

Characteristics of Hedge Fund Performance - Sources of Risk-Return Properties -

Tomohiro Miura, Yoshinori Tetsuda, and Tokiko Shimizu

March 2006

With the lowering volatilities in the foreign exchange and stock markets in recent years and historically low interest rates, investments in hedge funds and investment trusts (Japanese mutual funds)¹ by Japanese investors have been increasing. For both hedge funds and investment trusts, investors subcontract asset management to investment managers by paying a management fee. It is pointed out that hedge funds, compared to publicly offered investment trusts, generally have less information disclosure and may have risk characteristics which are difficult to comprehend. On the other hand, investors can, by investing in hedge funds, seek returns that are not subject to fluctuations in market benchmarks. Such characteristics of hedge fund investments are realized through a highly free environment for investment managers. But from the perspective that investors bear risks, not embedded in investment trusts, such as liquidity constraints, liquidation risks, etc., there is a trade-off between risk and return. The reasons behind hedge funds securing positive returns since year 2000 regardless of fluctuations in benchmarks may have been derived from an investment policy aiming for “absolute returns” and less investment constraints.

Introduction

With the lowering volatilities in the foreign exchange and stock markets in recent years and historically low interest rates, Japanese investors have been increasing investments via the investment vehicle “funds”. Especially among the funds, asset flows into “hedge funds” and “investment trusts” have been increasing. Regarding hedge funds, amid an expansion of the volume in markets (details described below), financial authorities including central banks have made efforts to comprehend the realities of hedge fund activities because their impacts on financial markets and market participants have become more significant.² It is indispensable for central banks to keep up with the progress in investment methods and the target markets of their investments in a timely manner, in order to monitor trends in global financial markets. The purpose of this *Review* is to clarify characteristics of hedge funds by comparing them with investment trusts, which have already been under the regulatory frameworks. In this *Review*, we will focus especially on the differences in characteristics of risks and returns between hedge funds and investment trusts.³ There exist privately placed investment trusts, and some investment trusts manage their assets in a way similar to hedge funds. Therefore, it has become difficult to distinguish both of them clearly. In this *Review*, we analyze them based on major indexes for convenience. In addition, regarding investment trusts, we focus on publicly offered investment trusts unless otherwise noted.

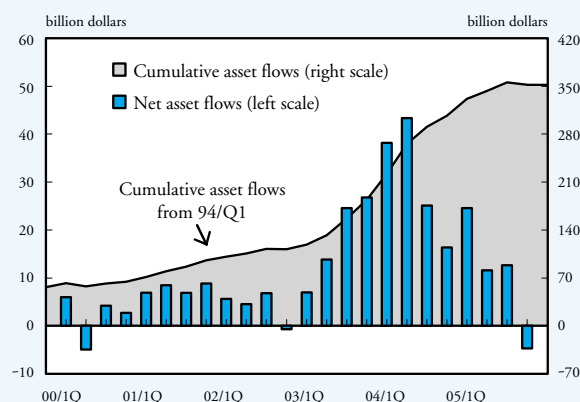
Expansion in markets for hedge funds and investment trusts

Hedge fund industry is expanding rapidly (Chart 1). Hedge funds, unlike investment trusts, are not strictly defined and it is extremely difficult to study their activities statistically. Given such a difficulty, concerns over impacts of hedge fund activities on markets grew globally during the periods of major shocks such as the Exchange Rate Mechanism (ERM) crisis [1992], the Asian currency crisis [1997], and the Long-Term Capital Management (LTCM) shock [1998]. However, according to the data (Tremont Capital Management), there

have been only a few cases that significant asset outflows from the hedge fund industries have been observed since 1994. Hence, hedge fund industries have expanded continuously regardless of some shocks in the markets. Particularly from year 2000, amid a global stock market slump, there were asset inflows, not only from high net worth individuals investing in hedge funds long before but also from institutional investors, into hedge funds that achieved stable returns. Japanese investors have also increased investments in hedge funds.

