Factor Investing and its Implications

Kim, Jongmin*

Factor investing refers to the investment decision-making based on factors that affect the performance of an asset or a portfolio. It is usually known that factors provide systematic premiums to compensate for the risks inherent in the asset or portfolio. Accordingly, factors are employed in the asset management process like strategic or tactical asset allocation, and performance evaluation on the fund manager or portfolio. Moreover, factor investing can be used in delivering tailored investment advices or wealth management services to different types of investors. It could also contribute to diversifying fund products in Korea as a useful means for active investment strategy. In fact, the analysis on the performance of publicly offered domestic stock funds confirms the possibility that actively managed domestic stock funds could perform better with factor investing. Therefore, the Korean asset management industry should seek ways to utilize factor investing, thereby enhancing the intended role of publicly placed funds as an efficient tool for wealth management to individual investors.

Exchange traded funds (ETF) have registered rapid growth in global and domestic markets because of its comparative advantages such as low fees, transparency, and its tracking efficiency. For example, the Korean ETF market has grown fourfold to nearly KRW 40 trillion (with 359 ETF products) until recently from about KRW 10 trillion at the end of 2011. Moreover, ETFs are available in various types, including index-tracking ETFs, sector ETFs, leveraged/inverse EFTs, bond ETFs, currency ETFs, and ETFs investing in offshore markets. Lately, ETFs are actively utilized as an efficient tool for wealth management, with a growing number of robo advisors and ETF

* All opinions expressed in this paper represent the author's personal views and thus should not be interpreted as Korea Capital Market Institute's official position.

* Ph.D., Senior Research Fellow, Fund & Pension Department, Tel: 82-2-3771-0822, E-mail: jongminkim@kcmi.re.kr

managed–portfolios. Such developments in the ETF market are closely associated with factor investing, which is an investment approach based on factors that drive the portfolio returns. A noteworthy example is a substantial increase in so-called "smart beta" ETFs in recent years, whose portfolios are built upon factors such as value, growth, momentum, and low volatility. In this respect, this article provides an overview of factor investing and then discusses how to make use of it as a means to make the Korean publicly offered funds market more vibrant.

Factor investing

Factor investing refers to the investment decision-making based on factors that affect the performance of an asset or a portfolio. More specifically, it involves identifying factors to drive the returns, constructing an investment benchmark reflecting the identified factors, i.e., building the factor benchmark, and using the factor benchmark in the investment process. Factor investing is a top-down approach under which factors are used to choose appropriate investments, unlike a bottom-up approach under which an investee company is selected based on the fundamental analysis of individual companies. Factors or its factor benchmark can be used in strategic or tactical asset allocation, performance evaluation on the fund manager or portfolio, or portfolio composition and investment advice.

According to Ang (2014), factors used in factor investing must meet the following conditions[1] : First, factors should be backed or justified by substantial academic research. Second, factors ought to have exhibited significant premiums that are expected to persist in the future. Third, there must be sufficient historical performance data over long periods including the bad times. Fourth, factor investing strategies should be implementable with highly liquid and tradable instruments like factor ETFs or relevant fund products. Examples of factors satisfying these conditions are market index, SMB (small-big), HML (high-low), and UMD (up-down), and volatility in case of stocks[2], and bond index, term premium, credit premium, and volatility in case of bonds. As such, factor investing can be put into effect in many ways depending on the asset class or portfolio composition.[3]

1) Ang, A., 2014, Asset Management - A Systematic Approach to Factor Investing.

2) SMB is a portfolio that takes long position in small stocks and short position in large stocks. HML is a portfolio that is long value stocks and short growth stocks. UMD is a portfolio that is long past winning stocks and short past losing stocks. Smart beta ETFs are the ETFs that incorporate factors such as size, (SMB), value (HML), growth, and momentum (UMD), as described earlier, and are used to implement factor strategies.

3) For example, if a portfolio invests in various asset classes or products across regions, macroeconomic variables such as inflation, real interest rate, and foreign exchange rate (FX) can be used as factors in addition to assets (e.g., stocks and bonds) or products.

