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APPLICATION OF INFORMATION RATIO IN COLLECTIVE INVESTMENT INSTITUTIONS

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ABSTRACT

The aim of this paper is to analyze whether information ratio (IR) is a good indicator for peer group performance (returns) of private pension funds, which are collective investment institutions. We employ annual data of IR and Peer Group Returns for the period between 2018 and 2021 for 12 standard funds that are the most significant part of private pension fund market with respect to total asset under management and also regulations. This study covers only standard pension funds in Voluntary Participation System (IPS-Individual Pension System). Findings indicate that for the years 2018, 2019, 2020 and 2021, there is no significant relation between 'Peer-Group Return Ranking' and 'Information Ratio Value Rankings' for IPS-Standard Funds. The paper suggests that although IR is a pivotal performance indicator, this ratio should not be considered as the single criterion -especially while reporting the performance of the pension funds-.

Keywords: INFORMATION RATIO, FUND RETURN, CAPITAL MARKET INSTITUTIONS

JEL Codes: G14, G20, G23.

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BİLGİ RASYOSUNUN KOLEKTİF YATIRIM ARAÇLARINDA UYGULANMASI

ÖZET

Bu çalışmanın amacı, bilgi rasyosunun kolektif yatırım kuruluşlarından birisi olan bireysel emeklilik fonlarının emsal-grup performansı (getiri) için iyi bir gösterge olup olmadığını analiz etmektir. Bireysel emeklilik fonu piyasasının toplam aktifleri ve mevzuat açısından en önemli parçası olan 12 standart fon için, 2018-2021 dönemi yıllık Bilgi Rasyosu ve Emsal Grup Getiri verilerini kullanıyoruz. Bu çalışma sadece Gönüllü Katılım Sistemi'ndeki (BES-Bireysel Emeklilik Sistemi) standart emeklilik fonlarını kapsamaktadır. Nicel analizin bulguları şu şekildedir; Gönüllü BES-Standart Fonları kapsamında, 2018, 2019, 2020 ve 2021 yılları için, emsal grup getiri sıralaması (yani fon performansı) ile Bilgi Rasyosu sıralaması arasında önemli bir ilişki yoktur. Bu çalışma, bilgi rasyosunun temel bir performans göstergesi olmasına rağmen, bu oranın -özellikle emeklilik fonlarının performansı raporlanırken- tek kriter olarak değerlendirilmemesi gerektiğini öne sürmektedir.

Anahtar Kelimeler: BİLGİ RASYOSU, FON GETİRİSİ, SERMAYE PİYASASI KURUMLARI.

JEL Sınıflandırma: G14, G20, G23.

1. INTRODUCTION

Information ratio (IR) is considered as one of the most important issues covered under portfolio theory, financial economics. Investopedia defines the ratio as follows: 'IR is a measurement of portfolio returns beyond the returns of a benchmark, usually an index, compared to the volatility of those returns.'

The subject matter of this paper is significant in that IR in Turkish Pension Fund Market (relatively young and fast-growing market) is applied as a performance indicator in periodic reports for all clients of the private pension system. The motivation of this study is the question whether Information Ratio can be a good indicator of ranking for private pension funds that are growing considerably in Turkish Pension Fund Market as a subset of collective investment instruments. Despite the pandemic disease's adverse effect on all economies (real economy plus financial economics), pension funds grew fast in Turkey in 2020 and 2021 with respect to AuM (asset under management) and the number of contributors.

Pension Monitoring Authority defines Voluntary Participation ('IPS' for short) as follows: *'IPS is a private pension system that provides an income to maintain living standards during retirement through the long-term investment of the savings people make during their active careers.'*

Turkish Individual Pension System (Private Pension System) is the third pillar of Pension System which is of three pillars. The first pillar is state-run Social Security Systems. The second pillar of the system is Auto-Enrolment System (AES). The pension system is regulated by Ministry of Treasury and Finance (HMB), Capital Market Board (CMB, SPK), Pension Monitoring Authority (EGM). Private pension funds are categorized into some groups according to legislation by Capital Market Board.

The establishment of Standard Pension Funds by pension companies is compulsory. Management of the pension funds are carried out by portfolio

management companies. In regard to asset under management, Standard Pension Funds are the leading funds.

