

The Study on Value-Added Benefits of Precipitate Housing Fund- Based on the Panel Data of Affordable Housing in 28 Pilot Cities Analysis

Yanyan Wang^{1,*} & Qing Wu¹

¹School of Management, Shanghai University of Engineering Science, China

*Correspondence: Shanghai University of Engineering and Technology, 1000 Lane Road, Songjiang District, Wenhui Building 24, Shanghai, China. E-mail: wyy123410121@sina.com

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Abstract

The effective functioning of the housing fund in favor of the promotion of Pareto optimality, precipitated scale and optimize investment structure of the reserve fund to better promote social justice and progress. By data of affordable housing pilot cities 28 analysis confirmed the differences between the current situation around the reserve stock of our country, pointed out the importance of addressing the issue of differences in the stock fund; and empirical research in national policies permitted by constructing a model of the mean-VaR under the housing fund invested in bank deposits, treasury bonds and guarantee structure and investment ratio of investment housing construction, and to provide the basis for effective investment decisions and take advantage of the latest bank deposits and government bonds interest rate data empirical analysis, the final articles based on empirical the results were summarized to determine the optimal ratio of investment and try to discuss the issue in transition housing fund management center. Based on the current state of the housing provident fund law-making is not comprehensive, fund value-added benefits of ownership are unclear, the article from the establishment of a sound legal system, a clear value-added benefits tenure position, improve the regulatory mechanism, the Quartet risk control policy in the face of precipitation funds investment risk early warning and prevention, in order to optimize the efficiency of capital investment precipitate.

Keywords: *precipitation; mean -VaR model; algorithm*

1. Introduction

Housing provident fund system is an important content of China's urban housing system reform is an important part of China's policy of housing finance system. However, at present, China's overall presence on the housing fund usage is low, precipitate too much money, the investment result is not the ideal situation has affected the role played housing security housing fund. As of March 2014, the actual level housing provident fund deposit 106 million people, total 6.47 trillion deposit, deposit balance of 3.27 trillion. Nationwide more than 30,000 fund underutilized. Therefore, as a social public funds, housing provident fund precipitation funds should be guaranteed under the premise of security, broaden investment channels, to expand the scope of its available bonds, to achieve professional investment diversification.

2. Literature Review

Each fund scholars precipitated definition differs precipitation funds are deducted from individual accounts fund withdrawal, the bank account balance of the loan after storage (ROCKETS, 2013), is deducted from the total fund imputation draw personal, home loans and bonds after the balance (Dai jia gang, 2007), the difference between the two main considerations for different bonds. In this paper, the precipitation housing fund is defined as:

Precipitation funds = total fund imputation - (+ Personal draw total personal loans)

Dai jia gang (2007) using ARIMA and neural network to fund the amount of funds precipitation forecast Jixi City, get quite a large amount of precipitation funds. Feng Changchun (2010) empirical estimates of the optimal proportion of housing provident fund deposits and bonds two kinds of financial products. Liu Wei (2010) that the Fund precipitated the biggest reason is that the game between the various stakeholders, including management center, deposit, banks, developers and so on. Zhang Shu fen (2011) proposed to take a new precipitation funds management, centralized management of funds, improve the management level of housing provident fund to enhance economies of scale funds. Lao Jie Cong (2013) to increase the value of the funds, from the perspective of empirical precipitated fund portfolio recommendations, and data Jixi City housing fund management center based, with the duration of Macaulay concept of precipitation investment funds bank deposit interest rate to quantify the risk, according to the proposed housing fund investment precipitate bank deposits with different maturities optimization. Xu jiu Feng (2013) from the perspective of interest rate changes, put forward countermeasures and suggestions to the effective functioning of the precipitation funds.

In summary, precipitation funds operating inefficiencies caused many domestic scholars to pay more attention, and how the portfolio in order to improve capital efficiency, so as to achieve capital preservation and appreciation of the necessity of having a purpose. The current study of Chinese scholars precipitate fund portfolio strategy of the few, most of its major motivation research, operational mechanism, stakeholder analysis to expand the game, rarely using empirical model Mean-VaR analysis. Thus, the optimization problem by exploring pilot city housing provident fund deposits funds using portfolio theory, in order to achieve precipitation funds to revitalize and improve the utilization of precipitation funds, increasing the value of funds to achieve the purpose of maintaining the interests of the majority of the deposit.