There have been asset inflows into investment trusts in Japan continuously in recent years. According to Chart 2,⁴ the amount of net assets of publicly offered and privately placed investment trusts (contractual type) temporarily increased from the latter half of 2000 through the beginning of 2002, as a result of lower interest rates and changes in the distribution methods for publicly offered bond investment trusts. Thereafter, until the beginning of 2003, the net assets of the money management funds (MMFs) and the bond investment trusts declined, because of continued redemptions as the value

Chart 1: Net asset flows and cumulative asset flows into hedge fund industry



Notes 1: Based on hedge funds registered in Lipper TASS Database.

2: The latest figures are as of 05/4Q.

Source: Tremont Capital Management

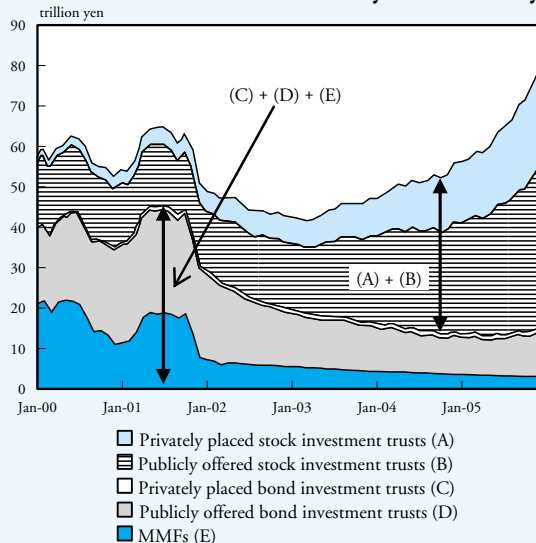
of MMFs fell below par due mainly to accounting scandals in the US, and the lower interest rates impaired the value of bond investment trusts. Since the beginning of 2003, net assets, especially those of foreign bond investment trusts⁵ with frequent distribution payouts, have increased. Because an investor base has been wider given that banks have become a sales channel for investment trusts, and the demands of retail investors to invest in risky assets have been higher. Since 2005, due to a rapid increase in asset inflows and good performance in stock markets, the net assets of publicly offered and privately placed investment trusts (contractual type) reached a historical peak of 81 trillion yen at the end of December 2005. During this period, net assets of investment trusts investing in overseas assets such as foreign bond investment trusts and stock investment trusts focusing on emerging markets have increased drastically, and products have become more diversified. The commencement of distribution of investment trusts by the Japan Post, from October 2005, may contribute to widening the range of investor base in the future.

Comparison of performance between hedge funds and investment trusts - α or β -

Hedge funds and investment trusts are both the investment vehicles for joint investments, which are formed by paying fees and subcontracting the management of assets. We compare risks and returns of hedge funds and investment trusts by using major indexes as follows. It is important to note that hedge fund indexes generally suffer from various biases including survivorship bias⁶ and self-selection bias.⁷ Therefore, it is necessary to take those points into consideration when interpreting the results of analyses (for details, please refer to "Recent Developments in Hedge Funds" [2005], Bank of Japan Research Papers, available in Japanese).

There were significant differences in the characteristics of risks and returns between hedge funds and investment trusts from January 2000 to December 2005. Specifically, amid a global stock market slump between 2000 and 2002, the performance of hedge funds did not deteriorate significantly. On the other hand, the performance of Japanese investment trusts⁸ was in a slump as well as stock prices (Chart 3). Even comparing volatilities (standard deviations), those of hedge funds were lower than stocks and close to bonds, while returns were at a higher level than investment trusts and traditional

Chart 2: Net assets of Japanese investment trusts by contractual type



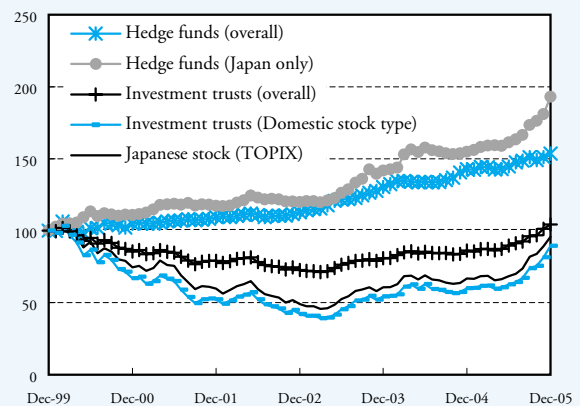
Source: The Investment Trusts Association, Japan

assets including stocks and bonds (Chart 4).⁹

Chart 5 shows the detailed characteristics of returns on hedge funds and investment trusts. As described later, hedge funds generally do not adopt benchmarks (indicators of the return targets for fund asset managements) such as stock indexes, etc. as criteria for evaluating their performance when managing their assets. However, in this *Review*, in order to compare the return characteristics of hedge funds and investment trusts, we attempted to make comparisons with benchmarks.