Use of factor investing for publicly offered domestic stock funds

I established the factor benchmark (FBM) using Korea Fund Ratings Co. (KFR)'s dataset on domestic stock funds from December 2009 through April 2017 in order to explore the meaning of the factor investing and its usage in practice. To be more specific, I used 518 actively managed domestic stock funds which are either feeder funds or class management funds with at least 3-year history, except for ETFs and index funds. As for factors, I used KOSPI200 index, SMB, HML, and UMD. In case of publicly offered funds, however, it is hard to implement long-short strategy implicitly assumed in a factor benchmark portfolio like SMB, HML, and UMD. Taking this into account, I also used KOSPI200 index, Small (small cap stocks), Low (growth stocks), and Up (momentum) to create long-only FBM.[4] Factor returns, e.g., the returns of SMB, HML, UMD, Small, Low, and Up, were calculated using FnGuide indices.

The FBM was computed as follows: First, each fund was classified into one of five categories or types based on the KFR classification standards, and value-weighted monthly returns for each type were calculated from January 2010 to April 2017. KFR divides domestic stock funds into five categories or types: general stocks, small cap stocks, sector stocks, dividend stocks, and other stocks. Then, I conducted a regression to estimate the weights of individual factors to reflect the returns' movement for the last 36 months.[5] This weight is called style weight. FBM return for the subsequent period is a weighted-average of factor returns computed using the style weights.[6] Style weights assigned to factors are the proportion of investments in each factor, derived from historical performance of publicly placed funds in each category. The FBM return indicates the rate of returns on publicly placed funds in each type that could have been achieved if factor investment strategies would be implemented. FBM returns for each type are depicted in Exhibit 1.

---

4) In the 4-factor model analysis, SMB and UMD were estimated to be positive, but HML was estimated to be negative. Based on these findings, factors like Small, Low and UP were selected for long-only investing. Of course, it would be difficult to implement long-only strategy without ETFs or asset managers' proprietary model portfolios involving relevant factors. Moreover, diversification effect could be low if factors are highly correlated. Despite these limitations, I constructed long-only FBM as an example to execute factor investing for publicly offered funds.

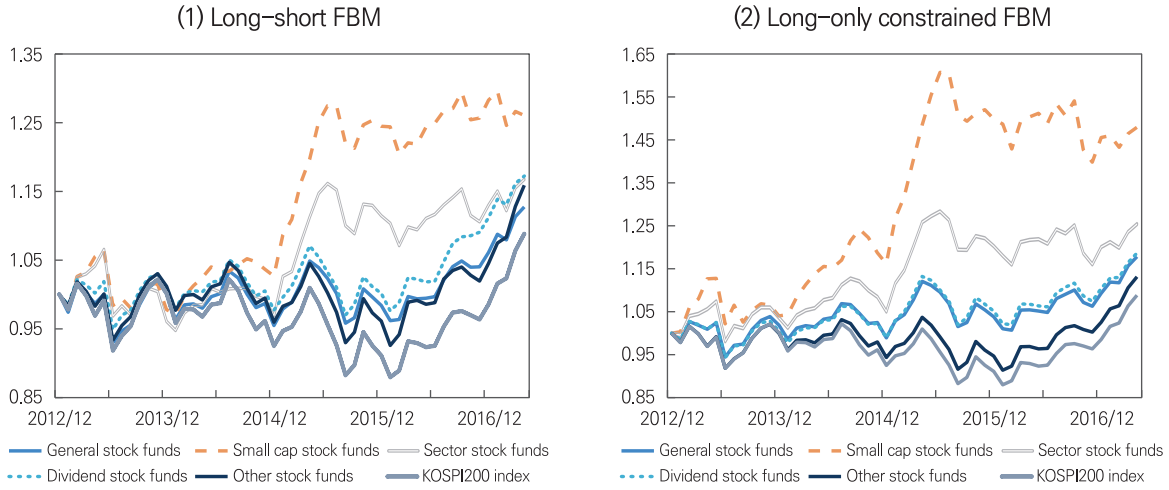
5) This methodology is usually referred to as return-based style analysis. Style weights are estimated from the regression subject to constraints depending on the availability of shorting. If shorting is allowed, factor weights are constrained to sum to 1. If shorting is not allowed, each factor's weight must be between 0 and 1, and their weights are constrained to sum to 1.

