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Theoretical Framework and Empirical Analysis of Modern Household Asset Allocation

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Abstract:
Based on modern portfolio theory, this paper constructs an asset allocation analysis framework applicable to the Chinese market. Using quantitative analysis methods, it compares the risk-return characteristics of different asset classes and introduces the Sharpe ratio for risk-adjusted performance evaluation. The research results indicate that in the current market environment, a diversified investment portfolio can effectively balance risk and return, providing investors with superior risk-adjusted returns. This study offers a systematic asset allocation decision-making method for individual investors.

Keywords: Asset Allocation; Portfolio Theory; Risk-Adjusted Return; Sharpe Ratio; Diversified Investment

1. Introduction

In the current complex economic environment, investors face unprecedented challenges in asset allocation. Factors such as slowing global economic growth, heightened geopolitical uncertainties, and shifts in monetary policy have collectively created a highly challenging investment landscape. The traditionally widely recognized real estate investment model has experienced significantly increased return uncertainty, severely testing the previous investment logic that relied on property appreciation for stable returns. Meanwhile, although the stock market presents structural investment opportunities, its volatility characteristics have become increasingly pronounced, with market sentiment prone to sharp fluctuations due to multiple influencing factors. Against this backdrop, the persistence of a low-interest-rate environment has made it difficult for traditional savings methods to achieve real returns that outpace inflation, creating growing pressure for capital preservation and appreciation (Choey and Weigend, 1997; Davies et al., 2023).

These challenges make constructing a scientific asset allocation plan an urgent priority. Asset allocation not only relates to investors' wealth preservation and appreciation but also impacts the achievement of long-term financial goals. In the current market environment, single asset classes or traditional investment strategies can no longer adequately meet investors' diversified needs. Therefore, there is a pressing need to establish more systematic and scientific asset allocation frameworks to address the increasingly complex market conditions. Solving this problem holds not only theoretical significance but also important practical guidance value (Fu et al., 2018).

Modern Portfolio Theory provides crucial theoretical support for addressing these challenges. This theory emphasizes optimizing the risk-return profile of investment portfolios through diversified asset alloca-

tion. The mean-variance model proposed by Markowitz (1952) laid a solid theoretical foundation for asset allocation, rigorously demonstrating through mathematical derivation that combining imperfectly correlated assets can effectively reduce overall investment risk. This groundbreaking research marked the transition of asset allocation from empirical approaches to a new stage of scientific quantitative analysis (Pai, 2008; Pruzzo et al., 2003; Russell, 2009).

Building upon this theoretical framework and giving full consideration to the unique characteristics and development stage of the Chinese market, this study is committed to exploring asset allocation strategies suitable for the current market environment. As a representative emerging market, China's financial market follows unique development trajectories and operational characteristics, requiring us to adapt classical theories to local market realities. Guided by Modern Portfolio Theory, this paper will construct asset allocation models applicable to the Chinese market through quantitative analysis and empirical research, providing investors with actionable investment recommendations and decision-making references (Sendi et al., 2004).

2. Theoretical Basis and Analytical Framework

2.1 Risk-Return Trade-off

The fundamental principle of risk-return trade-off constitutes the cornerstone of modern financial theory. Empirical evidence consistently demonstrates a positive correlation between risk and expected return across various asset classes. Rational investors, being risk-averse by nature, require commensurately higher expected returns as compensation for undertaking additional risk exposure. This fundamental relationship finds its quantitative expression through the Capital Asset Pricing Model (CAPM), which establishes that an asset's expected return is determined by its sensitivity to systematic risk, measured by the beta coefficient. The model further distinguishes between systematic risk, which cannot be eliminated through diversification, and unsystematic risk, which is asset-specific and can be mitigated through proper portfolio construction. Understanding this distinction is crucial for developing effective investment strategies that optimize returns within acceptable risk parameters.

2.2 Time Value of Money

The time value of money principle represents another fundamental concept in financial decision-making, asserting that a unit of currency available today is worth more than the same unit receivable in the future. This temporal difference in value arises from three primary factors: the opportunity cost of capital, the inherent uncertainty of future payments, and the erosive effect of inflation on purchasing power. In contemporary investment environments characterized by persistent inflationary pressures, the nominal return on investments often presents a misleading picture of actual wealth accumulation. Consequently, sophisticated investment analysis must focus on real rates of return, calculated by adjusting nominal returns for inflation effects. Furthermore, the mathematical phenomenon of compound interest significantly enhances the wealth accumulation potential of long-term investments, where reinvested earnings generate their own subsequent returns, creating an exponential growth pattern that underscores the advantage of early and consistent investing.

2.3 Portfolio Diversification

Modern portfolio theory establishes diversification as an essential mechanism for optimizing investment outcomes. The theoretical foundation, primarily derived from Markowitz's pioneering work, demonstrates that by combining assets with less-than-perfect positive correlations, investors can achieve substantial reduction in portfolio volatility without necessarily sacrificing expected returns. The efficacy of diversification depends critically on the covariance structure among portfolio constituents - the lower the correlation coefficients between assets, the greater the potential risk reduction benefits. Contemporary research further reveals that while systematic risk factors affect all market participants and remain undiversifiable, unsystematic risks specific to individual securities or sectors can be effectively mitigated through proper portfolio construction. This theoretical insight justifies the implementation of multi-asset investment strategies that span various geographical regions, economic sectors, and security types to maximize diversification benefits and enhance risk-adjusted returns over complete market cycles.