3. Model

Depending on the duration of bank deposits and treasury bonds, consider five investment products when constructing housing fund portfolio, namely 3-month time deposits, time deposits of six months, one-year time deposits, 3 and 5-year bonds year bonds. Due to the low book-entry treasury bonds coupon rate, and prone to illegal trade practices, this article is not included in the book-entry treasury housing fund portfolio.

$$\begin{cases} \min \{ \sigma_p^2 = \mathbf{x}^T \mathbf{G} \mathbf{x} \} \\ \max \{ \mathbf{r}_p = \mathbf{r}^T \mathbf{x} \} \\ \mathbf{e}^T \mathbf{x} = 1 \\ \text{s.t. } \mathbf{x} \in \mathbf{S} \end{cases}$$

Housing fund rate of return of the portfolio is a weighted sum of the interest rate of the five investment products, which is calculated as: $RP = \sum_{i=1}^5 w_i R_i$ (5)

Wherein, RP to yield portfolio, R_i ($i = 1, 2, \dots, 5$) for the various deposits and government bonds interest rates; w_i ($i = 1, 2, \dots, 5$) for the various deposits and Treasury bonds in the portfolio proportion, and $\sum_{i=1}^5 w_i = 1, w_i \geq 0$.

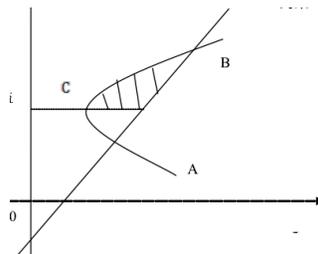


Figure 1. Based on Var and Expected Return under the Restriction of Portfolio Efficient Frontier

4. Empirical Analysis

4.1 Data Description

Through the establishment of different mean duration-VaR model estimates the pilot cities, different optimal scale of investment income products provide a reference for inventory of precipitation capital to achieve capital preservation and appreciation. Therefore, this article from the central bank, the National Statistical Yearbook collected 2004--2013 of different maturities bank deposits, bonds and protection of housing loan interest rates, the use of different investment products 10-year yields, using the mean function of Excel, VAR function and the function respectively COVAR the mean, variance and covariance, that is, its yield of arithmetic mean and covariance matrix, as shown below.

Table 1. The Arithmetic Mean of the Different Investment Rate of Return

Investment	1-year deposit rate of bank	2-year deposits rate of bank	3-year deposits rate of bank	5-year deposits rate of bank	3-year certificate bond yields	5-year certificate bond yields	Protection of housing loan yield
Means	0.02841	0.04902	0.03452	0.04028	0.04429	0.04459	0.04883

Seven kinds of financial products, to calculate the covariance matrix of the following results:

$$\begin{pmatrix}
 0.000044 & 0.000053 & 0.000049 & 0.000051 & 0.000056 & 0.000047 & 0.000026 \\
 0.000053 & 0.000113 & 0.000061 & 0.000063 & 0.000066 & 0.000105 & 0.000022 \\
 0.000049 & 0.000061 & 0.000057 & 0.000059 & 0.000064 & 0.000054 & 0.000028 \\
 0.000051 & 0.000063 & 0.000059 & 0.000062 & 0.000067 & 0.000056 & 0.000030 \\
 0.000056 & 0.000066 & 0.000064 & 0.000067 & 0.000073 & 0.000059 & 0.000034 \\
 0.000047 & 0.000105 & 0.000054 & 0.000056 & 0.000059 & 0.000098 & 0.000018
 \end{pmatrix}$$

Using the above method, estimated at expected earnings, the precipitation housing fund investment ratio in various financial products. In the case does not allow short selling, the integrated use of sequential quadratic programming and rotate solution, optimal investment strategies mean-VaR portfolio expected return model different case, the following table: Taking into account the 2013 official inflation data has not been announced, the article uses the data to predict the Standard Chartered Bank, Standard Chartered Bank forecast 2013 Chinese inflation rate of 4%, and on this basis were estimated inflation rate of the six 0.02841,0.030,0.035,0.040,0.045,0.049 investment ratio case.