Hedge funds specialized in Japanese assets mostly invest in Japanese stocks. By comparing such hedge funds focused on Japanese assets and publicly offered investment trusts purchasing domestic stocks (domestic stock type), hedge funds had characteristics that the beta (β) was low, while the alpha (α) was relatively high. Here, " β " means the sensitivity of the fund return to fluctuations in the overall market such as indexes, and " α " means the excess return, which supersedes such fluctuations in the overall market.¹⁰ For example, the α for a fund that has a portfolio exactly same as TOPIX is 0, while its β is 1. On the other hand, regarding funds with a portfolio which buys some stocks and concurrently sells others based on their own assessment criteria, the correlation of returns with TOPIX declines and the β lowers. The extent of divergence between the return on the fund and that on TOPIX is the α .

Chart 3: Performance of hedge funds and investment trusts

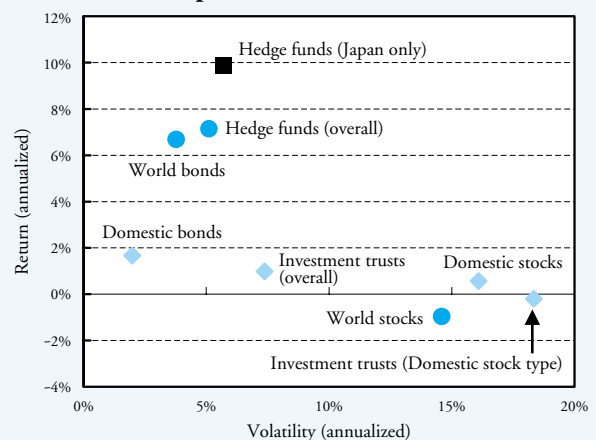


Note: End-December 1999 = 100.

The latest figures are as of end-December 2005.

Sources: Credit Suisse/Tremont, Eurekahedge, Nomura Research Institute.

Chart 4: Comparison of returns and volatilities



Notes 1: These figures are calculated based on monthly rate of returns from January 2000 to December 2005.

2: Domestic stocks, domestic bonds, investment trusts (overall, Domestic stock type) are yen-based. World stocks, world bonds, hedge funds (overall) are US dollar-based. Currency basis for hedge funds (Japan only) differs from each fund included in the index.

Chart 5: Characteristics of returns on hedge funds and investment trusts

Hedge fund performance (annualized)	Hedge fund	Long/Short equity	Equity market neutral	Fixed income arbitrage	<i>Japan only</i>
Benchmark	MSCI World	MSCI World	MSCI World	Citi BIG	TOPIX
Benchmark Return	-0.97%	-0.97%	-0.97%	6.69%	0.56%
Return	7.14%	5.46%	8.10%	5.78%	9.91%
Risk (standard deviation)	5.11%	8.59%	2.06%	2.55%	5.68%
β (sensitivity)	0.16	0.28	0.02	0.14	0.24
<For reference> Tracking error	13.10%	12.86%	14.45%	4.09%	13.08%
α (excess return)	8.01%	6.35%	8.96%	-0.99%	9.07%
IR (Information ratio)	0.61	0.49	0.62	-0.24	0.69

Investment trust performance (annualized)	Investment trust	<i>Domestic stock type</i>	Foreign stock type	Domestic bond type	Foreign bond type
Benchmark	TOPIX	TOPIX	MSCI World	NOMURA-BPI	Citi BIG
Benchmark Return	0.56%	0.56%	-0.97%	1.67%	6.69%
Return	0.98%	-0.20%	-0.91%	0.67%	6.27%
Risk (standard deviation)	7.38%	18.35%	18.85%	0.20%	6.06%
β (sensitivity)	0.42	1.09	1.03	0.04	0.30
<For reference> Tracking error	9.56%	4.71%	11.15%	1.91%	6.50%
α (excess return)	0.42%	-0.76%	0.06%	-1.01%	-0.42%
IR (Information ratio)	0.04	-0.16	0.01	-0.53	-0.06

Notes 1: These figures are calculated based on monthly rate of returns from January 2000 to December 2005.

