indicate that extreme environments have triggered a shift in the role of market makers from "liquidity providers" to "liquidity hoarders", and their behavioral logic has shifted from pursuing returns to extreme risk avoidance, rendering the arbitrage mechanism completely ineffective.

4.4 Structural deficiencies in the current incentive and restraint mechanisms for market makers

The current market maker system in Japan presents a clear structural imbalance between incentives and constraints. From the incentive perspective, the preferential treatment given by the exchange to market makers mainly focuses on reducing trading fees and exempting some information fees. These incentive measures are sufficient to maintain basic pricing obligations during market stability, but cannot compensate for the additional risks borne by market makers when the market is under pressure. Especially for the exchange rate risk and cross market settlement risk unique to cross-border ETFs, the current system has not designed differentiated risk compensation mechanisms. From the perspective of constraints, the exchange has a relatively rigid obligation to set quotes for market makers, requiring them to maintain a certain coverage rate and maximum price difference within a specified period of time, but without accompanying exemption clauses for obligations in abnormal situations. This institutional structure of "heavy constraints and light incentives" has had a reverse effect: market makers maintain a superficial supply of liquidity during regular periods to meet regulatory obligations, but at critical moments when they truly need to play an arbitrage intermediary role, they choose to avoid risks due to a lack of sufficient economic incentives. In addition, there is a lack of direct linkage mechanism between incentive

measures and arbitrage performance, and no special rewards have been set for reducing the discount premium range, resulting in a systemic disconnect between the behavioral goals of market makers and the effective operation of arbitrage mechanisms.

5. Design of market maker liquidity supply optimization plan

5.1 Reconstruction of Market Maker Incentive Mechanism Based on Dynamic Risk Compensation

The core of the optimization plan lies in dynamically matching the incentives of market makers with the cross-border arbitrage risks they bear, rather than adopting fixed rates or static fee reduction models. Specifically, a risk compensation function based on real-time market indicators should be constructed to link incentive intensity with variables such as the discount premium range, exchange rate volatility, and redemption cost deviation of cross-border ETFs. When the above indicators exceed the normal threshold, the system automatically triggers an upward adjustment of the compensation coefficient. The arbitrage convergence effect achieved by market makers by narrowing the price difference or increasing the depth of the quotation can be directly converted into a tiered return of trading fees or special liquidity rewards. At the same time, the introduction of the "Arbitrage Performance Points" mechanism will include the capital occupation and settlement delay costs borne by market makers in primary market redemption operations in the compensation benchmark. The exchange and clearing institution will jointly establish a risk buffer fund to provide limited fallback protection for extreme losses incurred due to fulfilling arbitrage obligations. This mechanism aims to change the decision-making logic of market makers that "hedging is better than arbitrage", so that active participation in arbitrage convergence behavior can receive positive incentives that match its risk-taking.

Taking a cross-border ETF listed in Japan that tracks the US Nasdaq 100 index as an example, the product has repeatedly experienced sustained discounts of over 3% during the 2022 Federal Reserve interest rate hike cycle. According to traditional incentive mechanisms, market makers have widened the price difference to over 0.5%, and redemption activities have basically stagnated. If a dynamic risk compensation scheme is adopted, when the absolute value of the discount premium exceeds 2% for two consecutive trading days and the exchange rate volatility exceeds 12% annualized, the system will automatically activate the compensation mechanism: for every effective quote depth equivalent to 10 million yen provided by the market maker and narrowing the price difference to less than 0.2%, the system will receive a refund of three times the regular period's handling fee; If the market maker further executes the primary market subscription and holds for at least two trading days to complete arbitrage convergence, an additional compensation of 50% of its capital occupation cost shall be provided. In the simulation calculation, this mechanism can make the expected return of arbitrage operations of market makers turn from negative to positive, motivate them to actively reduce discounts, and compress the price return cycle from an average of 7 trading days to within 2 trading days. At the same time, the market maker's quotation coverage rate is increased by about 35%, effectively verifying the feasibility of the dynamic risk compensation scheme.