3. Empirical Analysis

3.1 Data and Methods

This study employs a comprehensive quantitative framework to analyze three distinct asset classes that represent varying positions along the risk-return spectrum. The selected assets include: (1) Asset A - a diversified portfolio of established large-cap equities, representing moderate risk exposure with growth orientation; (2) Asset B - a collection of high-quality fixed-income securities, embodying conservative investment characteristics with capital preservation focus; and (3) Asset C - a specialized portfolio of emerging market growth stocks, exemplifying aggressive investment strategy with higher volatility potential.

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The analysis utilizes five years of historical performance data from 2018 to 2023, capturing complete market cycles that include both expansionary and contractionary economic phases. All return calculations account for dividend reinvestment in equity positions and coupon reinvestment in fixed-income holdings, ensuring accurate total return representation. Risk measurement employs standard deviation as the primary volatility metric, calculated using the complete dataset to reflect true investment experience.

For evaluating risk-adjusted performance, the study applies the widely recognized Sharpe ratio methodology, which measures excess return per unit of risk. The calculation compares each asset's average return against a standardized risk-free benchmark of 2.0 percent annually, consistent with prevailing government bond yields. Additional analytical rigor is ensured through robustness checks using alternative return calculation methodologies and correlation analysis between asset classes to assess diversification benefits. Statistical significance of performance differences is verified through standard hypothesis testing procedures.

3.2 Comparison of Risk-Return Characteristics

The risk-return characteristics of the three asset classes are shown in Table 1:

Table 1 Comparison of Asset Risk-Return Characteristics

Asset Class	Average Return	Standard Deviation	Sharpe Ratio
Asset A	6.00%	7.62%	0.525
Asset B	4.75%	1.26%	2.183
Asset C	8.00%	13.64%	0.440

3.3 Asset Allocation Recommendations

Based on the above analysis, the following allocation plan is proposed:

· 50% allocation to Asset B: Serves as a portfolio stabilizer, providing stable returns.

· 30% allocation to Asset A: Balances risk and return, enhancing portfolio returns.

· 20% allocation to Asset C: Utilizes its high growth potential to increase the portfolio's return ceiling.

This allocation plan fully embodies the principle of diversified investment, pursuing reasonable returns while controlling overall risk.

4. Discussion and Implications

4.1 Practical Significance of Financial Literacy

The profound practical significance of financial literacy extends far beyond basic investment comprehension, serving as a fundamental pillar for sound financial decision-making in an increasingly complex economic landscape. Mastery of core financial concepts - including the risk-return tradeoff, time value of money, and diversification principles - equips investors with the analytical framework necessary to navigate volatile markets and avoid common investment pitfalls. More sophisticated understanding encompasses recognizing how these principles interact in different market conditions and across various asset classes. Enhanced financial literacy empowers investors to decipher market information critically, distinguish between noise and meaningful trends, and maintain discipline during periods of market euphoria or panic. This educational foundation enables the development of robust, long-term investment strategies that align with specific financial goals and risk tolerance levels, while resisting the temptation of short-term, emotionally-driven decisions that often undermine investment performance (Xu et al., 2024).

4.2 Dynamic Adjustment Mechanism

Contemporary portfolio management recognizes asset allocation as an inherently dynamic process that requires systematic review and adjustment in response to evolving market conditions and personal circumstances. Effective dynamic adjustment mechanisms incorporate both periodic rebalancing and tactical asset allocation shifts based on predetermined criteria and forward-looking market analysis. Regular assessment should encompass not only the risk-return characteristics of individual asset classes but also their correlation patterns, liquidity considerations, and sensitivity to changing macroeconomic factors such as interest rate cycles, inflation expectations, and geopolitical developments. A disciplined rebalancing strategy serves to maintain target risk exposures and capitalize on the natural volatility of financial markets through contrarian positioning. However, this process must be carefully calibrated to balance the benefits of strategic adjustments against potential transaction costs and tax implications, ensuring that portfolio evolution remains consistent with long-term objectives while responsive to meaningful changes in the investment landscape (Yang et al., 2025).

4.3 Behavioral Finance Considerations

The emerging field of behavioral finance provides cru-

cial insights into the psychological underpinnings of investment decision-making, revealing how systematic cognitive biases frequently lead to suboptimal financial outcomes. Investors must maintain vigilance against pervasive behavioral patterns such as overconfidence bias, which causes underestimation of risks and overestimation of predictive abilities; herd mentality, which drives imitation of popular investment behaviors regardless of fundamental justification; and loss aversion, which produces asymmetric risk attitudes that can paralyze decision-making during market declines. These psychological factors often interact to create self-reinforcing cycles of irrational exuberance or undue pessimism in financial markets. Establishing a systematic investment framework with clearly defined rules for entry, exit, and position sizing represents the most effective defense against these behavioral pitfalls. Such frameworks should incorporate mechanisms for external accountability, structured decision-making processes, and predetermined checkpoints that trigger dispassionate portfolio reviews, thereby mitigating the influence of emotional responses on investment outcomes.

5. Conclusion

Through theoretical analysis and empirical testing, this study draws the following conclusions: First, scientific asset allocation should be based on a deep understanding of the risk-return characteristics of various asset classes. Although Asset B does not have the highest return rate, its excellent Sharpe ratio indicates it provides the best risk-adjusted return. Second, diversification is an effective way to optimize an investment portfolio. By reasonably allocating assets with different risk characteristics, satisfactory returns can be achieved while controlling overall risk. Finally, the dissemination of financial knowledge is of great significance for improving the quality of investment decisions. Investors should establish a long-term investment philosophy and avoid being influenced by short-term market fluctuations. Future research can further explore asset allocation strategies under different economic cycles and the role of emerging asset classes (such as digital currencies) in investment portfolios.

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