2: Tracking error is an indicator which shows the divergence from the benchmark of the portfolio. Regarding IR, please refer to the BOX (page 5).

3: The outline of hedge fund strategies mentioned above is as follows.

Long/Short equity:

Strategy to seek returns by taking long position on stocks expected to rise their price, and by taking short position on stocks expected to decline their price.

Equity market neutral:

Strategy to seek beta neutral returns from price anomalies by leveraging long and short positions in matched equity portfolios.

Fixed income arbitrage:

Strategy to seek returns from price anomalies between related fixed income securities.

A high α of hedge funds indicates that the returns of hedge funds provided the “absolute return” which was not affected by market benchmarks. On the other hand, as for stock type investment trusts, the β is close to 1 and the α is low.¹¹ Also, as for bond type investment trusts, although the β compared with major benchmarks is low,¹² α is low as well as that of stock type investment trusts. This suggests the possibility that the excess returns superseding benchmarks were not adequately provided by investment trusts, as a result that investment trusts targeted returns in accordance with benchmarks. In addition, it depends on the performance of benchmarks whether hedge funds seeking α returns or investment trusts seeking β returns achieve higher returns. Therefore, it is highly possible that investment trusts achieve higher returns than hedge funds when the performance of traditional assets is strong.

What causes differences in performance?

In this section, we consider why there are differences in performance between hedge funds and investment trusts from the following three perspectives: (1) investment policy; (2) investment constraints; and (3) incentive schemes (Chart 6).

(1) Investment policy

Hedge funds have been utilized as alternative investments that are to provide absolute returns to institutional investors and high net worth individuals, who have already globally invested in traditional assets including domestic/foreign stocks and bonds and to enhance diversification effects. On the other hand, the investor base for investment trusts is wide, and investment trusts are utilized as a tool to provide an opportunity to manage assets to many investors. Especially for retail investors, investment trusts may have a similar weight to traditional assets.

There are various types of funds in both hedge funds and investment trusts and we cannot make any standardized comments. However, if we were to infer the overall tendency

from trends in indexes, we could point out the followings. First, given that hedge funds seek absolute returns independently from overall trends in financial markets (fluctuations in benchmarks), the source of returns will greatly depend on the skills of individual investment managers who are responsible for constructing investment strategies. On the other hand, investment trusts are managed to track market benchmarks (β), and the source of return will strongly depend on the rise of benchmarks. Although a certain degree of skill is necessary to construct a portfolio which imitates benchmarks with limited assets, the reliance on the asset management skills of investment managers is low from the perspective to seek excess returns (α).

Thus, while the possibility of negative returns (losses) is recognized as the risk of hedge funds, as for investment trusts, the divergence from benchmarks for the portfolio (tracking error) is also recognized as the risk. For hedge funds, incurring losses would be negatively assessed regardless of trends in benchmarks. On the other hand, for investment trusts, even if the benchmarks were to achieve a negative performance, it is relatively important not to incur losses greater than the benchmarks. Such differences in investment policy have significant impacts on the performances of hedge funds and investment trusts.

(2) Investment constraints

From Chart 5, we can see significant differences in “Information Ratio (IR)” between hedge funds and investment trusts. “IR” is defined as the excess return (α) divided by the tracking error, one of the measures for evaluating the performance of asset management. The greater the value of the IR, the lower the investment constraints for investment managers and the higher accuracy of forecast of investment managers, etc. (please refer to the BOX). As one of the reasons that cause differences in IR, some constraints in constructing a portfolio can be pointed out. In other words, it is possible that the imposition of strict investment constraints