Table 2. Rotation Algorithm Based on Optimal Investment Strategies

	x ₁	x ₂	x ₃	x ₄	x ₅	x ₆	x ₇
r ₀ =0.02841	1.000000	0	0	0	0	0	0
r ₀ =0.030	0.922135	0	0	0	0	0	0.077865
r ₀ =0.035	0.677277	0	0	0	0	0	0.322723
r ₀ =0.040	0.432420	0	0	0	0	0	0.567580
r ₀ =0.045	0.187562	0	0	0	0	0	0.812438
r ₀ =0.049	0	0.894788	0	0	0	0	0.105212

Article proportional investment decisions rotation algorithm, specifically applied to 28 pilot cities estimates the proportion of investment in different financial products. According to 2013 the pilot cities housing provident fund deposit balance to give precipitate housing fund portfolio shown in the following table:

Table 3. Pilot Cities Housing Accumulation Fund Portfolio

	$r_0=0.02841$		$r_0=0.049$	
	R_1	R_2	R_7	
Beijing	438.50	392.36	46.14	
Tianjin	579.10	518.17	60.93	
Chongqing	121.85	109.03	12.82	
Tangshan	54.47	48.74	5.73	
Yuncheng	31.00	27.74	3.26	
Baotou	15.94	14.26	1.68	
Dalian	91.31	81.70	9.61	
Changchun	64.93	58.09	6.83	
Hangzhou	33.63	30.09	3.54	
Huainan	40.70	36.42	4.28	
Qingdao	66.90	59.86	7.04	
Jinan	99.17	88.746	10.43	
Fuzhou	13.29	11.89	1.40	
Xiamen	2.86	2.56	0.30	
Luoyang	7.97	7.13	0.84	
Wuhan	47.95	42.91	5.05	
Changsha	34.80	31.14	3.66	
Panzhuhua	42.03	37.61	4.42	
Kunming	81.06	72.53	8.53	
Xian	251.15	224.73	26.42	
Lanzhou	49.25	44.07	5.18	
Xining	39.55	35.39	4.16	
Yinchuan	28.85	25.81	3.04	
Wulumuqi	54.38	48.66	5.72	

4.2 Empirical Analysis

According to the housing fund usage 24 pilot cities, precipitation in the optimal housing fund investment ratio of different products, the proceeds obtained as shown in the following table:

Table 4. Precipitation in the Optimal Housing Fund Investment Ratio

	$r_0=0.02841$	$r_0=0.030$	$r_0=0.035$	$r_0=0.040$	$r_0=0.045$	$r_0=0.049$
Beijing	12.46	13.08	15.04	16.99	18.95	21.49
Tianjin	16.45	17.27	19.86	22.44	25.02	28.38
Chongqing	3.46	3.63	4.18	4.72	5.27	5.97
Tangshan	1.55	1.62	1.87	2.11	2.35	2.67
Yuncheng	0.88	0.92	1.06	1.20	1.34	1.52
Baotou	0.45	0.48	0.55	0.62	0.69	0.78
Dalian	2.59	2.72	3.13	3.54	3.95	4.47
Changchun	1.84	1.94	2.23	2.52	2.81	3.18
Hangzhou	0.96	1.00	1.15	1.30	1.45	1.65
Huainan	1.16	1.21	1.40	1.58	1.76	1.99
Qingdao	1.90	2.00	2.29	2.59	2.89	3.28
Jinan	2.82	2.96	3.40	3.84	4.29	4.86
Fuzhou	0.38	0.40	0.46	0.52	0.57	0.65
Xiamen	0.08	0.09	0.10	0.11	0.12	0.14
Luoyang	0.23	0.24	0.27	0.31	0.34	0.39
Wuhan	1.36	1.43	1.64	1.86	2.07	2.35
Changsha	0.99	1.04	1.19	1.35	1.50	1.71
Panzhuhua	1.19	1.25	1.44	1.63	1.82	2.06
Kunming	2.30	2.42	2.78	3.14	3.50	3.97
Xian	7.14	7.49	8.61	9.73	10.85	12.31

Lanzhou	1.40	1.47	1.69	1.91	2.13	2.41
Xining	1.12	1.18	1.36	1.53	1.71	1.94
Yinchuan	0.82	0.86	0.99	1.12	1.25	1.41
Wulumuqi	1.54	1.62	1.86	2.11	2.35	2.66