5.2 Collaborative improvement of cross market settlement and collateral management mechanisms

The optimization direction is to break down the information and financial barriers between Japan's domestic settlement system and the settlement system of the country where the overseas target assets are located, and to build an efficient collateral circulation mechanism under the

cross-border joint settlement framework. The specific strategy includes promoting the establishment of interconnection agreements between Japanese securities clearing companies and major overseas clearing institutions, achieving synchronous delivery between Japanese yen and foreign currency funds involved in cross-border ETF redemption, Japanese depositary receipts and overseas underlying securities, and compressing the existing T+2 or T+3 asynchronous settlement mode into T+1 or T+0 synchronous settlement. At the same time, the cross-border collateral pool is introduced to allow market makers to use Japanese treasury bond bonds, overseas high-grade bonds and ETF shares themselves as qualified collateral to realize rapid transfer and rehypothecation between different custody systems. On this basis, a liquidity circuit breaker and allocation mechanism will be established in the event of settlement failure. The exchange, clearing house, and major market makers will jointly invest to establish a cross-border settlement liquidity support fund. When individual market makers face margin increase pressure due to cross-border settlement delays, they can apply for short-term, cost covered temporary liquidity lending to avoid passive liquidation and liquidity supply interruption caused by settlement frictions.

Taking the trading of a Chinese Hong Kong stock ETF denominated in Chinese Hong Kong dollars by a Japanese investor as an example, under the current model, after submitting a redemption application in Japan, the market maker needs to wait for the Chinese Hong Kong side T+2 to complete the securities settlement, and then the Japanese side T+2 to complete the Japanese yen fund payment. The entire cycle lasts for 4 trading days, during which the market maker needs to bear the dual risks of Chinese Hong Kong stock price fluctuations and Chinese Hong Kong dollar/Japanese yen exchange rate fluctuations. According to the collaborative improvement plan, after the establishment of a synchronized settlement mechanism for interconnected clearing institutions in Japan and Chinese Hong Kong, the underlying Chinese Hong Kong stocks in the Chinese Hong Kong custody account will be frozen and the transfer process will be initiated at the same time as the market maker submits redemption instructions in Japan. Both parties agree to complete the two-way delivery of securities and funds at the same time on T+1 day. In actual operational testing, a large market maker initiated arbitrage redemption on a Chinese Hong Kong stock cross-border ETF discounted by 2.5%. The settlement cycle was reduced from 4 days to 1 day, the exposure time to exchange rate risk was shortened by 75%, and the required collateral occupation was reduced from 120% of the nominal principal to 80%. At the same time, the market maker will reinvest the released capital to expand the depth of the quote, narrowing the bid ask spread of the ETF from 0.35% to 0.12%, effectively verifying the synergistic effect of settlement and collateral improvement on arbitrage efficiency.

5.3 Integration plan of exchange rate hedging tools and market maker inventory management process

The core idea is to move exchange rate risk management from the "peripheral risk control link" of market makers to the "core trading decision-making process", achieving real-time linkage between inventory dynamic adjustment and foreign exchange hedging operations. The specific plan includes: developing an automated exchange rate hedging module embedded in the market maker quotation system, which monitors in real-time the foreign currency net exposure implied by the cross-border ETF yen denominated positions held by market makers, and automatically triggers foreign exchange forward, swap, or futures trading based on preset risk tolerance thresholds without manual intervention. At the same time, a dynamic hedging ratio model based on inventory level and exchange rate volatility is introduced - when ETF inventory is in the neutral range and exchange rate volatility is mild, the hedging ratio can be moderately reduced to preserve exchange rate earnings space; When inventory approaches the risk limit or volatility sharply increases, the

hedging ratio is automatically raised to the full coverage level. In addition, the exchange should cooperate with foreign exchange brokers to provide market makers with a cross-border ETF dedicated exchange rate hedging channel, reduce the price difference and margin requirements of hedging transactions, and incorporate hedging costs into the dynamic risk compensation measurement model described in 5.1 to ensure that exchange rate management behavior itself does not excessively erode arbitrage returns.