Chart 6: Differences between hedge funds and investment trusts

		Hedge funds	Investment trusts
Investment policy	Definition of return	Absolute return	Market benchmarks (β) + excess returns (α)
	Source of return	Asset management skill of investment managers (highly dependent)	Rising of benchmarks (highly dependent) + asset management skill of investment managers (not so dependent)
	Definition of risk	Loss	Tracking error (divergence from benchmarks)
Investment constraints	Regulations	Not under rigorous regulations in offshore (Investor base: institutional investors, high net worth individuals)	Regulated by financial authorities in terms of investor protection (Investor base: including many retail investors)
	Leverage / Short selling	Conducting freely at discretion of investment managers	Certain restrictions based on laws, regulations and self-regulations
	Assets for investment	Investment managers free to decide	Certain restrictions based on laws, regulations and self-regulations
	Liquidity constraints	Relatively low liquidity (lock-up period, payout period, etc.)	High liquidity (necessity to address redemptions at any time in principle)
	Methods to avoid risks of market declines	Short selling	Underweight
	Fund strategy	Selection of strategy and specialist field by investment managers (greater freedom for investment managers)	Impact of sales companies (less freedom for investment managers)
	Incentive schemes	Compensation for investment managers	Incentive fee
	Individual assets of investment managers	Most of them invested in their own funds	—

on investment trusts, compared with hedge funds, may have lowered the IR. We examine those factors in the following sections.

(Regulations)

As the investor base for investment trusts includes a wide range of retail investors who are not limited to high net worth individuals, from the perspective of investor protection, the following regulations¹³ have been enforced in Japan. They may have become constraints for investment managers.

A) Regulations on leverage and short selling

Under the self-regulations of the Investment Trusts Association Japan, borrowings of funds for publicly offered investment trusts shall be limited to the purposes in the case of paying redemption, and distributing reinvestment-type investment trusts. Also, various restrictions are in place for margin trading, borrowings of stocks and bonds, short selling of bonds, derivatives transactions, and so on.

B) Regulations on assets for investment

In principle, publicly offered investment trusts are required to invest at least 50% of their net assets in trust into securities. Regarding publicly offered investment trusts, investable stocks are limited to listed stocks whose values can be marked to market. As for futures trading, there are restrictions in place such that the assessed losses shall be under 50% of the net assets in trust.

Such restrictions are not strongly binding investment managers' daily operations, but are possibly limiting investment methods and asset diversification as product design of investment trusts.

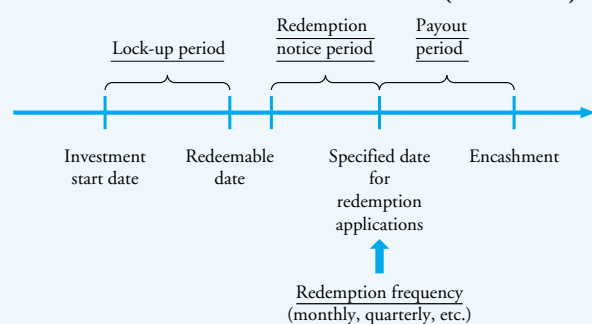
(Liquidity constraints)

There are significant differences between hedge funds and investment trusts in the liquidity constraints born by investors. In other words, while it takes long time until the redemption or encashment is made once investors make investments in hedge funds, investment trusts are financial products with a high liquidity (ability to be cashed out) for investors.

As a reason for such differences in liquidity constraints born by investors, it may be pointed out that hedge funds would invest in financial assets with low liquidities and difficulties in valuations in a timely manner because the limitations against hedge funds concerning investable assets are lax.

Liquidity constraints imposed on investors of hedge funds include: the so-called lock-up period,¹⁴ the redemption notice period,¹⁵ the redemption frequency,¹⁶ the payout period,¹⁷ and so on (Chart 7). Of course, it is possible for investors to ask hedge funds to secure high liquidity at the contract time. However, in such cases, it is very likely that an additional fee is required. While such constraints bring disadvantages of illiquidity to investors, the freedom of investments by investment managers is enhanced and it may make it possible to achieve returns regardless of the fluctuations in benchmarks consequently. In fact, there is a research result¹⁸ showing the relation between liquidity constraints and liquidation risks: the less liquidity hedge funds impose on investors, the lower the liquidation risk (details described below).