5. Main Conclusions and Implications

5.1 Establish a Sound Legal System

With economic development, housing fund operational risk gradually exposed, financial security has become of public opinion, the focus of media attention, the state and government leaders at all levels should make a difference on this issue. At present, China should also be developed as soon as possible "National Provident Fund Law," "housing provident fund deposit Management Law," "housing accumulation fund extraction and loan management approach", "housing fund investment management," revised "Financial Law", "Housing Fund Management Ordinance "build a relatively complete legal system, a clear legal form CMC, the management center, banks and supervisory bodies in which the duties will fund deposit, extraction, loans, investments and other business careful regulate them, and on this basis, strictly enforce the law, create a favorable legal environment, will only precipitate capital investment included in the scope of legal protection, in order to improve the operating efficiency of precipitation funds, in order to ensure the healthy development fund system.

5.2 Explicitly Targeting Value-Added Benefits of Tenure

Property Rights on value-added income housing fund, and in the end is the "name public" or "private name", currently in China's relevant laws or policies yet to be specified. According to the "Regulations", only provides value-added benefits adhere to three principles of distribution, both supplementary fund management center management costs of housing part, there to support the construction of affordable housing part, unclear property rights can easily lead to a series of social problems, become a breeding ground misappropriation of public funds, illegal occupation, a hotbed of corruption. Therefore, the state should be added as soon as possible to define the capital gains on the corresponding risk to provide financial compensation to improve the operational efficiency of capital, improve the fairness and prevent problems that affect social stability generated Society.

5.3 Improve the Regulatory Mechanism

First, the need to strengthen the regulatory functions of the decision-making housing provident fund management committee, the CMC as a decision-making body, the need for considerable expertise and responsible professional attitude in the development of specific regulations and decisions, collective examination and approval system, stipulated that only more than a certain number of decisions before they can take effect, and resolutely prevent the abuse of power and strength, as well as administrative interference caused by the expansion of personal power. Followed by the financial sector housing fund management center of financial supervision, financial sector to develop and set up financial supervision special inspection team responsible for the center, to ensure the recovery of funds, reduce the amount of bad debts bad debts. Finally, the trustee bank should strengthen the "memory bank accounts," the regulation, since the commercial banks currently deposit indicators, housing provident fund deposit has a great dependency, which weakens the supervision of banks.

5.4 Risk Control Strategies

5.4.1 Recent Policy: The Establishment of Specialized Operation Management

At present, all of China's major housing provident fund management committee and by the local fund management center responsible investment funds precipitation, but because most of its personnel belonging to local administrative staff, the lack of knowledge of professional money management, investment mainly in bank deposits Lord, bonds investment ratio is very low. Therefore, in the CMC authorization, fund management center to build investment operations management department, in accordance with the market economy mode of operation and financial management, investment funds dedicated to precipitation operation becomes necessary.

5.4.2 Long-Term Strategy: Transformation into a Housing Bank Guarantee

Although the housing fund management center to achieve capital preservation functions, but as a public institution property fund management unit, subject to the property market investment institutions to participate in the market or likely to cause suspicion. Housing security by local banks due to less policy guidance, based on the "rational economic man" principle, the implementation of due diligence before investing must analyze the potential risks of various investment products, on the basis of seeking policy support, the establishment of normalization of risk early

warning mechanism, funds exit, to prevent the occurrence of bad loans, a direct impact on the bank's liquidity, effective risk control.

6. Summary

Reasonable investment is an important means of increasing the value of the realization of housing provident fund, housing fund is to enhance the ability of the strong support of housing security. According to modern portfolio theory, through empirical analysis the following conclusions. First, bank deposits and the purchase of government bonds are relatively safe investment tool, but there are also interest rate risk, portfolio fund long-term need to focus on. Secondly, by constructing multi-objective programming model housing fund portfolio, found that the investment value of bank deposits with different maturities and bonds vary, priority should be given half the portfolio of deposits and treasury bonds with 3-year period. Third, the half time deposits accounted for 80%, 3-year bonds accounted for 20% of the portfolio has a low risk and a higher rate of return on the fund management centers around the reference significance. From the National Housing Fund investment structure nearly two years, the proportion of government bonds have been falling to below 10%, consider holdings of government bonds in order to increase profitability. Fourth, the value of long-term assets to interest rate changes than more sensitive to short-term assets, so if monetary policy tightening direction to development, with a time limit should be reduced in the proportion of long-term assets, if monetary policy easing, then the opposite.

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