Standard Pension Funds' Peer Group Ranking data are retrieved from TEFAS, Turkey Electronic Fund Trading Platform. Annual rankings are taken into consideration in order to be in conformity with the period of Information Ratio values of the funds. The limitation of the data is that annual data before 2018 is not available in TEFAS system, therefore, only 4 years are considered. Information Ratio values of standard funds of IPS is taken from KAP- Turkish Public Disclosure Platform.

This study's research question is whether Information Ratio is an effective indicator of –peer group ranking-performance of the pension funds (a part of collective investment instruments under Turkish Capital Market Legislation). Another way of saying, the paper investigates whether IR values are effectively reflecting the results of performance difference among the standard funds of individual pension system.

This study contributes to the literature by providing –for the first time- the comparison between performance rankings by peer-group return calculation and IR-Values-calculation.

In a way, this paper questions the effectiveness of Information Ratio for an emerging market's capital market (particularly, pension funds, a part of collective investment instruments).

The paper is structured as follows: Section I is the introduction. Section II presents literature review related to the subject of this paper. Section III includes quantitative analysis.

Section IV concludes the study.

2. LITERATURE REVIEW AND THEORETICAL BACKGROUND

In this part, previous studies regarding information ratio and its association with performance ranking calculation of funds is reviewed. In this paper, the application of information ratio for standard pension funds is analysed. Therefore, first of all it is necessary to look at the concept of collective investment institutions that

cover pension funds (in particular, standard pension funds). Capital Market Board of Turkey (CMB) explains these institutions as follows: According to their legal structure, collective investment institutions are called investment trusts when they are established as a separate and independent legal entity, and they are called investment funds when they are established by another legal entity within the framework of a contract. Although they are similar in purpose and economic function, mutual funds and investment trusts differ from each other in terms of the way they work and the service they offer to investors.

Corporate Finance Institute (CFI) explains Information Ratio as follows: The ratio measures the risk-adjusted returns of a financial asset or portfolio relative to a certain benchmark. This ratio shows excess returns relative to the benchmark, and also the consistency in generating the excess returns. The consistency of generating excess returns is calculated by the tracking error.

Guide for Private Pension Funds issued by Capital Market Board of Turkey specifies the basic rules governing performance calculation for pension funds: Gross rate of return is used to measure the performance of funds. On the other hand, if it is evaluated that ratios such as "sharpe ratio or sortino ratio" can produce better results depending on the nature of the funds in the groups, these ratios can also be used with the Committee decision for the determined fund groups and the said Committee decision is announced on the corporate website by the EGM.

Kahn and Rudd (1995) investigate whether historical performance predict future performance and contend that investors need more than past performance numbers to foresee future winners. Their study employs style analysis in order to separate fund total returns into style and selection components. Performance is specified in terms of total returns, selection returns, and IR. The evidence supports persistence solely for fixed-income fund performance.

Gupta et al. (1999) show how institutional investors (for example funds) can use the information between manager alpha and tracking error to perform strategic asset

allocation, and enabling them to (in an optimal manner) allocate tracking error among (asset) managers.

Bowie et al. (2001:14) review the practicalities of budgeting, managing and monitoring investment risk for pension funds. About risk and return they contend that the basic assumption behind the risk budget is the prospective association between active risk and excess return. The metric of return divided by risk is commonly called as the IR, calculating the amount of expected return per unit of risk.

Lundin (2003) conducts a study on the information ratio of tactical asset allocation and argues that the information ratio for tactical asset allocation strategies is derived upon the assumption of dependence solely on the information ratios for asset classes which are actively managed as sub-portfolios. In case information ratios for security selection within asset classes are positive, then that for tactical asset allocation must also be positive. In the event that information ratios for active management of the asset classes are equal, then they are considered to be also equal to the information ratio for tactical asset allocation.

Qian and Hua (2004) analyse active risk and information ratio. Upon their quantitative analysis they maintain that a more consistent prediction of IR is the ratio of average information coefficient to the standard deviation of information coefficient. They show how the interaction between information coefficient and investment opportunity, with regard to cross sectional dispersion of actual returns, impacts the IR.

Hallerbach (2005) argues that IR is utilized to evaluate the risk-adjusted performance of active portfolio managers; this performance metric's focus is upon the active portfolio only and disregards a risky benchmark element. This paper reviews the question whether the IR can be employed to assess the value-added of active management from the standpoint of the risky overall portfolio.