6) Long-short RMB return $r^{(1)}_{BM,t+1}$ and long-only FMB return $r^{(2)}_{BM,t+1}$ may be expressed below. Here, $r_{f,t+1}$ is risk-free interest rate.

$$r^{(1)}_{BM,t+1} - r_{f,t+1} = w_{1,t}(r_{M,t+1} - r_{f,t+1}) + w_{2,t}SMB_{t+1} + w_{3,t}HML_{t+1} + w_{r,t}UMD_{t+1}$$

$$r^{(2)}_{BM,t+1} = w_{1,t}r_{M,t+1} + w_{2,t}Small_{t+1} + w_{3,t}Low_{t+1} + w_{r,t}Up_{t+1}$$

Exhibit 1. FBM movements for public stock funds in each type (January 2013 - April 2017)



Note: Data on the fund returns are indexed to a starting point of 1.00, which is the return level as of December 2012.
Source: KFR; FnGuide

As shown in Exhibit 1, FBM for each fund type was above KOSPI200 index, suggesting that even if publicly placed funds employ factor-based investment strategies, they could generate better excess returns than KOSPI200 index.[7] When comparing the funds' actual returns with FBM returns, FBM outperformed not only KOSPI200 index but also corresponding actual funds in several categories as seen in Exhibit 2. As an example, other stocks' actual Sharpe ratio and information ratio (IR) were –0.32 and –0.89, respectively, but the ratios improved significantly to 0.15 and 1.23 in case of long-only FBM. If general stocks and small cap stocks employ factor investing strategies, their Sharpe ratios and IRs go up, regardless of whether shorting is allowed or not.

7) FBM outperformed KOSPI200 index in most types even if fees and commissions are considered.

Exhibit 2. Comparison of actual fund returns and FBM performance (January 2013 - April 2017)

Fund Type	Actual returns				Long-short FBM 1				Long-only FBM 2			
	Average	Standard Deviation	Sharpe ratio	IR	Average	Standard Deviation	Sharpe ratio	IR	Average	Standard Deviation	Sharpe ratio	IR
General stocks	2.6%	7.6%	0.09	0.04	3.1%	8.1%	**0.14**	**0.28**	4.2%	9.0%	**0.25**	**0.60**
Small cap stocks	6.5%	11.5%	0.40	0.31	5.7%	8.4%	**0.45**	**0.36**	9.8%	12.0%	**0.66**	**0.64**
Sector stocks	4.6%	10.1%	0.27	0.24	4.0%	8.9%	0.23	0.21	5.7%	9.6%	**0.39**	**0.49**
Dividend stocks	6.2%	7.9%	0.54	0.67	3.8%	9.0%	0.27	0.59	4.4%	9.0%	0.27	0.63
Other stocks	-1.4%	10.2%	-0.32	-0.89	2.4%	9.6%	**0.21**	**1.07**	3.3%	9.4%	**0.15**	**1.23**
KOSPI200	2.4%	9.6%	0.05	-	2.4%	9.6%	0.05	-	2.4%	9.6%	0.05	-

Note 1: Publicly placed funds above include only feeder funds and class management funds, and exclude index funds and ETFs.
Note 2: On a monthly basis, FBM returns for the following periods are calculated after estimating factor weights based on monthly returns over the past three years, using the return-based style analysis methodology.
Note 3: Risk-free rate is call rate, and performance figures are translated into annual terms.
Note 4: Figures highlighted using bold type indicate better performance than actual performance.

Implications

So far, I explored factor investing and how it could be useful to publicly offered stock funds in Korea. As mentioned in the beginning of the article, factor investing can be utilized in various fields like asset allocation, fund manager or portfolio performance evaluation, portfolio composition, and investment advice. As attested by the analysis of publicly offered domestic stock funds, factor investing can be used as an active investment strategy that allows investors to earn systematic risk premiums. Such use of factor investing, however, should be preceded by the existence of diverse fund products like smart beta ETFs that reflect or track particular factors. If this comes to pass, various forms of factor-based discretionary investments or wealth management services would be delivered to not only institutional investors but also individual investors. In this regard, it is worth noting that factor investing could play a part in diversifying fund products and expanding wealth management services in Korea. Accordingly, the asset management industry needs to proactively seek ways to utilize factor-based investment, thereby enhancing the intended role of publicly placed funds as an efficient wealth management tool to individual investors.