Chart 7: Liquidity constraints for hedge funds (Illustrative)



High liquidity possessed by investment trusts is a major advantage for investors. For example, when the performance of funds stagnates, investors can withdraw their assets within a short period. However, in order to secure high liquidity, investment managers of investment trusts need to hold a certain amount of cashable assets in their portfolio, and to take into account the fluctuations in managed assets caused by requests from investors. As a result, the requirement of liquidity puts stricter constraints on investment managers of investment trusts (IR declines). In other words, while investment trusts provide high liquidities for investors, it limits freedom of asset management by imposing constraints to maintain high liquidities on investment managers.

(Methods to avoid risks of market declines)

Also, as for methods to avoid the risks of market declines, for example, hedge funds can preserve their portfolio or gain returns by selling short or taking short positions in futures. On the other hand, while it is possible for investment trusts to sell short or utilize futures in accordance with regulations, given that they recognize the aforementioned tracking errors as risks, investment managers tend only to replace stocks with a high β which closely correlates with price movements of overall markets, with those with a low β which have low correlation, or to put relevant assets underweight. In this case, it is difficult to raise the return in a period of market downturn. In other words, investment managers' forecasts are not adequately exploited in their positions.

(Fund strategy)

There are also marked differences between hedge funds and investment trusts in fund strategies and asset management policies. In other words, investment managers of hedge funds select their specialized fields, methods and strategies. On the other hand, strategies of investment trusts are partly influenced by the distributors who want to make/sell products that are easy to understand investment policies and risks, from the perspective of protection of investors and also in line with the demands of investors, therefore the freedom of investment managers related to asset management is rather limited compared with that of hedge fund managers. For example, in stock type investment trusts with frequent dividend payouts, which have been attracting attentions recently, it is necessary to consider the distribution to investors such as 1) maintaining assets with high liquidity 2) purchasing stocks prior to dividend right determination dates of stocks and then selling them after dividend payments, as well as the skills of individual investment managers in picking stocks. As a result, constraints are imposed on investment managers in asset management, and IR is likely to decline.

(3) Incentive schemes

Hedge funds have the following characteristics in the compensation system for investment managers. Compensation depends on the performance in general (incentive fee), accompanied by a high water mark and hurdle rate.¹⁹ In addition, many hedge fund managers invest most of their own assets in hedge funds managed by themselves. In other words, incentives of investment managers to achieve high returns are strong. However, there is also a possibility that investors would take more risks than investors expected, in order to achieve high returns.

(4) Others (liquidation risks)

Liquidation risks can be pointed out as one of the differences between hedge funds and investment trusts. As for hedge funds, over 5% of them (single funds), in terms of numbers, may be liquidated within a year. The followings can be pointed out as backgrounds: a rapid increase in the number of hedge funds by large amounts of asset inflows into the hedge fund industry with declining profit opportunities, have caused the deterioration of the average quality of investment managers: as a result of intensified competition with declining profit opportunities, funds have tended to be quickly weeded out in terms of "survival of the fittest" increasingly. In addition, while regulations on hedge funds are not so strict and the freedom of asset management for investment managers is high, some hedge funds may intensively invest in illiquid assets, amplify their leverage to an extreme level, or not establish rigorous risk management systems. On the other hand, investment trusts are hardly liquidated on the condition that a certain asset volume is secured, even if the value of investment trusts declines significantly. Of course, in case of liquidation of funds invested by investment trusts or liquidation of asset management companies, etc., investment trusts would probably be liquidated. However, such a

possibility is by far lower than the possibility of hedge fund liquidation.

Conclusion

As aforementioned, returns on hedge funds generally bear a high α and a low β . However, hedge funds impose high liquidity constraints and high liquidation risks on investors. In contrast, while investment trusts have a relatively high β and low α , their liquidity is high and their liquidation risks are relatively low.

Comparing hedge funds with investment trusts that guarantee investor protection in accordance with regulations, their characteristics are apparent. While hedge funds are attractive as they provide returns that are not subject to fluctuations in benchmarks, it is necessary for investors to allow a highly free environment for investment managers in order to maximize their potential. The selection of fund type as an investment vehicle by investors depends on their own liquidity constraints, risk-bearing capacities and expected returns.