Muralidhar (2005) studies why maximising information ratios is wrong and shows the influence of maximizing the incorrect objective function and then indicates

the benefit of maximizing risk-adjusted returns for the entire fund, rather than the information ratio on the active component.

Hübner (2007) questions the performance of 'measures of performances' and argues that the relevance of the information ratio and the alpha largely is dependent on the type of portfolio held by investors. He compares these measures with Treynor ratio on the quality of the rankings they produce. A precise measure produces similar rankings with alternative benchmarks. The results show the types of skills underlined by portfolio managers.

Bertrand and Protopopescu (2010) examine the statistics of the IR. They derive the analytic expression of the asymptotic variance of the IR and indicate clearly how the higher order covariance affects the precision of the variance estimation. They also study the partial derivatives of the asymptotic variance of the IR in regard to the different moments of the returns.

Arora (2015) studies the information ratio on Indian Mutual Funds and suggests that despite the fact that majority of the plans have positive Information ratio which shows above average performance of the fund managers, but none of the schemes have an information ratio higher than or equal to 0.5; the results show signs of an efficient market as a manager's ability can neither add nor subtract value in such a percent in order to be worth mentioning.

Oran et al. (2017) examine Turkish mutual funds' and pension funds' performances for the period between 2009 and 2015 using the Sharpe, Sortino, Treynor, Jensen, and Information ratio models, followed by the TOPSIS. They find that pension funds -on average- outperform mutual funds when Treynor, Information, and Jensen models are taken into account. Whilst Sharpe and Sortino models are considered, mutual funds outperform pension funds. Furthermore, they maintain that mutual funds outperform pension funds when all measures are combined employing the TOPSIS model.

Lattimore and Gyorgy (2021) in their recent study evaluate mirror descent and information ratio. They argue that mirror descent with appropriate loss estimators and exploratory distributions has the same bound upon the adversarial regret since the bounds on the Bayesian regret for information-directed sampling. They enhance the theory for information-directed sampling and suggest an efficient algorithm for adversarial bandits for which the regret upper bound matches precisely the best known information-theoretic upper bound.

Standard pension funds normally hold bonds more than other investment tools in portfolios, however, partially they may hold stocks (shares). Therefore, factors that have impact on bonds and shares are important. In this regard, in Karataş and İslamoglu (2021) in their study regarding the effects of national and global macroeconomic factors on emerging stock markets maintain that ARDL approach analysis: the federal funds rate on Brazil, Russia, India and China; the global commodity price index on Turkey, Brazil, Russia, China and South Africa; the consumer price index on China; the money supply on Turkey, Brazil and India; the real exchange rate on Turkey, Brazil and Russia are found to have statistically significant impacts.

Theoretical and Legislative Background

The information ratio is employed to assess the ability (skill) of a portfolio manager at producing returns in excess of a given benchmark. In order to calculate IR, one should subtract the total of the portfolio return for a given period from the total return of the tracked benchmark index. Then, the result is divided by the tracking error. The tracking error is computed by taking the standard deviation of the difference between the portfolio returns and the index returns.

With respect to the calculation of a fund return, the following communique is applied as a legal framework: The communique is issued by Capital Market Board of Turkey (Communique Number, VII.128.5, dated 17.12.2013, Official Gazette, No.28854) upon the principles of activities regarding the performance presentation of

individual portfolios and collective investment organizations, performance-based remuneration and collective grading and ordering. Article 6 of this documents specifies portfolio rate of return at the end of the performance period; It is the percentage change in the portfolio value after deducting expenses for individual portfolios, and in the total value or net asset value per unit share for collective investment institutions compared to the previous period.

3. DATA ANALYSIS

In this section, peer group returns of standard pension funds that are the largest part of voluntary pension system (IPS) are compared to information ratio (IR) in order to analyze whether there exists any significant relation between peer group fund ranking and IR.

Data, Methodology and Analysis

Another way of saying, this part provides an answer to the research question of whether IR is a sufficient indicator of peer group performance ranking for pension funds. Turkish IPS market is the scope of this analysis with special attention to standard pension funds, which are the largest funds in regard to AuM. Since non-interest standard funds of IPS system have different portfolio and are subject to different rules under Communique of Turkish Capital Markets Board, they are to be covered in another paper.