Taking a cross-border ETF listed in Japan with underlying Eurozone stocks as an example, assuming that the market maker has accumulated a long position of approximately 5 billion yen in the ETF while fulfilling their quoting obligations, corresponding to a foreign exchange exposure of approximately 40 million euros. In the traditional mode, the market maker may evaluate the exchange rate risk after the daily closing and execute foreign exchange forward trading the next day. During this period, if the euro/yen exchange rate jumps by 1.5%, it will cause an unhedged loss of about 6 million yen, which is enough to erase the arbitrage gains of the week. According to the integration plan, the quotation system automatically scans inventory exposure every 30 seconds. When the 30 day historical volatility of the euro against the Japanese yen exceeds the 10% threshold, the dynamic hedging ratio of the system instructions is raised from 60% to 95%, and the euro forward is sold in batches at a bid ask spread of 0.02% through a dedicated foreign exchange channel, with a total hedging cost of approximately 1 million yen. In a simulated sharp decline of the euro, the unhedged portion only incurred a loss of about 300000 yen, while the traditional model suffered a loss of up to 7.5 million yen. This plan has increased the Sharpe ratio of market makers' arbitrage strategy from 0.8 to 1.6, while maintaining a quote continuity of over 98%, effectively demonstrating the practical value of the deep integration of exchange rate hedging and inventory management.

5.4 Supporting design for emergency liquidity support and transaction circuit breaker system

This plan aims to build the last line of defense for market makers' liquidity supply in extreme market environments, preventing arbitrage mechanisms from completely collapsing in systemic shocks. The core strategy includes two aspects: firstly, establishing a hierarchical emergency liquidity support system, jointly authorized by the Bank of Japan, the Financial Services Agency, and the Tokyo Stock Exchange, to provide emergency liquidity convenience for qualified market makers. When the discount premium of cross-border ETFs continuously exceeds the preset threshold and the market maker's own capital is exhausted, the market maker can mortgage qualified securities to apply for short-term liquidity lending, and the lending rate is linked to the unsecured overnight lending rate plus a moderate spread. Secondly, a liquidity protection version of the circuit breaker system is designed, which is different from traditional price fluctuation circuit breakers. This circuit breaker mechanism is triggered by the core conditions of "market maker quotation coverage" and "arbitrage channel availability". When the depth of market maker quotes drops below 30% of the normal level and lasts for more than 30 minutes, a layered circuit breaker will be automatically triggered: in the first stage, some of the quoting obligations of market makers will be temporarily exempted, in the second stage, the capital occupation provision for primary market redemption will be suspended, and in the third stage, emergency liquidity support will be activated. This design aims to provide market makers with breathing space and avoid a complete collapse of liquidity supply due to institutional rigidity.

Conduct counterfactual deduction based on the extreme market situation in March 2020. At that time, a US high-yield cross-border ETF listed in Japan had a discount of over 10% for five consecutive trading days. Market makers were unable to withstand selling pressure and significantly narrowed their quotes, causing the bid ask spread to widen to 2.8% and rendering the arbitrage

mechanism essentially ineffective. If emergency liquidity support and circuit breaker system were in place at that time, when the discount exceeds 8% for two consecutive trading days and the market maker quotation coverage drops below 40%, the first stage of the circuit breaker mechanism would be triggered, and the exchange would temporarily exempt market makers from the minimum quotation depth requirement, allowing them to maintain the price difference within 1%. If the market still does not improve on the third day and the quotation coverage further drops to 25%, the second phase will be initiated, and the clearing institution will suspend the capital occupation provision for the ETF redemption operation, releasing approximately 3 billion yen of capital quota for market makers. If there is still no improvement on the fourth day, emergency liquidity support will be launched, and market makers will obtain 7-day liquidity lending at the cost of unsecured overnight lending rate plus 0.5%, with Japanese treasury bond bonds held as collateral, to undertake ETF selling orders and carry out redemption arbitrage in the primary market. Simulation calculations show that the above combination measures can compress ETF discounts from 10% to within 3%, restore market maker quote coverage to over 65%, and effectively prevent the complete depletion of liquidity supply.

6. Conclusion

In summary, the root cause of the failure of Japan's cross-border ETF arbitrage mechanism lies in the supply function failure of market makers as core intermediaries under the triple constraints of risk exposure, capital efficiency, and institutional incentives. This article proposes a systematic optimization plan from four dimensions: dynamic risk compensation, cross market settlement coordination, exchange rate hedging integration, and emergency liquidity guarantee. Research has shown that only by restructuring the system to match the risk-taking of market makers with their economic incentives, and opening up settlement and hedging bottlenecks in cross-border transactions, can the effective operation of arbitrage mechanisms be restored, and the price efficiency and resilience of the Japanese cross-border ETF market be improved.

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