In order for hedge funds to make full use of a variety of investment methods in diverse markets, take more risks and raise returns efficiently, it is necessary for them to secure a certain degree of freedom in managing assets. Such arbitrage trading across markets by hedge funds have had significant impacts on the liquidity and efficiency of overall financial markets. As a central bank, while paying attention to investors' behavior, we shall continue to closely monitor hedge fund industry and the impacts of hedge fund activities against the financial markets and financial systems.

[BOX] Information Ratio

Information Ratio (IR) is derived by dividing α (excess return) by tracking error (TE), and is used as an indicator to measure the result of active management.

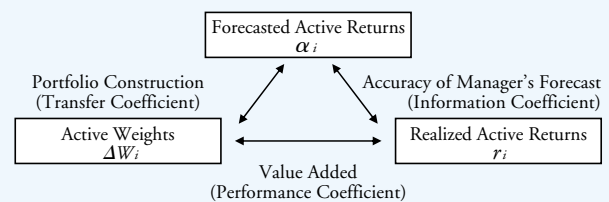
$$IR = \frac{\alpha}{TE}$$

The Clarke et al. who generalized the fundamental law of active management (Grinold/Kahn [2000]) shows that IR can be broken down as follows.

$$IR \approx TC \cdot IC \times \sqrt{N}$$

TC: Transfer Coefficient
 IC: Information Coefficient
 N: Breadth

The conceptual relationships among forecasted active returns, realized active returns and active weights are as follows.



TC is the correlation between forecasted active returns and active weights, and indicates the constraints for investment managers imposed in the portfolio construction process. The higher the value of TC, the fewer the constraints related to the portfolio construction.

IC is the correlation between forecasted active returns and realized active returns, and indicates the extent that investment managers' forecasts are exploited in achieving returns. Investment managers with a high IC will add more value.

Namely, IR depends not only on the accuracy of managers' forecasts and the number of forecasts, but also on the constraints in the portfolio construction.

References:

Bank of Japan, Financial and Payment System Department, Financial Markets Department [2005], "Recent Developments in Hedge Funds" (in Japanese), Bank of Japan Research Papers

Moridaira, Soichiro and Mitsubishi Trust and Banking Pension Investment Working Group [2003], "Pursuit of α - New Strategy for Asset Management" (in Japanese), Kinzai Institute for Financial Affairs, Inc.

Otsuka, Akio and Satoshi Kamiya [2005], "Alternative Investments (sequel)" (in Japanese), Kinzai Institute for Financial Affairs, Inc.

Clarke, Roger, Harindra de Silva and Steven Thorley [2002], "Portfolio Constraints and the Fundamental Law of Active Management", *Financial Analyst Journal*, 58, pp.48-66

¹ In this *Review*, Japanese mutual funds which mainly consist of investment trusts of contractual type are called "investment trusts".

² For example, in the US, new regulations took effect on February 2006, which strengthen registration requirements for investment advisors and put hedge funds domiciled in the US or having clients within the US under regulations and supervision. For details, please refer to the "Registration Under the Advisers Act of Certain Hedge Fund Advisers" of the US Securities Exchange Commission (<http://www.sec.gov/final/ia-2333.htm>).

³ In this *Review*, the scope of analysis is as follows: for hedge funds, in principle, global; for investment trusts, funds that are established and sold within Japan.

⁴ The classification of stock investment trusts, bond investment trusts and MMFs in Chart 2 is defined by the Investment Trusts Association, Japan. Details are as follows.

- Stock investment trusts: investment trusts which can invest in stocks.
- Bond investment trusts: investment trusts that invest in short-term financial products mainly and do not invest in stocks at all.
- MMF: Money Management Fund. Funds that invest in short-term financial products with short durations. It emphasizes safety of principal and has high liquidity.

⁵ Based on the classifications defined by the Investment Trusts Association, Japan, foreign bond type investment trusts such as "Global Sovereign Open" whose volume has been increasing recently, are included within stock investment trusts.

⁶ There is a possibility for indexes to be overestimated, because the indexes may only cover funds which currently operate businesses and report their performance to databases, and may not cover funds which stop reporting to databases due to low performance and stop conducting businesses.

⁷ There is a possibility that funds which have achieved a certain high returns stop reporting to databases (because they would get necessary money) and indexes do not cover such funds.