In the following tables, analysis is conducted as follows: Firstly, peer group rankings of standard funds of IPS-Voluntary Participation are retrieved for the years 2018, 2019, 2020 and 2021 though official website of TEFAS, Turkey Electronic Fund Trading Platform. Annual rankings are taken into account in order to be in line with the period of Information Ratio values of the corresponding funds. In applied finance, for this industry, for a certain period, fund returns are computed by comparing the last price of a fund with the first price (at the beginning of the period). Fund returns are calculated through this method and ranked accordingly.

It is observed that annual data before 2018 is not available in TEFAS system, therefor only 4 years are considered. Then, Information Ratio values of standard funds of IPS is obtained from KAP- Public Disclosure Platform: Annual performance reports are used to obtain that information.

Table 1. IPS - Standard Funds' Codes and Titles

Code	Fund Title
CHS	CİGNA SAĞLIK HAYAT VE EMEKLİLİK A.Ş. STANDART EMEKLİLİK YT. FONU
ATK	ANADOLU HAYAT EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU
GHD	GARANTİ EMEKLİLİK VE HAYAT A.Ş. STANDART EMEKLİLİK YATIRIM FONU
BNS	BNP PARİBAS CARDİF EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU
IEB	NN HAYAT VE EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU
FEN	FİBA EMEKLİLİK VE HAYAT A.Ş. STANDART EMEKLİLİK YATIRIM FONU
AVN	AGESA HAYAT VE EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU
AZS	ALLIANZ HAYAT VE EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU
HEK	AXA HAYAT VE EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU
MHK	METLİFE EMEKLİLİK VE HAYAT A.Ş. STANDART EMEKLİLİK YATIRIM FONU
ANG	AEGON EMEKLİLİK VE HAYAT A.Ş. STANDART EMEKLİLİK YATIRIM FONU
VEK	TÜRKİYE HAYAT VE EMEKLİLİK A.Ş. STANDART EMEKLİLİK YATIRIM FONU

Table 1 above provides the codes and title of 12 Standard Funds in IPS system as of June, 2022.

Table 2. Peer-Group Return Ranking and IR-Values of Standard Funds (**2021**)

Fund Code	Return %	*IR Value*	*IR Ranking*
CHS	10.3126	*0.0665*	*1*
ATK	7.8576	*0.1000*	*4*
GHD	7.4231	*0.0412*	*2*
BNS	6.7196	*0.0247*	*3*
IEB	6.6138	*-0.0430*	*10*
FEN	6.1526	*0.0016*	*5*
AVN	5.9185	*-0.0132*	*7*
AZS	5.9184	*-0.0114*	*6*
HEK	5.3826	*-0.0246*	*9*
MHK	3.3121	*-0.4500*	*11*

ANG	-0.2131	*-6.7400*	*12*
VEK	-4.2747	*-0.1567*	*8*
Correlation	**0.47**		
Average	5.09	-0.60	
Standard Deviation	3.90	1.94	

Source: TEFAS, KAP

Table 2 shows that in 2021 (the entire-year-period) peer-group-ranking of IPS-Standard Funds is dissimilar with ranking of Information Ratio (IR) Ranking. Although 'CHS' fund is ranked 1st in both criteria, there is no association between peer-group-ranking of other funds and the ranking by IR-Criteria.

Table 3. Peer Group Return (Performance) Ranking versus IR-Values of Standard Funds of IPS - **2020**

Fund Code	Return %	*IR Value*	*IR Ranking*
VEK	13.1438	*0.0266*	*7*
ANG	12.4029	*4.1700*	*1*
FEN	11.9702	*0.0261*	*8*
CHS	11.8508	*0.0400*	*2*
BNS	11.6996	*0.0348*	*4*
AZS	11.6263	*-0.0036*	*11*
IEB	11.6263	*0.0290*	*6*
AVN	11.5498	*0.0052*	*9*
HEK	11.3581	*-0.0006*	*10*
ATK	11.2911	*0.0300*	*5*
GHD	11.2656	*0.0375*	*3*
MHK	10.0014	*-0.0560*	*12*
Correlation	**0.33**		
Average	11.65	0.36	

Standard Deviation	0.74	1.20

Similar to Table 2, for the year of 2020, Table 3 indicates that peer-group-ranking of IPS-Standard Funds is quite different from ranking by Information Ratio (IR) Ranking. Correlation value, which is 0.33, reveals that no relation exists between the two ranking (performance criteria).