⁸ In the analysis of investment trusts, the NRI-FPI compiled by Nomura Research Institute is utilized. This index covers domestic open type publicly offered investment trusts (excluding some), and does not cover privately placed investment trusts. Also, there is no consistency with the classifications defined by the Investment Trusts Association, Japan. Specific details are as follows.

- Domestic stock type: Funds which mainly invests in domestic stocks and the share of domestic stocks in the portfolio is high in practice.
- Foreign stock type: Funds which invests in domestic/foreign stocks, the share of domestic/foreign stocks is high, and that of foreign assets is 30% or more in practice.
- Domestic bond type: Funds which mainly invests in yen dominated bonds and does not invest in stocks at all.
- Foreign bond type: Funds which invests in domestic/foreign bonds on a local currency basis and does not invest in stocks at all and the share of foreign assets is 30% or more in practice.

⁹ In Chart 4, the following indexes are utilized.

- Domestic stocks: TOPIX
- Domestic bonds: NOMURA-BPI
- World stocks: MSCI World

- World bonds: Citigroup world BIG bond index
- Hedge funds (overall): Credit Suisse/Tremont (in Chart 5, figures of each strategy are based on the same index)
- Hedge funds (Japan only): EurekaHedge Japan Hedge Fund Index
- Investment trusts (overall, domestic stock type): NRI-FPI

¹⁰ β is the sensitivity of the monthly return on funds to the monthly return on benchmarks. α is the excess return of funds against the monthly return on benchmarks.

$$\beta = \frac{Cov(R_{fund}, R_{benchmark})}{\sigma^2(R_{fund}, R_{benchmark})}$$

$$\alpha = \sum_{i=1}^n (R_{fund,i} - R_{benchmark,i}) * \frac{12}{n}$$

R_{fund} : Monthly rate of returns on funds

$R_{benchmark}$: Monthly rate of returns on benchmarks

n: Number of samples

(72: January 2000 through December 2005)

¹¹ Even among publicly offered investment trusts, funds, especially stock investment trusts, which manage assets like hedge funds have increased in recent years. Regarding such funds, they do not necessarily have the same characteristics as described in this *Review*.

¹² Especially for domestic bond type investment trusts, the share of funds investing in short-term financial products is higher in comparison with benchmarks.

¹³ For details, please refer to the "Summary of Hedge Fund Survey Results and the Discussion Points" released by the Financial Services Agency, Japan in 2005.

¹⁴ The period from investment start date to redeemable date (minimum investment period).

¹⁵ The period from the date of applying for redemption to the date the redemption application is received. For example, when the redemption notice period is 30 days, it is necessary to give notice of redemption up to 30 days prior to the specified date for redemption.

¹⁶ The frequency for a specified date for redemption. If it is "quarterly", the specified date for redemption applications is set every quarter.

¹⁷ The period from the specified date for redemption to the date of encashment in practice.

¹⁸ Baba, Naohiko and Hiromichi Goko [2006] "Survival Analysis of Hedge Funds", BOJ Working Paper Series 06-E-5, Bank of Japan.

¹⁹ A high water mark is one of the methods to determine the compensation to investment managers, which recognizes performance to be compensated only the portion exceeding the historical high for the net asset value of the fund, and paying an incentive fee to investment managers. Over 70% of hedge funds adopt this method. On the other hand, a hurdle rate is also one of the methods to determine the compensation to investment managers, which set minimum target returns beforehand and pay an incentive fee to investment managers only when the achieved returns exceed the target. Actually, few hedge funds adopt this method.

Bank of Japan Review is published by the Bank of Japan to explain recent economic and financial topics for a wide range of readers. This report, 2006-E-2, is a translation of the original Japanese issue, 2006-J-3, published in February 2006. The views expressed in the Review are those of the authors and do not necessarily represent those of Bank of Japan. If you have comments and questions as well as requests for hard copies, please contact Tokiko Shimizu, Director, Financial Markets Department (tokiko.shimizu@boj.or.jp). *Bank of Japan Review E-series* and *Bank of Japan Working Paper E-series* can be obtained through the Bank of Japan's Web site (<http://www.boj.or.jp>).