Table 4. Peer Group Return (Performance) Ranking versus IR-Values of Standard Funds of IPS - **2019**

Fund Code	Return %	*IR Value*	*IR Ranking*
ANG	28.8427	*-2.5100*	*12*
AZS	28.4428	*-0.0091*	*3*
ATK	28.2777	*-0.0300*	*4*
BNS	28.2639	*0.0054*	*2*
MHK	28.2173	*-0.0440*	*5*
GHD	27.8372	*-0.0609*	*10*
VEK	27.6559	*0.0176*	*1*
AVN	27.4631	*-0.1033*	*11*
HEK	27.2208	*-0.0478*	*7*
IEB	27.1319	*-0.0450*	*6*
CHS	26.4524	*-0.0556*	*9*
FEN	23.6829	*-0.0515*	*8*
Correlation	**-0.31**		
Average	27.46	-0.24	
Standard Deviation	1.36	0.71	

As in the case of years 2021 and 2020, for the year of 2019, Table 4 illustrates that peer-group-ranking of IPS-Standard Funds and ranking by Information Ratio (IR) Ranking are not alike. Correlation value, which is -0.31, provides strong evidence for this result.

Table 5. Peer Group Return (Performance) Ranking versus IR-Values of Standard Funds of IPS - **2018**

Fund Code	Return %	*IR Value*	*IR Ranking*
VEK	15.3427	*0.0979*	*2*
CHS	7.6518	*-0.0134*	*8*
ANG	6.0352	*5.6200*	*1*
BNS	5.3587	*0.0561*	*3*
MHK	4.8348	*0.0220*	*5*
ATK	4.3231	*0.0400*	*4*
FEN	3.9985	*-0.0262*	*10*
HEK	3.9310	*0.0132*	*6*
IEB	3.8611	*-0.0550*	*11*
AVN	3.1274	*-0.3588*	*12*
GHD	3.0644	*-0.0063*	*7*
AZS	2.2595	*-0.0162*	*9*
Correlation	**0.09**		
Average	5.32	0.45	
Standard Deviation	3.47	1.63	

Finally, for the year of 2018, Table 5 above depicts the lack of similarity between the results of rankings by the two methods (peer-group-return ranking and IR-Value-ranking).

Analysis Results

All in all, for the consecutive 4 years, the above tables clearly illustrate that IR-Ranking-Value does not turn out to be a reliable performance criterion to explain peer-group-performance ranking of the pension funds. This is valid in particular for IPS Standard Pension Funds in Turkey given the different rankings.

Another way of saying, when Information-Ratio-Values are compared to peer group rankings of pension funds (standard pension funds of IPS system in Turkey) it is explicitly seen that there is no statistically significant relation between the rankings.

Therefore, it can be safely argued that Information Ratio is not a strong indicator of the ranking of peer group performance.

Based on the above mentioned comparisons, this paper argues that relying solely on IR-Value in order to measure and explain fund return ratings may result in a statistical bias. Other criteria should be employed so as to evaluate and explain the fund return rankings. IR-rankings and Standard Fund Peer Group Rankings are not in line for the last 4 years in Turkey.

4. CONCLUSION

This study examines Information Ratio in general and reviews its application and effectiveness for collective investment institutions. Individual Pension System's Standard Pension Funds, which are the largest funds by AuM, are considered as sampling for collective investment institutions given the very fact that these funds are covered under collective investment institutions according to Capital Market Board of Turkey, which is an emerging economy where capital markets and private pension funds are growing remarkably.

The findings of the analysis is as follows as far as IPS-Standard Funds are concerned, for the years 2018, 2019, 2020 and 2021, there is no significant association between peer group return ranking (i.e. fund performance) and Information Ratio Value Rankings for the corresponding funds. The correlation results turn out to be very low for peer group rankings and IR-rankings for these rankings.

Considering all these, the paper concludes that Information Value is not a sound indicator for performance ranking of standard pension funds (the funds with the largest AuM in fund market) as far as Individual Pension System (Voluntary Private Pension Funds) are concerned. Further study can be conducted for non-interest standard pension funds and those standard funds in Auto Enrollment System in the pension fund market.

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